<table>
<thead>
<tr>
<th>Modification Index</th>
<th>Data</th>
<th>Author</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>19/01/2012</td>
<td>SPD</td>
<td></td>
<td>Added Parameter 11360 Pos 0 reset</td>
</tr>
<tr>
<td>29/04/2013</td>
<td>SPD</td>
<td></td>
<td>ADV200 FW 6.00 ASY – SYN</td>
</tr>
<tr>
<td>09/09/2014</td>
<td>CNL</td>
<td></td>
<td>Review Chap 4.2 &amp; 4.3</td>
</tr>
<tr>
<td>04/05/2015</td>
<td>SPD</td>
<td></td>
<td>ADV200 fw version 7.01</td>
</tr>
<tr>
<td>04/05/2015</td>
<td>BCM</td>
<td>CNL</td>
<td>ADV200 Version fw 7.1.3 standard &amp; LC Review Cap 5.1, Cap 5.5.2, Cap 6.8, Cap 6.16</td>
</tr>
<tr>
<td>26/06/2015</td>
<td>BCM</td>
<td>CNL</td>
<td>Reviewed menus and parameters managed by the application</td>
</tr>
<tr>
<td>22-06-16</td>
<td>BRI</td>
<td>CNL</td>
<td>Pag. 11-12: PAR 11480 “Pos Feedback type” to 11588 “Pos Feedback type”, Changed cover</td>
</tr>
<tr>
<td>22-8-16</td>
<td>BCM BRI</td>
<td>CNL</td>
<td>ch 1.1 mod compatibility table, ch 4.4 mod. text, ch. 4.6 add text, ch 6.1 add pars 11304-11506, ch. 6.8 add par 11362</td>
</tr>
<tr>
<td>13-3-17</td>
<td>BCM</td>
<td></td>
<td>chap. 1.1 change compatibility table, review chap. 3.2, review chap. 4.4, chap. 4.6 change text, chap. 4.7 addition, chap. 6.1 added par 11422 and note, chap. 6.9 added note</td>
</tr>
<tr>
<td>12-12-18</td>
<td>BNM-BRI</td>
<td>CNL</td>
<td>Add notes to ch 5.3, 5.5.3 and 6.1 (Pos Jerk), New PAR 11600 “Home Pos Autosave” on ch 6.4</td>
</tr>
</tbody>
</table>

Thank you for selecting this Gefran product.
If you have any information that might help us to improve this manual, do not hesitate to contact us at techdoc@gefran.com.
Before using the product, read the safety instructions section carefully.
Keep the manual in a safe place and available to technical personnel during the product functioning period. Gefran Drives and Motion S.r.l. reserves the right to modify products, data and dimensions without notice. The data indicated are provided for the sole purpose of describing the product and must not be considered as legally binding characteristics.
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1 Introduction

This manual contains all the information necessary for the design, wiring and configuration of a system based on the Positioner application for ADV200.

Chapter 2 - "General description" provides information about system characteristics and functions.

Chapter 3 - "Connection diagrams and system interface" illustrates typical connection diagrams and the command interface for controlling the application via digital I/O or fieldbus.

Chapter 4 - "Commissioning" provides information about installing the application on the ADV200 drive.

Chapter 5 - "Control logic and sequences" contains detailed information about application functions and operating modes.

Chapter 6 - "List of Parameters" contains the complete list of system parameters with a description of their functions.

1.1 Compatibility Application version / Drive firmware

<table>
<thead>
<tr>
<th>POS</th>
<th>Drive Firmware</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5.16.2</td>
<td>&gt; 7.3.11</td>
</tr>
<tr>
<td>2.3.16.1</td>
<td>7.3.11</td>
</tr>
<tr>
<td>2.3.16.0</td>
<td>7.X.7</td>
</tr>
<tr>
<td>2.2.16</td>
<td>7.1.3</td>
</tr>
<tr>
<td>2.6.16.2</td>
<td>7.5.16</td>
</tr>
</tbody>
</table>
2 General description

The system controls positioning of mechanical loads using a Gefran ADV200 drive to control asynchronous motors with speed sensor feedback. The Positioner application requires at least firmware version 3.0.0 of the ADV200 drive and of the relative optional encoder signal acquisition cards; some typical configurations are illustrated in section 3.3 "Suitable encoder configurations".

Characteristics of the Positioner application for ADV200:

- Choice of zero position search modes, using a zero sensor, encoder zero marker, or both. If an absolute position sensor is used, the zero search is only performed once at the time of commissioning.
- Independent selection of the position and speed sensors:
  - in case of a positive connection between motor and load (mechanically interlocked connection, e.g. rack and pinion), the position sensor can also be the speed sensor connected to the motor, whether incremental or absolute.
  - in case of a non-positive connection between motor and load (mechanically non-interlocked connection, e.g. wheel on track), the position sensor may also be a second external transducer connected positively to the load. This too can be incremental or absolute, rotary or linear, depending on the application.
- Absolute encoder emulation mode, which allows the position value read by an incremental encoder to be stored in the non-volatile memory avoiding the need to repeat the zero search each time the drive is restarted or reset.
- Possibility of selecting position feedback via analog input.
- Positioning commands controlled via digital I/O (positioning tables with 64 position presets) or fieldbus (free-choice profile positioning)
- Positioning can be performed in absolute or incremental mode or with reference to a touch probe signal and can be programmed independently for the first 8 position presets.
- Trapezoidal or S-ramp positioning profile.
- Position values can be expressed in user-defined units of measure.
- Trapezoidal or S-ramp positioning profile (the latter is currently being developed). Position values can be expressed in user-defined units of measure.
- Jog function with continuous mode or programmable step.
- Control of hardware and software limits for limiting the positioning field.
- Position teach function.
- Backlash recovery function.
- Positioning cam function: activation of digital outputs in correspondence with user-definable position ranges.
- Rotary axis function for managing continuous rotation in one direction with positions within a fixed range and management of remainders generated by mechanical coupling.
- Sequential positioning function for sequence automation.
- Virtual axis function, for converting coordinates defined by specific geometries applied to the positioning axis (e.g. pantograph lift).
- Support for the ADV200 native local/remote control mode that enables easy switching from position control to speed control and vice versa.
- V/f Positioner” mode for positioning control with no speed loop (drive in V/f control mode); this requires a motor-mounted or external encoder dedicated exclusively to position reading.
2.1 Fields of application

The Positioner application is particularly recommended for use in the following sectors:

**Material Handling**
- 2 or 3-axis gantries
- Stackers / De-stackers
- Pick & Place

**Transport**
- Trolleys
- Hoisting equipment
- Vehicles on rails

**Logistics**
- Rack feeders for automated warehouses
- Shuttles
3 Connection diagrams and system interface

3.1 Control via digital inputs and outputs

The example below shows a typical configuration of the digital inputs and outputs of the drive with EXP-IO-D6A4R1-ADV expansion card.

This configuration enables zero searches using a sensor and positioning operations by selecting one of the first 16 available position presets.

The **IPA 11202 Preset Conf (POSITIONER CONF menu)** parameter must be set to Digital. The digital input signals must be set as shown in the figure in the DIGITAL INPUTs menu. The digital output signals relating to the application must be set in the DIGITAL OUTPUTs menu to a specific "Pad" variable; configuration must then be completed in the DIGITAL OUTPUTS menu of the drive (setting Digital output x src = Pad y).

![Figure 3.1: Layout of I/Os of ADV200 with EXP-IO-D6A4R1-ADV](image)

---

**Recommended programming of I/O terminals (regulation + expansion)**

<table>
<thead>
<tr>
<th>Dig Input E</th>
<th>Enable (not programmable)</th>
<th>Digital output 1</th>
<th>Drive ready</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dig Input 1</td>
<td>POS 0 search</td>
<td>Digital output 2</td>
<td>Drive Enable</td>
</tr>
<tr>
<td>Dig Input 2</td>
<td>POS Start pos</td>
<td>Digital output 3</td>
<td>Pos Zero Found</td>
</tr>
<tr>
<td>Dig Input 3</td>
<td>POS 0 Sensor</td>
<td>Digital output 4</td>
<td>Pos Reached</td>
</tr>
<tr>
<td>Dig Input 4</td>
<td>POS-Preset 0</td>
<td>Digital output 1X</td>
<td>Position error</td>
</tr>
<tr>
<td>Dig Input 5</td>
<td>POS-Preset 1</td>
<td>Digital output 2X</td>
<td>n.a.</td>
</tr>
</tbody>
</table>
3.2 Control via fieldbus interface

The example below shows a typical configuration of the digital inputs and outputs provided with the drive regulation card and an assignment of process data on a fieldbus interface card; the latter must be installed in slot 3 dedicated to expansion cards.

Since process data are assigned in the parameters in the drive COMMUNICATION menu, the settings described below are applicable regardless of the type of fieldbus used.

The digital input signals must be set as shown in the figure in the DIGITAL INPUTs menu, where they are assigned to the regulation card terminals or to the control word bits (Word decomp).

The digital output signals must be set as shown in the figure in the DIGITAL OUTPUTs menu, where they are assigned to the regulation card terminals or to the status word bits (Word comp); an application status word can also be mapped in the process channel (see IPA 12046 Pos status), bringing together all the digital output signals defined in the DIGITAL OUTPUTs menu so that the Word comp can be used for other signals.

Figure 3.2.1: Layout of I/Os of ADV200 with EXP--Fieldbus
Recommended programming of I/O terminals (regulation only)

<table>
<thead>
<tr>
<th>Dig Input</th>
<th>Function</th>
<th>Digital output</th>
<th>Function</th>
<th>Digital output</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>Enable (not programmable)</td>
<td>1</td>
<td>Drive ready</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>POS 0 Search</td>
<td>2</td>
<td>Drive Enable</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>POS Start pos</td>
<td>3</td>
<td>Pos Zero Found</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>POS 0 Sensor</td>
<td>4</td>
<td>Pos Reached</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>End Run Reverse</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>End Run Forward</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Assignment of process data

<table>
<thead>
<tr>
<th>Fieldbus M-&gt;S1</th>
<th>Fieldbus S-&gt;M1</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pos Preset 0 (*)</td>
<td>Actual position (*)</td>
<td></td>
</tr>
<tr>
<td>Fieldbus M-&gt;S2</td>
<td>Fieldbus S-&gt;M2</td>
<td>Pos Status (*)</td>
</tr>
<tr>
<td>Fieldbus M-&gt;S3</td>
<td>Fieldbus S-&gt;M3</td>
<td>Word comp</td>
</tr>
<tr>
<td>Fieldbus M-&gt;S4</td>
<td>Fieldbus S-&gt;M4</td>
<td>Destination Pos</td>
</tr>
<tr>
<td>Fieldbus M-&gt;S5</td>
<td>Fieldbus S-&gt;M5</td>
<td>Motor Speed</td>
</tr>
<tr>
<td>Fieldbus M-&gt;S6</td>
<td>Fieldbus S-&gt;M6</td>
<td>Output current</td>
</tr>
</tbody>
</table>

(*) assigned automatically with the "Commands Mode = Fieldbus" parameter

In this case ("Commands Mode = Fieldbus") the first two input and output process data must be configured as follows:

1) If the format selected in IPA 11582 Pos Preset 0 Type, IPA 11582 Pos Preset 0 Type and IPA 11586 Actual position Type is "Floating point"

Menu COMMUNICATION / FIELDBUS M2S

<table>
<thead>
<tr>
<th>Ipa</th>
<th>Parameter Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>4020</td>
<td>Fieldbus M-&gt;S 1 ipa</td>
<td>0</td>
</tr>
<tr>
<td>4022</td>
<td>Fieldbus M-&gt;S 1 sys</td>
<td>Mdplc32</td>
</tr>
<tr>
<td>4030</td>
<td>Fieldbus M-&gt;S 2 ipa</td>
<td>0</td>
</tr>
<tr>
<td>11186</td>
<td>Fieldbus M-&gt;S 2 sys</td>
<td>Mdplc32</td>
</tr>
</tbody>
</table>

Menu COMMUNICATION / FIELDBUS S2M

<table>
<thead>
<tr>
<th>Ipa</th>
<th>Parameter Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>4180</td>
<td>Fieldbus S-&gt;M 1 ipa</td>
<td>4184</td>
</tr>
<tr>
<td>4182</td>
<td>Fieldbus S-&gt;M 1 sys</td>
<td>Mdplc32</td>
</tr>
<tr>
<td>4190</td>
<td>Fieldbus S-&gt;M 2 ipa</td>
<td>4194</td>
</tr>
<tr>
<td>4192</td>
<td>Fieldbus S-&gt;M 2 sys</td>
<td>Mdplc16</td>
</tr>
</tbody>
</table>

