CONNECTOR MATES
WITH DEUTCH
CONNECTOR #DTM-06-125A

PIN #1
INDICATED
1
12
6
7

47.1 mm
[1.85]

51.6 mm
[2.03]

144.5 mm
5.69

158.2 mm
6.23

2x 25.2 mm
[1.0]

2x ∅7.0
[.28]

MOUNTING
DIRECTION

PLUS+1™ GUIDE
Software

Generic Dual Path
Application Block
User Manual

GDP_Application
About this Manual

Organization and Headings
To help you quickly find information in this manual, the material is divided into sections, topics, subtopics, and details, with descriptive headings set in red type. Section titles appear at the top of every page in large red type. Topic headings appear in the left-hand column in bold red type. Subtopic headings appear above the body text in bold red type and detail headings in italic red type.

References (example: See Topic xyz, page XX) are also formatted in red italic type. In Portable Document Format (PDF) files, these references are hyperlinks that jump to the corresponding document pages.

Tables, Illustrations, and Complementary Information
Tables, illustrations, and graphics in this manual are identified by titles set in blue italic type above each item. Complementary information such as notes, captions, and drawing annotations are also set in blue type.

Special Text Formatting
Controls and indicators are set in bold black type.
Black italic type is used in the text to emphasize important information, or to set off words and terms that are used in an unconventional manner or alternative context.

Table of Contents
A Table of Contents (TOC) appears on the next page. In the PDF version of this document, the TOC entries are hyperlinked.

Revision history

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rev AB</td>
<td>November 2009</td>
<td>Supports software release 1.01</td>
</tr>
</tbody>
</table>
# Contents

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This manual documents the **GDP_Application** (GDP = Generic Dual Path) block, which is designed for use in dual path applications.

The **GDP_Application** block receives steering and propel inputs. Based on these inputs, this block outputs left and right speed commands.

Logic within the **GDP_Application** block provides these core dual path functions:

- Differential steering ratios.
- Ramps applied during acceleration, deceleration, and braking.
- Upshift and downshift points for two-position motors.

The **GDP_Application** block also contains “socket pages” for optional “plug-ins.”

Plug-ins are software that can be used to increase the functionality of the **GDP_Application** block.

Plug-ins are packaged in pages that can be imported into and connected to matching socket pages within the **GDP_Application** block.

The following plug-ins are available for use in the **GDP_Application** block:

- **Temp_Derate** plug-in—the **GDP_Application** block uses this plug-in’s output to scale down its propel commands when hydraulic fluid becomes too hot. Scaling down slows down temperature increases and helps prevent damage to hydraulic systems.

- **Antistall** plug-in—the **GDP_Application** block uses this plug-in’s output to scale down speed commands to prevent heavy loads from stalling the engine.

- **Trackstall** plug-in—the **GDP_Application** block uses this plug-in’s output to limit the scaling of its speed commands by the **Antistall** plug-in. This scaling limitation maintains track tension and keeps tracks from completely stopping under antistall conditions.

- **Tracker** plug-in—the **GDP_Application** block applies this plug-in’s output to correct track speed errors caused by uneven loading, hydraulic leakage, and imperfect calibration.
Page Symbols

<table>
<thead>
<tr>
<th>Page_Name</th>
<th>Plug—Plug-in page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inputs</td>
<td>Outputs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Page_Name</th>
<th>Key—Page keyed to application hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inputs</td>
<td>Outputs</td>
</tr>
</tbody>
</table>

Page symbols indicate page properties:

- **Plug**—the page contains a plug-in. A plug-in is software that extends the functionality of an application.
- **Key**—an application that contains this page can only download to similarly keyed application hardware.

Page Access

Some pages are view disabled to completely limit or partially limit access to their contents.

- The contents of a completely view-disabled page cannot be viewed.
- Some pages inside a partially view-disabled page can be viewed.