1) If the format selected in IPA 11582 Pos Preset 0 Type, IPA 11582 Pos Preset 0 Type and IPA 11586 Actual position Type is “Integer”

Menu COMMUNICATION / FIELDBUS M2S

<table>
<thead>
<tr>
<th>Ipa</th>
<th>Parameter Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>4020</td>
<td>Fieldbus M-&gt;S 1 ipa</td>
<td>0</td>
</tr>
<tr>
<td>4022</td>
<td>Fieldbus M-&gt;S 1 sys</td>
<td>Mdplc16</td>
</tr>
<tr>
<td>4030</td>
<td>Fieldbus M-&gt;S 2 ipa</td>
<td>0</td>
</tr>
<tr>
<td>11186</td>
<td>Fieldbus M-&gt;S 2 sys</td>
<td>Mdplc16</td>
</tr>
</tbody>
</table>

Menu COMMUNICATION / FIELDBUS S2M

<table>
<thead>
<tr>
<th>Ipa</th>
<th>Parameter Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>4180</td>
<td>Fieldbus S-&gt;M 1 ipa</td>
<td>4184</td>
</tr>
<tr>
<td>4182</td>
<td>Fieldbus S-&gt;M 1 sys</td>
<td>Mdplc16</td>
</tr>
<tr>
<td>4190</td>
<td>Fieldbus S-&gt;M 2 ipa</td>
<td>4194</td>
</tr>
<tr>
<td>4192</td>
<td>Fieldbus S-&gt;M 2 sys</td>
<td>Mdplc16</td>
</tr>
</tbody>
</table>
As of version 2.5.16.2 of the Positioner and ADV200 > FW7.3.11, limits have been eliminated to mapping Positioner parameters on process channel M2S and S2M. Therefore, unless there are reasons concerning compatibility with previous installations, you are advised to leave parameter IPA 11572 **Commands mode** at the **Digital** default value and directly map the IPAs in question on process channels M2S and S2M. Be careful to assign the type of exchange to **Par 32** or **Par 16** depending on whether the mapped parameter is 32bit or 16bit. Float parameters are to be assigned as **Par 32**.

The following is an example of programming with parameter IPA 11572 **Commands mode** set to **Digital**:

**Assignment of process data:**

<table>
<thead>
<tr>
<th>Process Data</th>
<th>Fieldbus M-&gt;S1</th>
<th>Fieldbus M-&gt;S2</th>
<th>Fieldbus M-&gt;S3</th>
<th>Fieldbus M-&gt;S4</th>
<th>Fieldbus M-&gt;S5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pos Preset</td>
<td>Pos Speed</td>
<td>Pos Acc</td>
<td>Pos Dec</td>
<td>Word decomp</td>
<td></td>
</tr>
</tbody>
</table>

**Menu COMMUNICATION / FIELDBUS M2S**

<table>
<thead>
<tr>
<th>Ipa</th>
<th>Parameter Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>4020</td>
<td>Fieldbus M-&gt;S 1 ipa</td>
<td>11026</td>
</tr>
<tr>
<td>4022</td>
<td>Fieldbus M-&gt;S 1 sys</td>
<td>Par 32</td>
</tr>
<tr>
<td>4030</td>
<td>Fieldbus M-&gt;S 2 ipa</td>
<td>11154</td>
</tr>
<tr>
<td>4032</td>
<td>Fieldbus M-&gt;S 2 sys</td>
<td>Par 32</td>
</tr>
<tr>
<td>4040</td>
<td>Fieldbus M-&gt;S 3 ipa</td>
<td>11170</td>
</tr>
<tr>
<td>4042</td>
<td>Fieldbus M-&gt;S 3 sys</td>
<td>Par 32</td>
</tr>
<tr>
<td>4050</td>
<td>Fieldbus M-&gt;S 4 ipa</td>
<td>11186</td>
</tr>
<tr>
<td>4052</td>
<td>Fieldbus M-&gt;S 4 sys</td>
<td>Par 32</td>
</tr>
<tr>
<td>4060</td>
<td>Fieldbus M-&gt;S 5 ipa</td>
<td>4452</td>
</tr>
<tr>
<td>4062</td>
<td>Fieldbus M-&gt;S 5 sys</td>
<td>Count 16</td>
</tr>
</tbody>
</table>

**Menu COMMUNICATION / FIELDBUS S2M**

<table>
<thead>
<tr>
<th>Ipa</th>
<th>Parameter Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>4180</td>
<td>Fieldbus S-&gt;M 1 ipa</td>
<td>12010</td>
</tr>
<tr>
<td>4182</td>
<td>Fieldbus S-&gt;M 1 sys</td>
<td>Par 32</td>
</tr>
<tr>
<td>4190</td>
<td>Fieldbus S-&gt;M 2 ipa</td>
<td>12046</td>
</tr>
<tr>
<td>4192</td>
<td>Fieldbus S-&gt;M 2 sys</td>
<td>Par 16</td>
</tr>
<tr>
<td>4200</td>
<td>Fieldbus S-&gt;M 3 ipa</td>
<td>4432</td>
</tr>
<tr>
<td>4202</td>
<td>Fieldbus S-&gt;M 3 sys</td>
<td>Count 16</td>
</tr>
</tbody>
</table>
3.3 Suitable encoder configurations

Version 3.0.0 of the firmware for the ADV200 drive supports various optional cards for acquiring encoder signals. It can manage up to three. The following optional cards are available:

Single encoder management

- **EXP-DE-I1R1F2-ADV** Digital Incremental Encoder (DE)
- **EXP-SE-I1R1F2-ADV** Incremental Sinusoidal Encoder (SE)
- **EXP-SESC-I1R1F2-ADV** Incremental Sinusoidal + Absolute SinCos Encoder (SESC)
- **EXP-EN/SSI-I1R1F2-ADV** Incremental Sinusoidal + Absolute Endat + SSI Encoder (SE-EnDat/SSI)
- **EXP-EN/SSI-I1R1F2-ADV** Incremental Sinusoidal + Absolute Hiperface Encoder (SE-Hiperface)
- **EXP-RES-I1R1-ADV** Resolver (Requires ADV200 FW7.0.1 and higher) (RES)
- **EXP-ASC-I1R1F2-ADV** Absolute SinCos Encoder (Requires ADV200 FW7.0.1 and higher) (ASC)

Double encoder management

- **EXP-DE-I2R1F2-ADV** Dual Digital Incremental Encoder (2 x DE)

For details about use of the SLOTs for ADV200 optional cards, reference should be made to section 11.5.1 of the ADV200 Quick Start Guide.

The “V/f Positioner” function was introduced with Positioner for version 6.0.0 of the ADV200 so that positioning can be controlled without a motor speed loop. This mode is enabled with parameter **IPA 11598 Positioner conf**, which must be set to the same value as parameter **IPA 552 Regulation mode**.

The functions of “V/f Positioner” mode are described in paragraph 3.3.3. The encoder configurations listed below are applicable if the drive needs to control a speed loop, with the transducer installed on the motor, and a position loop, where the transducer may or may not be the speed loop transducer.

Parameter **IPA 552 Regulation mode** must be set to “Flux vector CL” (closed loop speed control), and parameter **IPA 11598 Positioner conf** to “CL Positioner”.

The encoder that closes the speed loop is selected with drive parameter **IPA 5310 Encoder sel src**. The position encoder is selected with application parameters **IPA 11556 Position feedback** and **IPA 11588 Position feedback Type**.

3.3.1 Positive connection between motor and load (mechanically interlocked connection)

In this case the position encoder may also be the speed loop encoder installed on the motor; this may be either incremental or absolute and in the latter case the zero search is only performed once during commissioning of the application. The encoder card must be installed in SLOT 2, while SLOTs 1 and 3 can be used for the digital I/O expansion or fieldbus interface.
IPA 5310  Encoder sel src = Null  (Encoder 1 speed loop)
IPA 11556 Position feedback = Main Encoder

IPA 11588 Position feedback type = Incremental (DE, SE, SESC)
    Absolute (SE-EnDat/SSI, SE-Hiperface)

3.3.2   Non-positive connection between motor and load (mechanically non-interlocked connection)

In this case the position encoder cannot also be the speed loop encoder installed on the motor. A second incremental or absolute encoder is needed. This must be positively connected to the load.

Example A: Digital motor encoder and digital position encoder

Example B: Digital motor encoder and absolute position encoder

IPA 5310  Encoder sel src = Null  (Encoder 1 speed loop)
IPA 11556 Position feedback = Encoder 2
IPA 11588 Position feedback type = Incremental

A zero search is requested each time the drive is turned back on or reset.

Figure 3.3.2: Installation of double encoder card in Slot 2

Figure 3.3.3: Installation of speed encoder card in Slot 2 and position encoder card in Slot 1
IPA 5310 Encoder sel src = One (Encoder 2 speed loop)
IPA 11556 Position feedback = Main Encoder
IPA 11588 Position feedback type = Absolute

A zero search is only requested during commissioning.

### 3.3.3 V/f Positioner

(Available in Expert mode)

In this mode the positioner configuration parameter IPA 552 Regulation mode must be set to “V/f control” (open loop speed control), and parameter IPA 11598 Positioner conf to “V/f Positioner”.

There must be one encoder dedicated entirely to position reading; the drive is therefore provided with an optional card to acquire data from one of the supported encoders.

The encoder in question may be installed on the motor shaft or coupled directly to the load; in the latter case the mechanical scale factors must be calculated and set (see parameters IPA 11214 Gear NUM and IPA 11216 Gear DEN).

In this operating mode, position control is less precise and dynamic than with closed loop speed control. In this case, there is no strict monitoring of correspondence between the current position and the position requested by the profile generator and a certain misalignment is tolerated between the requested profile and the motor speed, which is not known (open loop). The application determines the moment the deceleration ramp starts according to the space covered, obtained from the encoder reading, and monitors the position error during the deceleration ramp.

This function is useful if, due to the mechanical configuration, the load is not compatible with particularly strict control, or if the closed loop vector control mode cannot be set, for example to control several motors connected in parallel to the same drive.
4 Commissioning

4.1 General information

This section describes a standard application commissioning procedure. The preliminary operations for commissioning ADV200 drives are described in chapter 7 of the "ADV200 Quick Start Guide - Specifications and connection".

4.2 Requirements

The Positioner application for ADV200 requires at least firmware version 3.0.0 with the relative optional cards for encoder signal acquisition. To install the application you must have a PC, version 1.6.5 or higher of the Gefran GF Express software with Catalog, the drive RS485 - PCI COM connection kit and the Positioner application file (downloadable from the Gefran website http://www.gefran.com/en/products/250-adv200-field-oriented-vector-inverter#downloads)

The Positioner application set-up contains an automatic procedure that copies the required files in the specific folders of the GF Express catalog.

Through GF Express is possible to use "Download firmware" command on the toolbar. This command will open a drop-down menu where all the downloadable applications compatible with the drive fw are listed.

By choosing the desired application, the window "Download firmware" will open with the field: "File to download" and the indication of all the applications that are compatible with the drive used.

If you have not installed applications (only the PID is installed by default as application 1) Download Firmware window will be empty. The user will need to manually select the file "*. FL2" to download.
4.3 Preliminary operations

- Check the connections, paying particular attention to shielding (see standard wiring diagrams) in order to reduce interference to a minimum, especially on encoders.
- Set the **IPA 558 Application Select** parameter to the application where you wish to load the Positioner (Application 1 or Application 2).
- If the Positioner application firmware is not already installed, download it using the GF-Express "Download firmware" utility.
- Files called "filename___A1fl2" enable the firmware to be downloaded to Application 1, files named "filename___A2.fl2" enable the firmware to be downloaded to Application 2.

**Note!** the ADV200 drive is supplied with the PID application installed in Application 1; to avoid overwriting this application, we recommend downloading the firmware to Application 2.

- Send a "Drive reset" command.
- Open the drive parameters file containing the Positioner parameters (advpositioner.gfe).
- Send the "Load default drive values" command from the configurator Parameters menu to load the default parameters.
- First send a “Save parameter into target” command, then “Drive reset”.