View-disabled pages display a message when you try to enter them.
Additional Documentation

- PLUS+1 Controller Family Technical Information (Sauer-Danfoss part 520L0719)
- Recommended Machine Electronic Control System Start-up Procedures (Sauer-Danfoss part 11010667)
- PLUS+1 GUIDE Service Tool User Manual (Sauer-Danfoss part 520L0899)
- Generic Dual Path Subsystem Application User Manual (Sauer-Danfoss part 11061724)
- Generic Dual Path Subsystem Application Service Tool User Manual (Sauer-Danfoss part 11058326)
- PLUS+1 GUIDE Basic Function Blocks Library User Manual (Sauer-Danfoss part 10103409)
- Plug-in documentation:
  - Antistall Plug-in GUIDE Programming User Manual (Sauer-Danfoss part 11057258)
  - How to Tune the Antistall and Tracker Plug-ins User Manual (Sauer-Danfoss part 11060612)
  - Temperature Derate Plug-in GUIDE Programming User Manual (Sauer-Danfoss part 11057257)
  - Tracker Plug-in GUIDE Programming User Manual (Sauer-Danfoss part 11057260)
  - Trackstall Plug-in GUIDE Programming User Manual (Sauer-Danfoss part 11057259)
To simplify connecting GDP_Application block signals, first install and connect plug-ins. Connect as many plug-in signals as possible. Then connect GDP_Application block signals.

Input Signals

The following tables describe input signals applied to the GDP_Application block.

Inputs Bus Signals

<table>
<thead>
<tr>
<th>Bus/Signal</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inputs bus</td>
<td>—</td>
<td>Inputs signals required by the GDP_Application block and any plug-ins that are installed in the block.</td>
</tr>
<tr>
<td>B_Mtr2Pos signal*</td>
<td>BOOL</td>
<td>T = Configure for two-position motors. F = Configure for fixed displacement or proportional displacement motors.</td>
</tr>
<tr>
<td>B_SetDefaults signal*</td>
<td>BOOL</td>
<td>T = Set defaults in the CoreParams page.</td>
</tr>
<tr>
<td>Desired_RPM signal†</td>
<td>U16</td>
<td>Throttle (desired) rpm input for the Antistall plug-in.</td>
</tr>
<tr>
<td>Engine_RPM signal†</td>
<td>U16</td>
<td>Actual engine rpm input for the Antistall plug-in.</td>
</tr>
<tr>
<td>L_PPU_RPM signal†</td>
<td>S16</td>
<td>Left PPU input for the Tracker plug-in.</td>
</tr>
<tr>
<td>R_PPU_RPM signal†</td>
<td>S16</td>
<td>Right PPU input for the Tracker plug-in.</td>
</tr>
<tr>
<td>PhasePt_Pct2 signal*</td>
<td>U16</td>
<td>Propel command at which:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Two position motors shift between low and high positions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Proportional motors shift between pump and motor phases.</td>
</tr>
<tr>
<td>Temp_C signal†</td>
<td>U16</td>
<td>Temperature input for the Temp_Derate plug-in.</td>
</tr>
</tbody>
</table>
### Inputs Bus Signals

<table>
<thead>
<tr>
<th>Bus/Signal</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disable sub-bus</td>
<td>——</td>
<td>Inputs required for installed plug-ins.</td>
</tr>
<tr>
<td>B_Disable_AStall signal†</td>
<td>BOOL</td>
<td>T = Enable the Antistall plug-in. F = Disable the Antistall plug-in. (Enabling and disabling the Antistall plug-in also enables and disables the Trackstall plug-in.)</td>
</tr>
<tr>
<td>B_Disable_SpdCtrl signal†</td>
<td>BOOL</td>
<td>T = Enable the Tracker plug-in. F = Disable the Tracker plug-in.</td>
</tr>
<tr>
<td>B_Disable_Temp signal‡</td>
<td>BOOL</td>
<td>T = Enable the Temp_DeRate plug-in. F = Disable the Temp_DeRate plug-in.</td>
</tr>
</tbody>
</table>

*You must connect this signal for a successful compile. If the GDP_Application block is installed in the GDP Subsystem Application, connect this signal to the appropriate Subsystem Application signal. If the GDP_Application block is being used “stand-alone,” connect this signal to an external input, constant, or EE component as appropriate.

†You must connect this signal for a successful compile when using the plug-in associated with the signal.