4.4 Drive parameters managed by the application

**Drive reference necessary to the application:**

- Default Speed reference output for **sysPad16 system (IPA 3730)**
- Default Disable Command for **sysPad15 system (IPA3728)**
- Command to Disable Integral Speed Gain for **sysPad1-16 system (IPA3700-3730)**
- Status info for digital outputs for the system **sysPad1-16 (IPA3700-3730)**

**As of version 2.3.16.0 of Positioner and ADV200 FW7.0.7, or higher,** the output of the control is **sysPad16**, it corresponds to parameter IPA3730. For the proper functioning of the application it must be assigned IPA 3730 to IPA 650 **Speed ref 1 src** (or IPA 652 **Speed ref 2 src**). It is also recommended to set IPA 556 **Control mode select** to “Speed”. If not, make sure that the Reference Ramp block is not active (default value of IPA 610 is set to “analog input” and may add a not required reference value if there is a high level of offset).

**As of version 2.3.16.0 of Positioner and ADV200 FW7.3.11 or higher,** the outputs of the control (related to speed reference and system disable command), are programmable from selection lists (IPA 11418 **Pos Spd Out Dest** e IPA 11420 **Pos FS Out Dest**). For compatibility with previous version the selection lists defaults are respectively **Pad 16** and **Pad 15**, but with regard to IPA 11418 **Pos Spd Out Dest**, you can directly assign the output to **Speed ref 1** or **Speed ref 2**.

**As of version 2.5.16.2 of the Positioner and ADV200 > FW7.3.11,** support for management of mechanical stops has been introduced via a new command (IPA 11422 **Pos Spd Reg I D Dest**), assignable to the relative system command IPA 2244 **Speed reg I dis src** via outputs **sysPad1-16**.

For details, see section 4.7 “Support for management of mechanical stops.”

**COMMANDS menu**

*Only if the Fast Stop command is assigned, it is necessary:*

IPA 1004 Enable/Disable mode

- FS&Spd=0, to disable the torque control to the motor at the end of the Fast Stop ramp time
- Off, to keep torque control at the end of the Fast Stop ramp time

IPA 1022 FastStop src = Pad 15
4.5 Enable and drive commands

The ADV200 Positioner application uses its own coding system for commands relating to its functions (jog, zero search and positioning); therefore, parameter IPA 1000 Commands remote sel must be mandatory set to “Digital” and commands assignments must be done directly on application’s DIGITAL INPUTs menu. The signals and positioner management sequences are described in chapter 5.

The low-level enable signal of the drive (digital input Enable, terminal 7 of the regulation card) can be managed in two different ways:

1- Via the digital signal at the Enable terminal (wired): in this case, parameters IPA 1018 Digital Enable src and IPA 1020 Digital Start src must be set to “Digital input E mon”.
2- Via field bus: in this case the Enable terminal is usually connected to the auxiliary 24 Vdc signal by a jumper, and thus always active. The axis is enabled by controlling a bit in the control word (word decomp), by setting parameters IPA 1018 Digital Enable src and IPA 1020 Digital Start src both to “Bitx decomp mon”.

4.6 Support for Local / Remote control modes

Starting from the Positioner associated to the FW 6.0.0 ASYN /SYN of ADV200, the speed reference chain and that of the application commands have been isolated from the native “Remote” command mode of the ADV200 drive; in this mode, the drive is able to run in position control mode provided that:

- The drive is in “Remote” mode with the factory settings for parameters IPA 1014 Local/remote src and IPA 1012 Digital local/remote

- Parameter IPA 1000 Commands remote sel is set to Digital: the enable commands are thus associated with the settings of IPA 1018 Digital Enable src and IPA 1020 Digital Start src (assigned as described in par. 4.5), whereas the commands for the various positioner functions (zero search, jog, positioning) are assigned in the POSITIONER/DIGITAL INPUTs menu of the application.

- The ramp 1 reference chain is active; the Positioner application writes to IPA 600 Dig ramp ref 1 which represents the speed reference for the drive.

If the drive is set to “Local” control mode by appropriately setting parameters IPA 1014 Local/remote src and IPA 1012 Digital local/remote, it is able to run in speed control mode provided that:

- Parameter IPA 1002 Commands local sel is set to Terminal: the enable command is thus associated with terminal 7 (Digital Input E), while the run command is assigned with parameter IPA 1016 Terminal Start src.

- Starting from Positioner V2.3 and ADV200 FW7.1.3, the speed reference selection can be assigned freely by programming parameter of the Ramp reference block (e.g. to IPA 614 Ramp ref 3 src)

The two modes, position control and speed control, are mutually exclusive and the drive must be disabled to switch from one to the other.

Correct management of the conditions associated with such switching is clearly the responsibility of the user.

As of version 2.3.16.0 of Positioner and ADV200 FW7.3.11 or higher, in addition to the control mode Local / Remote, you can use a dedicated digital command for enabling / disabling the Positioner application.

This command is freely assignable by the parameter IPA 11362 Appl Enable and the application status is described as follow:

<table>
<thead>
<tr>
<th>Appl Enable</th>
<th>Local/Remote</th>
<th>POS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>X</td>
<td>Disabled</td>
</tr>
<tr>
<td>1</td>
<td>Local</td>
<td>Disabled</td>
</tr>
<tr>
<td>1</td>
<td>Remote</td>
<td>Enabled</td>
</tr>
</tbody>
</table>
4.7 Support for management of mechanical stops

In applications where mechanical stops have to be reached with application of constant torque, the mechanical axis controlled by the drive is brought to the stopping point by means of held jog or positioning commands. The torque applied to the motor increases up to the set system limit.

To correctly manage release of the delivered torque, management of a new control output has been added to directly interface the Positioner logic with the motor control part after the command is removed.

The new command, assignable via outputs sysPad1-16, is programmed via IPA 11422 Pos Spd Reg I D Dest.

Interface with the motor control part is obtained by assigning the output sysPad1-16, previously programmed in IPA 11422 Pos Spd Reg I D Dest, to the relative system command IPA 2244 Speed reg I dis src.
5 Control logic and sequences

5.1 Application control modes

The input and output signals of the Positioner application for ADV200 drives and the relative sequences are managed by a superordinate control device such as a PLC or IPC. The application can thus be controlled via discrete digital I/O (digital input and output terminals on the ADV200 regulation card and any expansion cards, such as EXP-IO-D6A4R1-ADV); however, due to the number of input and output terminals available (9 digital inputs and 6 digital outputs with the expansion card installed), control via digital I/O is clearly limited: for example, simply selecting all of the 64 available position presets uses up 6 digital inputs programmed as POS-Preset 0 - 5. Therefore, except in particularly straightforward cases requiring management of a limited number of fixed positions, the use of a fieldbus interface is recommended (Profibus, DeviceNet, CANopen, EtherCAT, GDNET); besides overcoming the limit on the number of digital signals that can be managed, this also enables free-choice profile positioning, in which the positioning and speed values can be modified in the same way as process data. Moreover, the fieldbus configuration channel enables access to all drive and application parameters in read and write mode.

5.2 Jog function

The Jog function can be used to move the axis controlled by the Positioner application during servicing, without carrying out a zero search. The Jog function commands that are used are the Jog Forward and Jog Reverse digital input signals in the DIGITAL INPUT's menu of the application; the "Jog cmd + src" and Jog cmd - src" commands in the JOG FUNCTION menu of the drive are not used. The speed and acceleration parameters are IPA 910 Jog setpoint, IPA 912 Jog acceleration and IPA 914 Jog deceleration, respectively, in the JOG FUNCTION menu of the ADV200 drive. The motor starts the acceleration ramp when one of the two jog commands is enabled (these are mutually exclusive). The motor continues at the jog speed for as long as the command remains active and starts the deceleration ramp when the command is disabled. When the Jog Forward command is active the motor turns clockwise, the Jog Reverse command turns it anti-clockwise, as seen from the shaft side. The Jog function without a zero point that is valid for the system (digital signal Pos Zero Found = 0) is performed in speed control mode in exactly the same way as the drive JOG FUNCTION; once a zero search has been performed, so that the digital signal is Pos Zero Found = 1, the Jog function is performed in position control mode and is the equivalent of a positioning operation to a software limit position (parameters IPA 11228 Max Prs Abs Val and IPA 11230 Min Prs Abs Val of the POSITION LIMIT menu). The axis therefore stops on the hardware and software limits.

5.2.1 Jog Step Function

When the Jog Step function is enabled by setting the IPA 11580 Enable Jog Step parameter to On in the POS JOG STEP menu, it replaces the Jog function described above, making it possible to perform a positioning step with the value set in the IPA 11436 Jog Step parameter (expressed in user units for the position) with each Jog Forward or Jog Reverse command. The command must remain active until the step is complete. The active command and the sign of the Jog Step parameter define the direction of the step. The speed and the acceleration and deceleration ramps are those described above for the Jog function.

5.3 Zero search

The zero search procedure is necessary for positioning operations and the relative parameters must be set in the DIGITAL INPUTs and ZERO FOUND CONF menus. For systems with an incremental position encoder, IPA11588 Pos feedback Type must be set to "Incremental"; this means that each time the drive is turned back on or reset, the Pos Zero Found digital output signal is reset to zero and the zero search procedure must be repeated. For systems with an absolute position encoder (SSI, EnDat, Hiperface) the IPA11588 Pos feedback Type parameter must be set to "Absolute" and the zero search procedure is only
performed during commissioning or following operations that alter the mechanical coupling between the encoder and the system.
There is also another way of emulating the behaviour of the system with an absolute encoder, even if the position is measured by an incremental encoder.
When parameter IPA11588 Pos feedback Type is set to “Inc Abs” the zero search procedure must be performed at least once during startup or when the drive is reset, for example following a power supply failure during a movement.
The position value read by the encoder is stored in the non-volatile memory each time the drive is restarted or reset, so that it can always be displayed correctly by the Actual Position parameter.

The digital output signal Pos Zero Found is managed consistently, i.e. it always remains active once the first zero search has been completed.

**NB:** if a power supply failure occurs during a positioning procedure, there could be a discrepancy between the position value saved by the application prior to the power failure and the actual value of the axis position. In that case we recommend repeating the zero search procedure.

**NB:** With this setting of parameter Pos feedback Type the Startup Zero Pos parameter is forced to On and must not then be modified.

Generally speaking, the zero search procedure is launched by activating the digital input signal Pos 0 Search; the end of the procedure is indicated by the setting (0->1) of the digital output signal Pos Zero Found.
The Home Pos Offset parameter can be used to set an offset on the zero position; this parameter is expressed in user units with a sign and is algebraically added to the actual position. Alternatively, the Zero init pos parameter can be used, to initialise the zero position using a user-defined value after sending the zero search command, even with the drive disabled.
The zero search procedure can be performed in different ways, depending on the reference signals used:
- Using the zero sensor and the encoder reference (default method)
- Using the zero sensor only
- Using the encoder reference (function available also for feedback as Resolver or Abs SinCos)
- Using the “Startup Zero Pos” parameter

**Note!** At the end of the zero search procedure, all parameters are automatically saved.
If it is not required, disable the Autosave procedure setting the parameter Home Pos AutoSave (PAR 11600) = OFF.
5.3.1 Zero search using the zero sensor and the encoder reference (default)

Requirements:
Zero sensor connected to a digital input programmed as Pos 0 Sensor.
Parameter Zero Sensor En = Enabled.
Parameter Zero Index En = Enabled.

Figure 5.3.1: Zero search using sensor and encoder reference

1) Enable the drive: set digital input "Enable" to high logic status.
2) Enable (high logic status) the digital input programmed as POS 0 Search.
3) When the motor receives the POS 0 Search command, it starts in the direction set in Home Src Direc (Positive =clockwise motor rotation) at the Home Spd Ref reference speed. When the sensor is engaged (POS 0 Sensor high) the motor changes direction and Home Fine Spd becomes the active speed reference. The motor stops at the first encoder reference after clearing the sensor (POS 0 Sensor low). The position of the encoder reference is acquired as position 0.

If the zero sensor is engaged (POS 0 Sensor high), the motor starts in the opposite direction to that indicated by the Home Srp Direc parameter (Positive = the motor turns anti-clockwise) at the Home Fine Spd reference speed. The motor stops at the first encoder reference after clearing the sensor (POS 0 Sensor low). The position of the encoder reference is acquired as position 0. The Inside Index Src parameter can be used to enable reading of the encoder reference with the zero sensor engaged. The Zero Sensor Edge parameter can be used to select the active edge of the zero sensor.

If the appropriate limit is engaged before the sensor (digital input signal End Run Forward with positive speed or End Run Reverse if negative), the motor inverts its direction of rotation and maintains the Home Spd Ref speed reference. When the sensor is engaged (POS 0 Sensor high), Home Fine Spd becomes the active speed reference, but the motor does not invert its direction and stops when the sensor is cleared (POS 0 Sensor low).

This position is acquired as position 0; this is useful when the zero sensor is not at one of the ends of the working stroke.

These examples are illustrated in detail in the figures below.
**Figure 5.3.2** Zero search using sensor and encoder reference: first search direction positive

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**Detail:**
- **Home Src Direc** = Positive

IPA 11004 Zero Sensor En = On, IPA 11008 Zero Index En = On
IPA 11002 Home Src Direc = Positive
Speed 1 = IPA 11016 Home Spd Ref
Speed 2 = IPA 11018 Home Fine Spd

IPA 11010 Inside Index Src = Off, IPA 11006 Zero Sensor Edge = Rising
- CW rotation
- Speed 1
- Speed 2

IPA 11010 Inside Index Src = On, IPA 11006 Zero Sensor Edge = Rising
- Speed 1
- Speed 2

IPA 11010 Inside Index Src = On, IPA 11006 Zero Sensor Edge = Falling
- Speed 1
- Speed 2

IPA 11010 Inside Index Src = Off, IPA 11006 Zero Sensor Edge = Falling
- Speed 1
- Speed 2
Figure 5.3.3: Zero search using sensor and encoder reference: first search direction negative
5.3.2 Zero search using the zero sensor only

Requirements:
Parameter **Zero Sensor En** = Enabled.
Parameter **Zero Index En** = Disabled.

Figure 5.3.4: Zero search using the sensor only

1) Enable the drive: set digital input "Enable" to high logic status.
2) Enable (high logic status) the digital input programmed as **POS 0 Search**.
3) When the motor receives the **POS 0 Search** command, it starts in the direction set in **Home Src Direc** (Positive = anti-clockwise motor rotation) at the **Home Spd Ref** speed reference. When the sensor is engaged (POS 0 Sensor high) the motor changes direction and **Home Fine Spd** becomes the active speed reference. The motor stops when the sensor is cleared (POS 0 Sensor low). This position is acquired as position 0.

If the zero sensor is engaged (POS 0 Sensor high), the motor starts in the opposite direction to that indicated by the Home Src Direc parameter (Positive = the motor turns anti-clockwise) at the Home Fine Spd reference speed. The motor stops when the sensor is cleared (POS 0 Sensor low). This position is acquired as position 0. The **Zero Sensor Edge** parameter can be used to select the active edge of the zero sensor.

If the appropriate limit is engaged before the sensor (digital input signal **End Run Forward** with positive speed or **End Run Reverse** if negative), the motor inverts its direction of rotation and maintains the Home Spd Ref speed reference. When the sensor is engaged (POS 0 Sensor high), Home Fine Spd becomes the active speed reference, but the motor does not invert its direction and stops when the sensor is cleared (POS 0 Sensor low). This position is acquired as position 0; this is useful when the zero sensor is not at one of the ends of the working stroke.
These examples are illustrated in detail in the figures below.
Figure 5.3.6: Zero search using the sensor only: first search direction positive

IPA 11004 Zero Sensor En = On, IPA 11008 Zero Index En = Off

Speed 1 = IPA 11016 Home Spd Ref
Speed 2 = IPA 11018 Home Fine Spd
5.3.3 Zero search using the encoder reference

Requirements:
Parameter **Zero Sensor En** = Disabled.
Parameter **Zero Index En** = Enabled.

![Figure 5.3.7: Zero search using the encoder reference](image)

1) Enable the drive: set digital input "Enable" to high logic status.
2) Enable (high logic status) the digital input programmed as **POS 0 Search**.
3) When the motor receives the **POS 0 Search** command, it starts in the direction set in **Home Src Direc** (Positive = clockwise motor rotation) at the **Home Fine Spd** speed reference. The motor stops at the first encoder reference that is detected and acquires this as the 0 position.

If an offset is set for the zero position (Home Pos Offset other than 0), the motor behaves as described above during the zero search. The only difference is that the home position is equal to - Home Pos Offset. It is possible to use the Home Pos Offs En parameter to stop the motor at 0 user units, thus automatically moving by -Home Pos Offset with respect to the encoder reference.

**Note!** If **Zero Sensor En** = **Disabled** and **Zero Index En** = **Disabled**, the POS 0 Search command is ineffective (the motor does not move and the zero search is not executed).

This is illustrated in detail below.
5.3.4 Zero search with the Startup Zero Pos parameter

1) Enable the Startup Zero Pos parameter
2) Next time the drive is turned on or reset it will sample the encoder position which will be acquired as the Zero position.

Note! If another zero search is performed, the initial zero position will be overwritten.

5.4 Positioning

Positioning can be performed when the zero search phase is complete. The unit of measure for the position is defined in user units (u.u.) in the User units per rev parameter, which shows the number of user units corresponding to one turn of the position encoder, and in the Gear NUM and Gear DEN parameters, which simplify the numerical representation of any gear ratios in the form of ratios between finite integers; these two parameters can only be used if Pos feedback = Main encoder, because remainder retrieval logic is enabled. If not used, set them to 1. Some examples are shown below.

The procedure for positioning to a selected position preset is generally launched by activating the digital input signal POS Start Pos; the (0->1) setting of the digital output signal Pos Reached indicates the end of the procedure.

There are 64 registers where the desired positions can be stored and from which they can be recalled via the digital input signals programmed as POS-Preset 0-5; these are used to select the positioning value in binary logic when Commands Mode = Digital. The selection signals can be assigned to digital inputs or to bits of the control word (Word decomp) in the process channel of the fieldbus (when available). They need not all be used at once. Sub-groups can be defined. Any inputs that are not programmed are considered as equal to zero.

An individual speed (Pos Speed 0-7), acceleration and deceleration ramp (Pos Acc 0-7, Pos Dec 0-7) and positioning mode (Pos Mode 0-7) can be set for each position of the first 8 registers; the respective parameters in the POSITIONER CONF menu apply to all the other presets.

Generally speaking, the positioning mode can be set in the Pos Mode parameter (see description), and enables the currently selected position preset to be referred to the system zero point (Absolute), to the current position (Incremental) and, for the first 8 presets only, via the Pos Mode 0-7 parameter, to an external touch probe signal (Touch Probe); see the relative parameter description. For all the other registers, the speed and acceleration and deceleration ramp are the same as those defined in the POSITIONER CONF menu.

The positioning speed override function is available via analog input; see the description of the Position Speed src parameter.
Instead of digital selection, free-choice profile positioning can be performed via fieldbus when **Commands Mode = Fieldbus**. In this case the target position and maximum positioning speed are automatically mapped by the process data to the fieldbus in the Pos Preset 0 and Pos Speed 0 parameters, while the positioner status word (see Pos Status parameter, DIGITAL OUTPUTs menu) and the actual position are mapped in the process data sent to the superordinate control device. Reference should be made to the description of the Commands Mode parameter.

In this operating mode the **POS Start Pos** digital input signal can also remain active and the target position and positioning speed can be updated on the fly. The effective positioning range can be delimited by setting hardware and software limits. The hardware limits must be connected to the digital inputs programmed as **End Run Forward** and **End Run Reverse** in the DIGITAL INPUTs menu; if the sensing devices use negative safety logic, i.e. if they are active with low logic level, the logic can be inverted (the default setting is positive) on the relative inputs using the Dig inp x inversion parameters in the DIGITAL INPUTS menu of the drive.

If an hardware limit is triggered during a positioning operation, the motor stops and a "Pos Out of Lim" error condition occurs; from this moment onwards the system only accepts positioning or jog commands when the target position is inside the allowed range, i.e. in the opposite direction to that of the triggered limit.

The software limits correspond to the **Max Prs Abs Val** and **Min Prs Abs Val** parameters in the POSITION LIMITS menu; values are defined in user units.

If the selected position preset produces a target position outside the range defined by the software limits, the positioning command is not executed and a "Pos Out of Lim" error condition occurs.

### 5.5 Other functions

#### 5.5.1 Sequential Positioner Function (multi-position controller)

**(Available in Expert mode)**

At the end of a positioning operation, within the first eight presets, you can define the conditions required before the next movement is performed. This means a predefined sequence of steps can be performed. The following parameters, defined in the POS PRESET 0-7 menu, manage the sequence:

- **MPos X Progress**
  At the end of each positioning operation, this parameter enables or prevents the next positioning operation.

- **MPos X Dwell**
  Setting of the delay (ms) before proceeding to the next step.

- **MPos X Event**
  Numerical code that must be equalled by the combination of the **POS Event Bit X** digital input signals with binary code to enable the next step.

- **MPos X NextPos**
  Setting of the number (0-7) corresponding to the next positioning preset.

- **MPos X Repeat**
  Setting of the number of repeats for the current step; only valid if the relative preset is set to Incremental positioning mode.

The advancement may thus take place:

- after a delay, set in MPos X Dwell
- following an event; the event is the MPos X Event numerical code
- with a combination of these: after the delay, it waits until the event occurs.

When the **POS Start Pos** command is activated the first sector is given by the currently selected preset. The entire sequence can be performed for a number of repeats defined in the **Multi Pos Repeat** parameter in the POSITIONER CONF menu; if this parameter is set to zero (default), the number of repeats is unlimited.

The following parameters are available for enabling, displaying and aborting the sequence:

**DIGITAL INPUTs menu**

- **MultiPos Enable**
  To enable the multi-position controller

- **MultiPos Abort**
  To abort the position sequence; this can be aborted when POS Start Pos is not active or the drive is disabled. The next time a POS Start Pos command is sent, the sector will be chosen according to POS Preset.

**POSITIONER CONF menu**
5.5.2 Positioning with Touch Probe Function

Requirements: one of the two "encoder freeze" channels on the position encoder signal acquisition card must be connected to an external sensor used to detect the system touch probe event.

Example for digital encoder card EXP-DE-I1R1F2-ADV

![Figure 5.5.1: Terminals for connecting the touch probe sensor on the EXP-DE-I1R1F2-ADV card](image)

The "touch probe reference" positioning method can be selected in the **Pos Mode X** parameter for the first 8 position presets; the relative parameters are found in the TOUCH PROBE menu.

Once enabled, the value indicated in Pos Preset X is referred to the point of interception of the rising or falling edge of the touch probe digital signal, which corresponds to one of the **Freeze** inputs on the position encoder signal acquisition card: the actual target position is thus calculated as the algebraic sum of the intercepted value and the current position preset. In some cases this may produce a change in direction of axis movement, when for example the calculated target position is before the value intercepted by the touch probe sensor in that direction. The active encoder freeze input for the function can be selected in the **Touch Probe Channel** parameter.

When the **POS Start Pos** command is sent, the motor starts at the speed and acceleration values that can be selected in the **Touch Probe Chg Set** parameter and waits for the touch probe event until the distance covered exceeds the value set in **Touch Probe Step**; the sign of this parameter also determines the direction of movement during the waiting phase.

If the touch probe event does not occur within the maximum distance that can be covered during the waiting phase, the motor stops and the **Touch Probe Error** output signal is activated.

**Note!** When **Resolver** is used for position feedback, the "Encoder freeze" channels are not available thru EXP-RES-I1R1F2-ADV board. "Freeze" functions are available by using the ADV200 regulator board (IPA 2094 **Resolver freeze0 src** to assign function: F0, IPA 2096; **Resolver freeze1 src** to assign function F1). The way to set the positioning function are the same as the Encoder programming.

5.5.3 Rotary Axis Function

The rotary axis function manages the following conditions:
- continuous rotation with positions inside a set range;
- management of remainders generated by the encoder connection.

The rotary axis function is enabled by setting the **Max Prs Abs Val** and **Min Prs Abs Val** software limits to the same value.

The set value also defines the range of axis positions. For example, if both limits are set to 360, the range of positions is assumed to be cyclic and between 0 and 360.

The axes rotate in a clockwise direction for increasing position values. With a negative encoder connection, rotation is in the opposite direction.

To obtain absolute positioning in a clockwise direction, set a position reference with a positive sign. To obtain absolute positioning in an anti-clockwise direction, set a position reference with a negative sign.
Positions are univocally defined, except for position 0°, that corresponds also to 360° multiple positions (720°, 1080°...). See the table below for some examples.