‡You must connect each B_Disable signal to the Disable bus when using the plug-in associated with the signal. (Installing the GDP_Application block in the GDP Subsystem Application makes the Disable bus available.) If the GDP_Application block is not installed in the Subsystem Application, you must individually connect each plug-in’s B_Disable signal.
### Cmd Bus Signals

<table>
<thead>
<tr>
<th>Bus/Signal</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cmd bus</strong></td>
<td>———</td>
<td>Required command signals for the GDP_Application block.</td>
</tr>
</tbody>
</table>
| AllowHR signal* | BOOL | Allow upshifts on two-position and proportional motors.  
T = Allow upshifts.  
F = Disable upshifts. |
| Propel signal* | S16 | Propel input, typically from a joystick.  
Range: ±10000 (10000 = 100.00%) |
| RampMode signal* | U8 | Selects a ramp time for the propel command from a three-element array output from the Ramps page.  
You can add more elements to this array to add more ramp times.  
The default selections are:  
0 = Normal.  
1 = Decel.  
2 = Brake. |
| Steer signal* | S16 | Steer input, typically from a joystick.  
0 = Straight/±10000 = Pivot Steer/±20000 = Counter-rotate.  
Range: ±20000 (20000 = 200.00%) |

*You must connect this signal for a successful compile.
Output Signals

The following tables describe the signals output by the GDP_Application block.

### Status Bus Signals

<table>
<thead>
<tr>
<th>Bus/Signal</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status bus</td>
<td>———</td>
<td>Outputs signals that report the status of the GDP_Application block and any plug-ins that are installed inside this block.</td>
</tr>
<tr>
<td>RampedPropel signal</td>
<td>S16</td>
<td>Rate-limited propel command with smoothing applied by a Soft_Ramp function block. The Soft_Ramp function block is locked inside the GDP_Application block. For more about the Soft_Ramp function block, refer to the PLUS+1 GUIDE Basic Function Blocks Library User Manual (Sauer-Danfoss part 10103409). Range: 0–±10000 (10000 = 100.00%)</td>
</tr>
<tr>
<td>UnrampedPropel signal</td>
<td>S16</td>
<td>Rate-limited propel command without any smoothing. Range: 0–±10000 (10000 = 100.00%)</td>
</tr>
<tr>
<td>Status/OL_Cmd bus</td>
<td>———</td>
<td>Outputs open-loop propel command and propel command related signals.</td>
</tr>
<tr>
<td>L_Cmd_Pct2 signal</td>
<td>S16</td>
<td>Left speed command before the Tracker plug-in applies error correction. Range: ±10000 (10000 = 100.00%)</td>
</tr>
<tr>
<td>R_Cmd_Pct2 signal</td>
<td>S16</td>
<td>Right speed command before the Tracker plug-in applies error correction. Range: ±10000 (10000 = 100.00%)</td>
</tr>
</tbody>
</table>
| Limit_Pct2 signal | U16      | Maximum possible speed command. For two-position motors in:  
- Low speed = PhasePt_Pct2 signal.  
- High speed = 10000 (100.00%). For single-speed and proportional displacement motors, always = 10000 (100.00%) unless the AllowHR signal = F. Range: 0–10000 (10000 = 100.00%) |
## Status Bus Signals

<table>
<thead>
<tr>
<th>Bus/Signal</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status/PowerDistr</td>
<td>——</td>
<td>Signals from the Antistall plug-in. For more information about these signals, refer to the Antistall Plug-in GUIDE Programming User Manual (Sauer-Danfoss part 11057258).</td>
</tr>
<tr>
<td>Power_Pct2 signal</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>Status signal</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>Status/RampedCmd</td>
<td>——</td>
<td>Speed commands after ramping but before power distribution (antistall) scaling. Compare the signals in this bus with the signals in the Status/UnrampedCmd bus.</td>
</tr>
<tr>
<td>L_Cmd_Pct2 signal</td>
<td>S16</td>
<td>Left speed command after smoothing but before power distribution (antistall) scaling. Smoothing is applied by a Time_Ramp function block locked inside the GDP_Application block. For more about the Time_Ramp function block, refer to the PLUS+1 GUIDE Basic Function Blocks Library User Manual (Sauer-Danfoss part 10103409). Range: ±10000 (10000 = 100.00%)</td>
</tr>
<tr>
<td>R_Cmd_Pct2 signal</td>
<td>S16</td>
<td>Right speed command after smoothing but before power distribution (antistall) scaling. Smoothing is applied by a Time_Ramp function block locked inside the GDP_Application block. For more about the Time_Ramp function block, refer to the PLUS+1 GUIDE Basic Function Blocks Library User Manual (Sauer-Danfoss part 10103409). Range: ±10000 (10000 = 100.00%)</td>
</tr>
<tr>
<td>Status/SpeedControl</td>
<td>——</td>
<td>Signals from the Tracker plug-in. For more information about these signals, refer to the Tracker Plug-in GUIDE Programming User Manual (Sauer-Danfoss part 11057260).</td>
</tr>
<tr>
<td>Saturated signal</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>Status signal</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>Status/Tmp_Derate</td>
<td>——</td>
<td>Signals from the Temp_Derate plug-in. For more information about these signals, refer to the Temperature Derate Plug-in GUIDE Programming User Manual (Sauer-Danfoss part 11057257).</td>
</tr>
<tr>
<td>Status signal</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>Temp_Derate_Pct2</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>Status/UnrampedCmd</td>
<td>——</td>
<td>Speed commands without ramping and before power distribution (antistall) scaling. Compare the signals in this bus with the signals in the Status/RampedCmd bus.</td>
</tr>
<tr>
<td>L_Cmd_Pct2 signal</td>
<td>S16</td>
<td>Left speed command without smoothing and before power distribution (antistall) scaling. Range: ±10000 (10000 = 100.00%)</td>
</tr>
<tr>
<td>R_Cmd_Pct2 signal</td>
<td>S16</td>
<td>Right speed command without smoothing and before power distribution (antistall) scaling. For more about the Time_Ramp function block, refer to the PLUS+1 GUIDE Basic Function Blocks Library User Manual (Sauer-Danfoss part 10103409). Range: ±10000 (10000 = 100.00%)</td>
</tr>
</tbody>
</table>
## Left and Right Signals