<table>
<thead>
<tr>
<th>Actual Position</th>
<th>Position Reference</th>
<th>Rotation</th>
<th>Movement</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>200</td>
<td>clockwise</td>
<td>+110</td>
</tr>
<tr>
<td>90</td>
<td>10</td>
<td>clockwise</td>
<td>+280</td>
</tr>
<tr>
<td>90</td>
<td>-10</td>
<td>Anti-clockwise</td>
<td>-80</td>
</tr>
<tr>
<td>90</td>
<td>-200</td>
<td>Anti-clockwise</td>
<td>-250</td>
</tr>
<tr>
<td>90</td>
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<td>+270</td>
</tr>
<tr>
<td>90</td>
<td>-360</td>
<td>Anti-clockwise</td>
<td>-90</td>
</tr>
<tr>
<td>0</td>
<td>730</td>
<td>clockwise</td>
<td>+10</td>
</tr>
<tr>
<td>0</td>
<td>± n·360</td>
<td>-</td>
<td>0</td>
</tr>
</tbody>
</table>

With incremental positioning, one positive positioning step corresponds to one clockwise turn, one negative positioning step corresponds to one anti-clockwise turn. Target positions expressed as 360° multiples are also accepted, either positive or negative; for instance, setting 720° target position results in two complete 360° clockwise revolutions of the axis.

Remainder retrieval management is enabled when the Gear NUM and Gear DEN parameters of the encoder connection are integers and at least one of these is other than 1. Otherwise the Gear NUM / Gear DEN ratio is used, with the consequent inaccuracies of its 32-bit REAL representation.

**Note!** By activating the Rotary Axis function, the "S" ramp setting is not available.

### 5.5.4 Position cams

The position cams function enables activation of up to 4 physical or virtual outputs, i.e. digital outputs or status word bits on the fieldbus, according to the axis position.

The position cam function is enabled when at least one **Pos CAM 0-3** digital output signal is assigned in the DIGITAL OUTPUTs menu.

Four pairs of parameters have been defined for each of the aforesaid digital output signals, corresponding to the position values in user units that delimit the 4 zones of activation of the relative output signal; these parameters are found in the CAMME PRESET 0-3 menus. See the description of menus (2.3.11).

### 5.5.5 Backlash Recovery Function

This function is used to recover any backlash by performing all positioning operations in the same direction.

For example:

- **Back Lash En** = Enable
- **Back Lash Dir** = Positive
- **Delta Pos** = 100 u.u.,
- **Speed Comp** = 10 rpm
- **Actual Position** = 10000 u.u.
- **Destination Pos** = 15000 u.u.

Since the movement is positive, the drive performs a first positioning operation to 15100 u.u. (without activating the position reached output signal) and then immediately performs a new positioning operation to 15000 u.u. at a maximum speed of 10 rpm. At the end of this positioning operation the position reached output signal is activated.

Assume we then need to perform a new positioning operation:

- **Actual Position** = 15000 u.u.
- **Destination Pos** = 8000 u.u.
The movement is negative, so the recovery function is not active.

5.5.6 Special functions

(Available in Expert mode)

User functions can be enabled and configured in the PROFILE_GEN menu. There is currently only one function relating to the "pantograph lifter" application. This can be selected by setting "Special funct type = Pantograph".

See figure below.

![Figure 5.5.2: Pantograph lifter](image)

This function implements a change in coordinates between a physical axis A (controlled directly by the motor via a worm screw) and a virtual axis H, linked to the former by a specific kinematic relationship: it must be possible to set the position preset and read the actual position referred directly to the virtual axis. To transform the coordinates, the profile generator requires a programmable parameter that corresponds to the length of the arm L in the figure; this is assigned via the **Special funct P1** parameter.
6 List of Parameters

This section contains the list and description of the parameters, which are grouped according to the sub-menus of the POSITIONER in the parameter file of the drive where the application is installed.

6.1 POSITIONER CONF menu

This menu contains the general application configuration parameters such as the method for selecting the target position, acceleration and speed of the position profile generator and selection of the position transducer. (Gray background indicates parameters available in Expert mode)

<table>
<thead>
<tr>
<th>Ipa</th>
<th>Parameter Name</th>
<th>User type</th>
<th>Target type</th>
<th>Unit</th>
<th>Default</th>
<th>Min</th>
<th>Max</th>
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<td>Parameter</td>
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<td>11206</td>
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<td>Boolean</td>
<td>-</td>
<td>Off</td>
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<td>-</td>
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<td>rpm</td>
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<td>-</td>
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<td>11556</td>
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<td>-</td>
<td>Main Encoder</td>
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<td>10.000</td>
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<td>Word</td>
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<td>CL Positioner</td>
<td>-</td>
<td>-</td>
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<tr>
<td>12008*</td>
<td>Multi Pos Index</td>
<td>Unsigned Short</td>
<td>Word</td>
<td>-</td>
<td>-</td>
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<tr>
<td>12010*</td>
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<td>Float</td>
<td>u.u.</td>
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<td>-</td>
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<tr>
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<td>12016*</td>
<td>Actual Pos Error</td>
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<td>Float</td>
<td>u.u.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12048*</td>
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<td>Unsigned Short</td>
<td>Word</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Preset Conf

Setting of the method for selecting the target position preset.

0 Parameter  The selected position preset is that indicated by the value (0...63) of the Preset Index parameter.

1 Digital  The position preset is selected according to the combination of active digital input signals. To use this mode, the digital input signals POS-Preset 0...5 in the DIGITAL INPUTs menu must be assigned to the digital inputs Dig Inp x of the drive or to the control word bits Bit x decompMon.

In "Sequential positioner" mode (multi-position controller) this parameter selects the first position preset in the sequence.

Preset Index

The value of this parameter (0...63) indicates the current target position preset when Preset Conf is set to “Parameter”. If Preset Conf is set to “Digital”, this
parameter is only accessible in read mode and indicates the preset selected via the
digital input signals **POS-Preset 0...5**.

**Multi Pos Enable**

This parameter enables or disables the "sequential positioner (multi-position controller) function. When this function is enabled, the multi-position controller sequence is defined by the specific parameters available in the POS PRESET 0...7 menus.

If the multi-position controller is disabled while the sequence is running, the current positioning operation is aborted (the motor decelerates to reach a speed of zero with the ramp of the active preset); positioning to the currently selected preset resumes on a new rising edge of the **POS Start Pos** command.

If the multi-position controller is enabled during positioning to the currently selected preset, the current positioning operation is aborted (the motor decelerates to reach a speed of zero with the ramp of the active preset); the currently selected preset sequence resumes on a new rising edge of the **POS Start Pos** command.

**Position Speed**

Setting of the maximum speed reference value used by the profile generator during positioning. This is the default setting for POS PRESET 8 – 63, whereas for POS PRESET 0 – 7 the speed reference must be specified each time using the relative **Pos Speed 0 – 7** parameters.

**Pos Acc**

Setting of the acceleration time used by the profile generator during positioning. This is the default setting for POS PRESET 8 – 63, whereas for POS PRESET 0 – 7 the acceleration time must be specified each time using the relative **Pos Acc 0 – 7** parameters.

**Pos Dec**

Setting of the deceleration time used by the profile generator during positioning. This is the standard setting for POS PRESET 8 – 63, whereas for POS PRESET 0 – 7 the deceleration time must be specified each time using the relative **Pos Dec 0 – 7** parameters.

**Gear NUM**

Gear ratio numerator; this is the number of revolutions of the slow shaft in which the motor encoder revolutions are equal to Gear DEN.

**Gear DEN**

Gear ratio denominator; this is the number of revolutions of the motor encoder in which the slow shaft revolutions are equal to **Gear NUM**.

**Note!**

This can only be used with a speed reduction ratio and if **Pos feedback = Main encoder**, as remainder retrieval logic is activated. If not used it must be set to 1 (default value).

**Pos Stop Dec**

Setting of the deceleration time used by the profile generator when the current positioning operation is aborted by removing the **POS Start Pos** command.

**Fast Stop Dec**

Setting of the deceleration time used when the **Fast Stop** command is activated.

**Max Pos Error**

Maximum position error. The position error is calculated as the instantaneous difference between the calculated position reference and the actual position.

**Pos Mode**

Setting of the positioning mode valid for POS PRESET 8 – 63. The positioning mode for POS PRESET 0 – 7 can be defined separately each time using the specific **Pos Mode 0 – 7** parameters.

- **0 Inc Abs**
  The selected position preset is applied in incremental mode (referred to the actual position) each time the **POS Start Pos** command is activated. If the current step is aborted by disabling this command, the step is completed.

  *Example: if the selected position preset is 2000 u.u., with each POS Start Pos command the target positions are 2000, 4000, 6000,...u.u.; if the first positioning
The selected position preset is applied with reference to the active zero position.

The selected position preset is applied in incremental mode (referred to the actual position) with each POS Start Pos command. If the current step is aborted by disabling this command, the current step is performed again.

Example: if the selected position preset is 2000 u.u., with each POS Start Pos command the position increases by 2000 u.u.

Destination of Positioner output speed reference for system.

Destination of Positioner output immediate stop command reference for system.

Destination of speed loop integral gain disable command output for the system.

This parameter indicates the number of complete sequences performed by the "sequential positioner" (multi-position controller). If set to zero, the number of repeats is unlimited.

Selection of the position feedback sensor.

The position sensor is also the speed sensor installed on the motor.

The position sensor is also the speed sensor installed as Encoder 2.

The position sensor is also the speed sensor installed as Encoder 3.

The position sensor is analog input 1 of the ADV200 drive and is also considered a single-turn encoder with 32,768 pulses/rev.

This parameter defines the number of position user units (u.u.) per revolution of the position encoder.

A negative value of this parameter allows changing rotating direction of the axis by keeping the same management and visualization of actual position Actual Pos.

Selection of the source of the positioner commands.

Commands assigned by programming the parameters in the DIGITAL INPUTs menu, i.e. digital input terminals or bits of the control word Word decomp.

Free-choice profile positioning via fieldbus. The position setpoint is assigned in the Pos Preset 0 parameter and made available in the first datum of the process channel on the fieldbus (Fieldbus M->S 1), the positioning speed reference is assigned in the Pos Speed 0 parameter and made available in the second datum of the process channel on the fieldbus (Fieldbus M->S 2). The actual position is assigned in the first datum of the process channel on the fieldbus (Fieldbus S->M 1), while the second datum contains the status word of the application Pos Status. The format of these data on the bus can be set, in the respective parameters in the FIELDBUS menu, as integer or floating point values.
**Note!** As of version 2.5.16.2 of Positioner and ADV200 > FW7.3.11, only for compatibility with previous installations.

### Position Speed src
Selection of the positioning speed source.

**0 Parameter** The positioning speed is defined by the Position Speed parameter for POS PRESET 8-63 and by the Pos Speed X parameters for POS PRESET 0-7.

**1 Analog Input 2** The positioning speed is defined via analog input 2 on the drive regulation card for POS PRESET 8-63 and for parameters POS PRESET 0-7 only if the related parameters Pos Speed X are set to 0. The 0-10 V voltage range on this input is made to correspond to the 0-Position Speed range.

### Pos Jerk
Parameter for setting the S-ramp. This is the time needed to reach the rated acceleration indicated in parameter Pos Acc; it is applied indiscriminately to all positioning profiles. The default setting (Pos Jerk = 0) is the setting for a trapezoidal ramp.

The meaning of the parameter is illustrated in the figure below.

For example, if the acceleration time Pos Acc is $T_a$ and the jerk time is $T_j$, the acceleration ramp time will be:
- $T_r = T_a + T_j$ if all phases of the ramp are complete (positive jerk + linear acceleration + negative jerk)
- $T_r = \frac{(2T_a N)}{N_{\text{max}}} \text{ if not all phases of the ramp are complete (positive jerk + negative jerk only), where } N \text{ is the target speed and } N_{\text{max}} \text{ is the full scale speed, i.e. the speed to which system ramp times refer.}$

The acceleration/deceleration ramp is not complete if the following condition is true for the target speed $N$:
\[ N < \left(\frac{N_{\text{max}}}{2}\right) \times \frac{T_j}{T_a} \]

**Note!** By activating the Rotary Axis function, the "S" ramp setting is not available.

### Positioner conf
Parameter for selecting the positioner control mode. This must be set to the same value as parameter IPA 552 Regulation mode. See par. 3.3.3.

**0 CL Positioner** Default mode with closed speed loop on the motor encoder. IPA 552 Regulation mode must be set to "Flux vector CL".

**1 V/f Positioner** Open loop speed control and encoder position reading. IPA 552 Regulation mode must be set to "V/f control".

### Multi Pos Index
This parameter displays the sector (Pos Preset) being executed during the "sequential positioner" (multi-position controller) cycle.
Actual Position

This parameter displays the actual position of the set position sensor (see the Position feedback parameter) in relation to the active zero position. This parameter is automatically mapped as the first process datum sent to the superordinate control device via fieldbus when the Commands Mode parameter is set to Fieldbus.

Destination Position

This parameter displays the active target position.

Actual Pos Error

This parameter displays the actual position error.

Pos Actual Event

This parameter displays the actual value of the variable that constitutes the transition from one preset to the next during the “sequential positioner” (multi-position controller) cycle when MPos x Progress is set to “Event Match” or “Dwell + Event”.

6.2 POS PRESET 0 – 7 menu

The parameters and settings for the first 8 position presets are all the same. For this reason only the PRESET 0 menu is described in detail here.

For the first 8 position presents, the profile and positioning mode can be configured at choice, as can an automatic positioning sequence (sequential positioner or multi-position controller).

The Pos Preset 0 and Pos Speed 0 parameters are used for controlling the application via fieldbus to send the position setpoint and relative positioning speed as process data. When Commands Mode = Fieldbus, the two parameters mentioned above are mapped, respectively, in the first and in the second process datum sent by the superordinate control device via fieldbus.

(Gray background indicates parameters available in Expert mode)

<table>
<thead>
<tr>
<th>Ipa</th>
<th>Parameter Name</th>
<th>User type</th>
<th>Target type</th>
<th>Unit</th>
<th>Default</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
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<td>Pos Preset 0</td>
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<td>Float</td>
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<td>Pos Speed 0</td>
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<td>1000.00</td>
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<tr>
<td>11170</td>
<td>Pos Acc 0</td>
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<td>Pos Dec 0</td>
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<td>11240</td>
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<td>11288</td>
<td>MPos 0 Next Pos</td>
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<td>Word</td>
<td>-</td>
<td>Absolute</td>
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</tr>
</tbody>
</table>

Pos Preset 0

Setting of the 0 position preset. The target position is calculated on the basis of this value and the zero position as defined by the Pos Mode 0 parameter.

Pos speed 0

Setting of the maximum speed reference value used by the profile generator during positioning to the 0 preset.

Pos Acc 0

Setting of the acceleration time used by the profile generator during positioning to the 0 preset.

Pos Dec 0

Setting of the deceleration time used by the profile generator during positioning to the 0 preset.

MPos 0 Progress

Setting of the behaviour of the multi-position controller function upon completion of the current sector (0 preset).

0 None

The multi-position controller sequence is aborted.
1 **Dwell** At the end of the current sector (0 preset), the next sector, defined in the **MPos 0 Next Pos** parameter, is executed after the time set in **MPos 0 Dwell**.

2 **Event Match** At the end of the current sector (0 preset), the next sector, defined in the **MPos 0 Next Pos** parameter, is executed when the configuration present on the **POS Event Bit 0-7** digital input signals (binary code) corresponds to the value set in **MPos 0 Event**.

3 **Dwell + Event** At the end of the current sector (0 preset), the next sector, defined in the **MPos 0 Next Pos** parameter, is executed after the time set in **MPos 0 Dwell** and, subsequently, when the configuration present on the **POS Event Bit 0-7** digital input signals (binary code) corresponds to the value specified in **MPos 0 Event**.

**MPos 0 Dwell** Setting of the delay between the end of the current sector (0 preset) and the beginning of the next sector, specified in **MPos 0 Next Pos**.

**MPos 0 Event** This value corresponds to the configuration that must be present on the **POS Event Bit 0-7** digital input signals (binary code) to enable passing to the next sector, specified in **MPos 0 Next Pos**.

**MPos 0 Next Pos** Setting of the number of the next sector to be executed at the end of the current sector (0 preset).

**MPos 0 Repeat** Setting of the number of repeats to be performed for the current sector (0 preset); only valid for positioning in incremental mode.

**Pos Mode 0** Setting of the positioning mode valid for the 0 preset. Possible modes are those described for the Pos Mode parameter in the POSITIONER CONF menu, namely Absolute, Inc Abs and Incremental, plus Touch probe mode.

3 **Touch probe** The selected position preset is applied with reference to the position in which the touch probe sensor is intercepted.

*Example: if the selected position preset is +2000 u.u., when the POS Start Pos command is sent the axis moves at the speed and acceleration defined by the parameters in the TOUCH PROBE menu; if the touch probe sensor is intercepted at +1500 u.u. (position encoder freeze position), the final target position is +3500 u.u. As a general rule the target position is given by the algebraic sum of the position encoder freeze position and the selected position preset.*

### 6.3 POS PRESET 8 – 63 menu

It is only possible to define the value of the position to be reached for position presets 8 to 63. The other positioning profile parameters are those defined in the POSITIONER CONF menu, i.e. speed in Position Speed, ramps in Pos Acc and Pos Dec and positioning mode in Pos Mode.

<table>
<thead>
<tr>
<th>Ipa</th>
<th>Parameter Name</th>
<th>User type</th>
<th>Target type</th>
<th>Unit</th>
<th>Default</th>
<th>Min</th>
<th>Max</th>
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</tr>
<tr>
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<td>[11042+2*(n-8)]</td>
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<td>u.u.</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11150</td>
<td>Pos Preset 62</td>
<td>Float</td>
<td>Float</td>
<td>u.u.</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11152</td>
<td>Pos Preset 63</td>
<td>Float</td>
<td>Float</td>
<td>u.u.</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* where 8 <= n <= 63
Pos Preset n

Setting of position presets 8 - 63. The target position is calculated on the basis of this value and the zero position as defined by the Pos Mode parameter in the POSITIONER CONF menu.

6.4 ZERO FOUND CONF menu

Setting of the parameters relating to the zero search procedure.

<table>
<thead>
<tr>
<th>Ip</th>
<th>Parameter Name</th>
<th>User type</th>
<th>Target type</th>
<th>Unit</th>
<th>Default</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>11000</td>
<td>Startup Zero Pos</td>
<td>Boolean</td>
<td>Boolean</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11002</td>
<td>Home Src Direc</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Positive</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11004</td>
<td>Zero Sensor En</td>
<td>Boolean</td>
<td>Boolean</td>
<td>-</td>
<td>On</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11006</td>
<td>Zero Sensor Edge</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Rising</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11008</td>
<td>Zero Index En</td>
<td>Boolean</td>
<td>Boolean</td>
<td>-</td>
<td>On</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11010</td>
<td>Inside Index Src</td>
<td>Boolean</td>
<td>Boolean</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11012</td>
<td>Home Pos Offs En</td>
<td>Boolean</td>
<td>Boolean</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11014</td>
<td>Home Pos Offset</td>
<td>Float</td>
<td>Float</td>
<td>u.u.</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11016</td>
<td>Home Spd Ref</td>
<td>Float</td>
<td>Float</td>
<td>rpm</td>
<td>100.00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11018</td>
<td>Home Fine Spd</td>
<td>Float</td>
<td>Float</td>
<td>rpm</td>
<td>50.00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11020</td>
<td>Home Pos Acc</td>
<td>Float</td>
<td>Float</td>
<td>s</td>
<td>10.00</td>
<td>0.01</td>
<td>1000.000</td>
</tr>
<tr>
<td>11022</td>
<td>Home Pos Dec</td>
<td>Float</td>
<td>Float</td>
<td>s</td>
<td>10.00</td>
<td>0.01</td>
<td>1000.000</td>
</tr>
<tr>
<td>11478</td>
<td>Zero Init Pos</td>
<td>Float</td>
<td>Float</td>
<td>ie.</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11588</td>
<td>Pos feedback Type</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Incremental</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11600</td>
<td>Home Pos Autosave</td>
<td>Boolean</td>
<td>Boolean</td>
<td>-</td>
<td>ON</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Startup Zero Pos**

This parameter enables the position of the encoder used each time the drive is turned on to be acquired as the zero position.

**Home Src Direc**

This parameter defines the direction for the first zero position search when the POS 0 Search command (DIGITAL INPUTs menu) is sent.

- **0 Positive** The motor turns clockwise.
- **1 Negative** The motor turns anti-clockwise.

**Note!** By convention, the direction of rotation refers to the motor seen from the shaft side.

**Zero Sensor En**

This parameter enables the zero sensor search; the POS 0 Sensor digital input signal (DIGITAL INPUTs menu) must have been assigned.

**Zero Sensor Edge**

This parameter defines the active edge of the zero sensor.

- **0 Rising** The zero sensor is active on the rising edge.
- **1 Falling** The zero sensor is active on the falling edge.

**Zero Index En**

This parameter enables/disables the index search (rev pulse, zero reference) of the position encoder during the zero search. The zero position search, which is conditioned by backlash and hysteretic switching of the zero sensor, is performed more accurately and with increased repeatability when the encoder index is enabled.

**Inside Index Src**

This parameter controls the use of the zero sensor and position encoder index during the zero search.
Off  The zero position coincides with the first encoder index that is found after clearing the zero sensor.

On   The zero position coincides with the first encoder index found with the zero sensor engaged (Enabled).

**Home Pos Offs En**

This parameter enables the return to the 0 position in u.u. from the value currently set for Home Pos Offset at the end of the zero search.

Off   At the end of the zero search procedure, the motor stops on the sensor/encoder index and the position displayed in Actual Position is equal to Home Pos Offset u.u.

On    At the end of the zero search procedure the value of Home Pos Offset is set to correspond with the sensor/encoder index but the motor moves by Home Pos Offset u.u. until reaching 0 u.u.; this movement is executed at the speed set in Home Fine Spd.

**Home Pos Offset**

The value of the zero position offset, defined by the user. This value is always added to the actual position.

**Home Spd Ref**

The speed reference value used during the zero search, expressed as rpm.

**Home Fine Spd**

The speed reference value used during the absolute zero position search, expressed as rpm. This reference is applied when the zero sensor is activated and/or during the encoder index search.

**Home Pos Acc**

Setting of the acceleration time used during the zero search.

**Home Pos Dec**

Setting of the deceleration time used during the zero search.

**Zero Init Pos**

Value of the user-defined zero position displayed after turning on and when the POS 0 Search command is sent without any procedure being performed (no motor movement); the command is accepted even with the drive disabled. Expressed in encoder pulses.

**Pos feedback Type**

This parameter is used to set the type of position encoder.

0 Incremental  The position encoder is an incremental encoder, the zero search is therefore performed each time the drive is turned back on or reset.

1 Absolute    The position encoder is an absolute encoder, therefore the zero search is only performed once at startup; the position value read by the encoder is retained so that each time the drive is turned on again or reset the position value read by the encoder is displayed correctly in the Actual Position parameter.

2 Inc Abs    Absolute encoder emulation. The position encoder is incremental, therefore the zero search is performed at least once during startup or when the drive is reset, for example following a power failure during a movement. The position value read by the encoder is stored in the non-volatile memory each time the drive is restarted or reset, so that it can always be displayed correctly in the Actual Position parameter; this avoids the need to repeat the zero search procedure (NB: The setting of this option influences that of the Startup Zero Pos parameter, which is forced to On).

---

**Note!**

The value of Actual Position stored in the non-volatile memory might not be the same as the actual position of the axis if this was moving at the time of the power failure or when the unit was switched off. If that is the case, the zero search must be repeated.
Home Pos Autosave  It enables the parameters Autosave at the end of the search of zero procedure. Autosave will load all drive parameters into memory. If this option is not required, set the parameter Home Pos Autosave = OFF, anyway to allow the correct saving of the zero position, it will be necessary to start saving the parameters before turning off the drive.

6.5 POSITION LIMIT menu

Setting of the software limits that delimit the helpful positioning range.

<table>
<thead>
<tr>
<th>Ipa</th>
<th>Parameter Name</th>
<th>User type</th>
<th>Target type</th>
<th>Unit</th>
<th>Default</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>11228</td>
<td>Max Prs Abs Val</td>
<td>Float</td>
<td>Float</td>
<td>u.u.</td>
<td>10000</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11230</td>
<td>Min Prs Abs Val</td>
<td>Float</td>
<td>Float</td>
<td>u.u.</td>
<td>-10000</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Max Prs Abs Val Setting of the maximum absolute value of the positioning range (software limit).

**Note!** If set equal to Min Prs Abs Val the rotary axes function is enabled.

Min Prs Abs Val Setting of the minimum absolute value of the positioning range (software limit).

**Note!** If set equal to Max Prs Abs Val the rotary axes function is enabled.

6.6 POSITION THR CONFIG menu

<table>
<thead>
<tr>
<th>Ipa</th>
<th>Parameter Name</th>
<th>User type</th>
<th>Target type</th>
<th>Unit</th>
<th>Default</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>11232</td>
<td>Pos Window</td>
<td>Float</td>
<td>Float</td>
<td>u.u.</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11234</td>
<td>Pos Window Time</td>
<td>Float</td>
<td>Float</td>
<td>s</td>
<td>0.000</td>
<td>0.000</td>
<td>30.000</td>
</tr>
<tr>
<td>11236</td>
<td>Pos Window Tout</td>
<td>Float</td>
<td>Float</td>
<td>s</td>
<td>0.000</td>
<td>0.000</td>
<td>30.000</td>
</tr>
</tbody>
</table>

**Pos Window** This parameter, together with the Pos Window Time parameter, defines the behaviour of the Pos Reached digital output signal (DIGITAL OUTPUTs menu): the output is set when, at the end of positioning, the actual position is within the range given by the target position ± Pos Window for a time set in Pos Window Time.

**Pos Window Time** Setting of the length of time after which the current positioning procedure is considered to have ended.

**Pos Window Tout** Setting of the length of time after which the current positioning procedure is considered not to have ended and the Pos Not Reached digital output signal is activated.

6.7 POS LOOP CONF menu

(Gray background indicates parameters available in Expert mode)

<table>
<thead>
<tr>
<th>Ipa</th>
<th>Parameter Name</th>
<th>User type</th>
<th>Target type</th>
<th>Unit</th>
<th>Default</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>11218</td>
<td>Pos P Gain</td>
<td>Float</td>
<td>Float</td>
<td>10</td>
<td>0</td>
<td>100000</td>
<td></td>
</tr>
<tr>
<td>11220</td>
<td>Pos I Gain</td>
<td>Float</td>
<td>Float</td>
<td>0</td>
<td>0</td>
<td>100000</td>
<td></td>
</tr>
<tr>
<td>11226</td>
<td>Pos FFW Gain</td>
<td>Float</td>
<td>Float</td>
<td>-</td>
<td>0.5</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>11594</td>
<td>Spd P Gain</td>
<td>Float</td>
<td>Float</td>
<td>-</td>
<td>0</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>12012*</td>
<td>Reference Pos</td>
<td>Float</td>
<td>Float</td>
<td>u.u.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12026*</td>
<td>Pos loop ref pos</td>
<td>Float</td>
<td>Float</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ipa</td>
<td>Parameter Name</td>
<td>User type</td>
<td>Target type</td>
<td>Unit</td>
<td>Default</td>
<td>Min</td>
<td>Max</td>
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<td>----------------------</td>
<td>-----------</td>
<td>-------------</td>
<td>------</td>
<td>---------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>12028*</td>
<td>Pos loop fbk pos</td>
<td>Float</td>
<td>Float</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12038*</td>
<td>Pos loop out spd</td>
<td>Float</td>
<td>Float</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12040*</td>
<td>Pos loop ref spd</td>
<td>Float</td>
<td>Float</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12050*</td>
<td>Spd loop err spd</td>
<td>Float</td>
<td>Float</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12052</td>
<td>Spd loop ref spd</td>
<td>Float</td>
<td>Float</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Pos P Gain**
Setting of the proportional gain of the position loop.

**Pos I Gain**
Setting of the integral gain of the position loop.

**Pos FFW Gain**
Setting of the position feedforward.

**Spd P Gain**
Setting of the proportional speed in the Positioner V/f modality

### 6.8 DIGITAL INPUTs menu

This menu contains the digital input signals relating to the application, directly assignable to the digital inputs or to the bits of the Word decomp on the fieldbus.
(Gray background indicates parameters available in Expert mode)

<table>
<thead>
<tr>
<th>Ipa</th>
<th>Parameter Name</th>
<th>User type</th>
<th>Target type</th>
<th>Unit</th>
<th>Default</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>11310</td>
<td>POS 0 Sensor</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11312</td>
<td>End Run Reverse</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11314</td>
<td>End Run Forward</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11316</td>
<td>POS 0 Search</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11318</td>
<td>POS-Preset 0</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11320</td>
<td>POS-Preset 1</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11322</td>
<td>POS-Preset 2</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11324</td>
<td>POS-Preset 3</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11326</td>
<td>POS-Preset 4</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11328</td>
<td>POS-Preset 5</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11330</td>
<td>POS Start Pos</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11332</td>
<td>Jog Forward</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11334</td>
<td>Jog Reverse</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11336</td>
<td>POS Memo Pos</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11338</td>
<td>POS Event Bit 0</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11340</td>
<td>POS Event Bit 1</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11342</td>
<td>POS Event Bit 2</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11344</td>
<td>POS Event Bit 3</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11346</td>
<td>POS Event Bit 4</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11348</td>
<td>POS Event Bit 5</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11350</td>
<td>POS Event Bit 6</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11352</td>
<td>POS Event Bit 7</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11354</td>
<td>MultiPos Abort</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11356</td>
<td>MultiPos Enable</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11358</td>
<td>Fast/Stop</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11360</td>
<td>Pos 0 Reset</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11362</td>
<td>Appl Enable</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11578</td>
<td>Pos Memo 0</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**POS 0 Sensor**
The zero sensor signal used for the zero search.

**End Run Reverse**
Clockwise limit signal.
End Run Forward

Anti-clockwise limit signal.

POS 0 Search

Command to start the zero search procedure; pulse input active on the rising edge.

POS-Preset 0 - 5

Input signals for selecting the active position preset; the number is obtained from the binary code of the combination of active inputs:

<table>
<thead>
<tr>
<th>POS-Preset x</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>POS-Preset 0</td>
<td>Position preset Bit 0.</td>
</tr>
<tr>
<td>POS-Preset 1</td>
<td>Position preset Bit 1.</td>
</tr>
<tr>
<td>POS-Preset 5</td>
<td>Position preset Bit 5.</td>
</tr>
</tbody>
</table>

6 input signals can be used to represent values of 0 to 63, covering the full range of available presets.

POS Start Pos

Command to start a positioning operation; pulse input active on the rising edge.

Jog Forward

Jog forward command; this must remain active throughout the movement. The speed, acceleration and deceleration parameters are those defined by the JOG FUNCTION menu of the drive.

Jog Reverse

Jog reverse command; this must remain active throughout the movement. The speed, acceleration and deceleration parameters are those defined by the JOG FUNCTION menu of the drive.

Note!
The jog function is performed in speed control mode until a valid axis zero position is defined; when a valid zero position is found, position control mode is enabled.

POS Memo Pos

Command to save the position. Active on the rising edge, this command saves the actual position in the currently selected position preset (auto-tuning function).

POS Event Bit 0 - 7

Input signals only active with the sequential positioner (multi-position controller) enabled. When the number defined by the binary code of the active inputs corresponds to the value of the MPos 0 - 7 Event parameter of the active sector of the multi-position controller in Event Match or Dwell + Event mode, the system moves to the next sector.

MultiPos Abort

Command to abort the multi-position controller sequence. The current positioning operation is aborted when the command is sent. Positioning resumes at the next rising edge of the POS Start Pos command, starting from the active sector of the sequence of the multi-position controller (indicated by the Multi Pos Index parameter); if the multi-position controller is disabled after the abort command, positioning resumes on the next rising edge of the POS Start Pos command, starting from the currently selected position preset.

MultiPos Enable

Command to enable the sequential positioner (multi-position controller).

Fast/Stop

Fast stop command.

Pos 0 Reset

Zero found system flag reset. Once activated, Pos Zero Found digital output is reset; in order to perform new positioning tasks, a zero search procedure must be repeated.

Appl Enable

Command to enable / disable the Positioner application. In addition to the Local / Remote control mode, this command allows to control the enabling / disabling of the Positioner application. If assigned the application status is described as follow:
Appl Enable | Local/Remote | POS
---|---|---
0 | X | Disabled
1 | Local | Disabled
1 | Remote | Enabled

Pos Memo 0
Command to save actual position as new zero position.
If set to "Freeze on F0/F1", cable connection of one freeze encoder channel of encoder option board to an external command (proximity switch) is required; command is active on the rising edge.
If set to "Bit n decomp Mon", command is activated by means of one bit on ADV200 word decomp, thus available through fieldbus interface.

Note!  Command assignment to encoder option board freeze input, where available, grants a very high precision on new zero position detection and establishment, also with moving axis.
Command assignment to word decomp bit can be used only in case command can be activated with standstill axis, since fieldbus interface delay time cannot grant enough precision and repeatability.

When Resolver is used for position feedback, the “Encoder freeze” channels are not available thru EXP-RES-I1R1F2-ADV board. “Freeze” functions are available by using the ADV200 regulator board (IPA 2094 Resolver freeze0 src to assign function: F0, IPA 2096, Resolver freeze1 src to assign function F1). The way to set the positioning function are the same as the Encoder programming.

Off  Not active.
Freeze on F0  Active on the position encoder card F0 input.
Freeze on F1  Active on the position encoder card F1 input.
Bitn decomp Mon  Active on setting bit n (con n = 0…15) of word decomp.

6.9 DIGITAL OUTPUTs menu
This menu contains the digital output signals relating to the application that can be assigned indirectly.
To assign an output signal this must first be associated with an ADV200 Pad 1-16 variable in the application menu; the corresponding Pad variable must then be assigned to the digital output or to the bit of the Word Comp on the fieldbus, respectively, in the DIGITAL OUTPUTS or COMMUNICATION \ WORD COMP menu.
For the sake of convenience an application status word, called Pos status, has been created. All the available digital output signals have thus been grouped together in a single 16-bit word; this is automatically mapped in the first process datum sent to the superordinate control device via fieldbus when Commands Mode = Fieldbus.

<table>
<thead>
<tr>
<th>Ipa</th>
<th>Parameter Name</th>
<th>User type</th>
<th>Target type</th>
<th>Unit</th>
<th>Default</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>11372</td>
<td>Drive Enable</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11374</td>
<td>Pos Reached</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11376</td>
<td>Pos Not Reached</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11378</td>
<td>Pos Zero Found</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11380</td>
<td>Pos Out of Lim</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11382</td>
<td>Speed 0 Thr</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11384</td>
<td>Position Error</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11386</td>
<td>Pos CAM 0</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11388</td>
<td>Pos CAM 1</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11390</td>
<td>Pos CAM 2</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11392</td>
<td>Pos CAM 3</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11394</td>
<td>Touch Probe Error</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12046*</td>
<td>Pos status</td>
<td>Unsigned Short</td>
<td>Word</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
**Drive Enable**
This output signal acquires the high logic state if the drive is powered, with no alarms active and enabled (see settings in the COMMANDS ADV200 menu).

**Pos Reached**
This signal indicates that the target position has been reached. This is set when, at the end of positioning, the actual position is within the range given by the target position ± **Pos Window** for the time set in **Pos Window Time**.

**Pos Not Reached**
This signal indicates that the target position has not been reached. This is set if, after the time set in **Pos Window Tout**, the actual position is not within the range given by the target position ± **Pos Window**.

**Pos Zero Found**
This signal indicates that the zero search is complete. This is necessary in order to perform any positioning operations.

**Pos Out of Lim**
This output signal is active if:
- The calculated current target position is outside the software limits defined by the **Max Prs Abs Val** and **Min Prs Abs Val** parameters.
- The hardware limit switch **End Run Forward** and **End Run reverse** are reached

**Speed 0 Thr**
This output signal is active when the motor speed is zero with deadband defined by the IPA 940 **Speed 0 thr** and IPA 942 **Speed 0 delay** system parameters.

**Position Error**
This output signal is active if the instantaneous difference between the position reference as per the command and the actual position is more than the value set in **Max Pos Error** (POSITIONER CONF menu).

**Pos CAM 0 - 3**
This output signal is active when the actual position is within the range defined by the specific parameters in the CAMME PRESET 0 - 3 menus. A maximum of 4 “zones” can be defined for each output signal.

*E.g.*  **Pos CAM 0** is active when:
- **Cam Pos 0 Min ≤ Actual Position ≤ Cam Pos 0 Max**
- **Cam Pos 1 Min ≤ Actual Position ≤ Cam Pos 1 Max**
- **Cam Pos 2 Min ≤ Actual Position ≤ Cam Pos 2 Max**
- **Cam Pos 3 Min ≤ Actual Position ≤ Cam Pos 3 Max**

**Touch Probe Error**
This output signal is active when the distance covered during positioning in Touch Probe mode exceeds the value of the **Touch Probe Step** parameter without the touch probe input signal being intercepted (Freeze 0 or Freeze 1 channel of the position encoder).

**Pos status**
Application status word; this groups all the digital output signals defined in the DIGITAL OUTPUTs menu in exadecimal mask form, maintaining the same menu order starting from the least significant bit (Drive Enable ↔ bit 0, Pos Reached ↔ bit 1, ...etc.).

---

**Note!**  As of version 2.5.16.2 of Positioner and ADV200 > FW7.3.11, bit 15 reports reaching of drive current limit.
6.10 POS JOG STEP menu

The Jog Step function is described in paragraph 5.2.1.

<table>
<thead>
<tr>
<th>Ipa</th>
<th>Parameter Name</th>
<th>User type</th>
<th>Target type</th>
<th>Unit</th>
<th>Default</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>11436</td>
<td>Jog Step</td>
<td>Float</td>
<td>Float</td>
<td>u.u.</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11580</td>
<td>Enable Jog Step</td>
<td>Boolean</td>
<td>Boolean</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Enable Jog Step**  
Enabling of the jog function with step programmable using the Jog Step parameter.

**Jog Step**  
Positioning step with respect to the actual position.

6.11 CAMME PRESET 0 – 3 menu

The parameters and settings for the first 4 digital output signals called **Pos Cam 0-3** are all the same. For this reason, only the CAMME PRESET 0 menu is described in detail here. Each menu contains the position values in user units which delimit the 4 activation zones of the relative position cam output signal.

<table>
<thead>
<tr>
<th>Ipa</th>
<th>Parameter Name</th>
<th>User type</th>
<th>Target type</th>
<th>Unit</th>
<th>Default</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>11454</td>
<td>Cam 0 Pos 0 Min</td>
<td>Float</td>
<td>Float</td>
<td>u.u.</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11456</td>
<td>Cam 0 Pos 0 Max</td>
<td>Float</td>
<td>Float</td>
<td>u.u.</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11458</td>
<td>Cam 0 Pos 1 Min</td>
<td>Float</td>
<td>Float</td>
<td>u.u.</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11460</td>
<td>Cam 0 Pos 1 Max</td>
<td>Float</td>
<td>Float</td>
<td>u.u.</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11462</td>
<td>Cam 0 Pos 2 Min</td>
<td>Float</td>
<td>Float</td>
<td>u.u.</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11464</td>
<td>Cam 0 Pos 2 Max</td>
<td>Float</td>
<td>Float</td>
<td>u.u.</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11466</td>
<td>Cam 0 Pos 3 Min</td>
<td>Float</td>
<td>Float</td>
<td>u.u.</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11468</td>
<td>Cam 0 Pos 3 Max</td>
<td>Float</td>
<td>Float</td>
<td>u.u.</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Cam 0 Pos 0 Min**  
Minimum position limit for activation zone 0 of the Pos CAM 0 digital output signal.

**Cam 0 Pos 0 Max**  
Maximum position limit for activation zone 0 of the Pos CAM 0 digital output signal.

**Cam 0 Pos 1 Min**  
Minimum position limit for activation zone 1 of the Pos CAM 0 digital output signal.

**Cam 0 Pos 1 Max**  
Maximum position limit for activation zone 1 of the Pos CAM 0 digital output signal.

**Cam 0 Pos 2 Min**  
Minimum position limit for activation zone 2 of the Pos CAM 0 digital output signal.

**Cam 0 Pos 2 Max**  
Maximum position limit for activation zone 2 of the Pos CAM 0 digital output signal.

**Cam 0 Pos 3 Min**  
Minimum position limit for activation zone 3 of the Pos CAM 0 digital output signal.

**Cam 0 Pos 3 Max**  
Maximum position limit for activation zone 3 of the Pos CAM 0 digital output signal.

The figure below illustrates the following assignments: Pos CAM 0 on digital output 1, Pos CAM 1 on digital output 2.
6.12 BACKLASH RECOV menu

<table>
<thead>
<tr>
<th>IpA</th>
<th>Parameter Name</th>
<th>User type</th>
<th>Target type</th>
<th>Unit</th>
<th>Default</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>11470</td>
<td>Back Lash En</td>
<td>Boolean</td>
<td>Boolean</td>
<td>-</td>
<td>Off</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11472</td>
<td>Back Lash Dir</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Positive</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11474</td>
<td>Delta Pos</td>
<td>Float</td>
<td>Float</td>
<td>u.u.</td>
<td>10</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11476</td>
<td>Speed Comp</td>
<td>Float</td>
<td>Float</td>
<td>rpm</td>
<td>100.00</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Back Lash En**
Enabling of the backlash recovery function.

**Back Lash Dir**
Setting of the direction of movement that activates backlash recovery. Positive refers to movement that generates a positive position delta.

**Delta Pos**
Setting of the position value to add or deduct from the target position.

**Speed Comp**
Maximum positioning speed during return positioning (recovery).

6.13 ABOUT menu

<table>
<thead>
<tr>
<th>IpA</th>
<th>Parameter Name</th>
<th>User type</th>
<th>Target type</th>
<th>Unit</th>
<th>Default</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>12000*</td>
<td>APPLVERSION</td>
<td>Float</td>
<td>Float</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12002*</td>
<td>MDPLCVERSION</td>
<td>Float</td>
<td>Float</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12004*</td>
<td>CONFVERSION</td>
<td>Float</td>
<td>Float</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12006*</td>
<td>APPLDATE</td>
<td>Float</td>
<td>Float</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

6.14 PROFILE GEN menu

(Gray background indicates parameters available in Expert mode)

<table>
<thead>
<tr>
<th>IpA</th>
<th>Parameter Name</th>
<th>User type</th>
<th>Target type</th>
<th>Unit</th>
<th>Default</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter Name</td>
<td>User type</td>
<td>Target type</td>
<td>Unit</td>
<td>Default</td>
<td>Min</td>
<td>Max</td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------</td>
<td>-------------</td>
<td>------</td>
<td>---------</td>
<td>-----</td>
<td>-----</td>
<td></td>
</tr>
<tr>
<td>Special funct type</td>
<td>Enum</td>
<td>Word</td>
<td></td>
<td>None</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Special funct P1</td>
<td>Float</td>
<td>Float</td>
<td></td>
<td>0</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Special funct P2</td>
<td>Float</td>
<td>Float</td>
<td></td>
<td>0</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Special funct P3</td>
<td>Float</td>
<td>Float</td>
<td></td>
<td>0</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Special funct P4</td>
<td>Float</td>
<td>Float</td>
<td></td>
<td>0</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Special funct V1</td>
<td>Float</td>
<td>Float</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Special funct V2</td>
<td>Float</td>
<td>Float</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Special funct V3</td>
<td>Float</td>
<td>Float</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Special funct V4</td>
<td>Float</td>
<td>Float</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Prof pos out</td>
<td>Float</td>
<td>Float</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Prof speed out</td>
<td>Float</td>
<td>Float</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Prof acc out</td>
<td>Float</td>
<td>Float</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Prof pos act</td>
<td>Float</td>
<td>Float</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Special funct type Parameter for activating special functions (e.g. management of virtual axes).

0 None No functions enabled.

1 Pantograph Virtual axis function for pantograph lifter. If activated, the value for the arm L (see paragraph 5.5.6) must be entered in the Special funct P1 parameter.

Special funct P1...P4 Auxiliary parameters for special functions.

Special funct V1...V4 Read only auxiliary parameters for special functions.

6.15 TOUCH PROBE menu

The Positioning with Touch Probe function is described in paragraph 5.5.2.

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>User type</th>
<th>Target type</th>
<th>Unit</th>
<th>Default</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Touch Probe Step</td>
<td>Float</td>
<td>Float</td>
<td>u.u.</td>
<td>0.000</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Touch Probe Speed</td>
<td>Float</td>
<td>Float</td>
<td>rpm</td>
<td>100.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Touch Probe Acc</td>
<td>Float</td>
<td>Float</td>
<td>s</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Touch Probe Channel</td>
<td>Enum</td>
<td>Word</td>
<td></td>
<td>Freeze on F0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Touch Probe Chg Set</td>
<td>Enum</td>
<td>Word</td>
<td></td>
<td>Use preset par</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Touch Probe Freeze</td>
<td>Float</td>
<td>Float</td>
<td></td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Touch Probe Step The maximum value of the position range within which the touch probe event must occur, i.e. detection of an edge in the fast sampling signal of the actual position via the F0 or F1 freeze channel of the position encoder signal acquisition card. The sign of this parameter also determines the direction of movement while waiting for the touch probe signal.

Touch Probe Speed Setting of the maximum value to be maintained while waiting for the touch probe event.

Touch Probe Acc Setting of the acceleration value to be maintained while waiting for the touch probe event.

Touch Probe Channel Selection of the input channel (freeze) of the position encoder signal acquisition card on which the touch probe function is active.

0 Freeze on F0 The touch probe function is active on the F0 input of the position encoder card.
1 Freeze on F1

The touch probe function is active on the F1 input of the position encoder card.

Touch Probe Chg Set

Selection of the acceleration speed to use during the touch probe event waiting phase.

0 Use TouchP Par

The Touch Probe Speed and Touch Probe Acc parameters are used.

1 Use Preset Par

The Pos Speed 0 – 7 and Pos Acc 0 – 7 position preset parameters are used in touch probe positioning mode (where Position Mode 0 – 7 = Touch Probe).

Touch Probe Freeze

The position sampled in correspondence with the touch probe event is displayed.

6.16 ENCODER CAPTURE menu

All encoder signal acquisition cards for the ADV200 fw version 3.0.0 support 2 separate channels for fast sampling of the position read by the encoder, called "encoder freeze" signals.

This menu contains the parameters for selecting the encoder freeze signal used in touch probe positioning mode and with Pos Memo 0 function.

<table>
<thead>
<tr>
<th>Ipa</th>
<th>Parameter Name</th>
<th>User type</th>
<th>Target type</th>
<th>Unit</th>
<th>Default</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>11560</td>
<td>Capture Edge F0</td>
<td>Enum</td>
<td>Word</td>
<td>Rising</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11576</td>
<td>Capture Edge F1</td>
<td>Enum</td>
<td>Word</td>
<td>Rising</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Capture Edge F0

Selection of the edge of the input channel (freeze) of the position encoder signal acquisition card on which sampling of the actual position is active (freeze).

0 Rising

Sampling of the actual position is performed on the rising edge of the F0 input of the position encoder card.

1 Falling

Sampling of the actual position is performed on the falling edge of the F0 input of the position encoder card.

Capture Edge F1

Selection of the edge of the input channel (freeze) of the position encoder signal acquisition card on which sampling of the actual position sampling is active (freeze).

0 Rising

Sampling of the actual position is performed on the rising edge of the F1 input of the position encoder card.

1 Falling

Sampling of the actual position is performed on the falling edge of the F1 input of the position encoder card.

Note!

When Resolver is used for position feedback, the “Encoder freeze” channels are not available thru EXP-RES-I1R1F2-ADV board. “Freeze” functions are available by using the ADV200 regulator board (IPA 2094 Resolver freeze0 src to assign function: F0, IPA 2096; Resolver freeze1 src to assign function F1). The way to set the positioning function are the same as the Encoder programming.
6.17 FIELDBUS menu

The parameters in this menu can be used to select the format of the data exchanged via fieldbus when the Commands mode parameter in the POSITIONER CONF menu is set to "Fieldbus". This allows more flexible management of data formats on the supervision PLC.

<table>
<thead>
<tr>
<th>Ip</th>
<th>Parameter Name</th>
<th>User type</th>
<th>Target type</th>
<th>Unit</th>
<th>Default</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>11582</td>
<td>Pos Preset 0 Type</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Integer</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11584</td>
<td>Pos Speed 0 Type</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Integer</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11586</td>
<td>Actual position Type</td>
<td>Enum</td>
<td>Word</td>
<td>-</td>
<td>Integer</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Pos Preset 0 Type**

This parameter determines the format of the target position sent by the control device to the drive via fieldbus.

- 0 **Integer** Integer format (16-bit signed).
- 1 **Floating point** Floating point format (32-bit).

**Pos Speed 0 Type**

This parameter determines the format of the positioning speed reference sent by the control device to the drive via fieldbus.

- 0 **Integer** Integer format (16-bit signed).
- 1 **Floating point** Floating point format (32-bit).

**Actual position Type**

This parameter determines the format of the actual position sent by the control device to the drive via fieldbus.

- 0 **Integer** Integer format (16-bit signed).
- 1 **Floating point** Floating point format (32-bit).