<table>
<thead>
<tr>
<th>Signal</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>L_Cmd_Pct2 signal</td>
<td>S16</td>
<td>Rate-limited left speed command, after scaling by any plug-ins in use. Range: ±10000 (10000 = 100.00%)</td>
</tr>
<tr>
<td>R_Cmd_Pct2 signal</td>
<td>S16</td>
<td>Rate-limited right speed command, after scaling by any plug-ins in use. Range: ±10000 (10000 = 100.00%)</td>
</tr>
</tbody>
</table>

## Phase Bus Signals

<table>
<thead>
<tr>
<th>Bus/Signal</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase bus</td>
<td>———</td>
<td>Outputs motor-related signals.</td>
</tr>
<tr>
<td>B_Mtr2Pos signal</td>
<td>BOOL</td>
<td>T = Configured for two-position motors.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F = Configured for single-speed or proportional motors.</td>
</tr>
<tr>
<td>MtrPos signal</td>
<td>BOOL</td>
<td>T = Two-position motors shifted to high speed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F = Two-position motors shifted to low speed.</td>
</tr>
<tr>
<td>PhasePt_Pct2 signal</td>
<td>U16</td>
<td>Propel command at which:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– Two position motors shift between low and high positions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– Proportional motors shift between pump and motor phases.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Range: 0–10000 (10000 = 100.00%)</td>
</tr>
</tbody>
</table>
The GDP Application contains:

- **CoreParams** page with non-volatile memory (EE) components whose output signals configure the GDP_Application block.
- **GDP_Application** block that is a wrapper for a keyed GDP_Application page. The keyed GDP_Application page has:
  - Logic that provides the basic functionality for this application.
  - Socket pages for optional plug-ins.

### GDP_Application

<table>
<thead>
<tr>
<th>Callout</th>
<th>Item</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Inputs bus</td>
<td>——</td>
<td>Inputs signals required by:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– The GDP_Application block.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– Any plug-in plug-ins that are installed in the GDP_Application block.</td>
</tr>
<tr>
<td>2</td>
<td>CoreParams page</td>
<td>——</td>
<td>Contains non-volatile memory (EE) components whose output signals define the GDP_Application block’s steering, propel, shift, and braking ramp values. The CoreParams page also passes through some Inputs bus signals.</td>
</tr>
<tr>
<td>3</td>
<td>GDP_Application block</td>
<td>——</td>
<td>Is a wrapper page for a keyed GDP_Application page. The keyed GDP_Application page has:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– Logic that provides the basic functionality for this application.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– Socket pages for optional plug-ins.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The keyed GDP_Application page can only be downloaded to similarly keyed application hardware.</td>
</tr>
<tr>
<td>4</td>
<td>Cmd bus</td>
<td>——</td>
<td>Inputs command signals to the GDP_Application block.</td>
</tr>
<tr>
<td>5</td>
<td>Status bus</td>
<td>——</td>
<td>Outputs signals that report the status of:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– The GDP_Application block.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– Any plug-ins that are installed inside the GDP_Application block.</td>
</tr>
<tr>
<td>6</td>
<td>Left signal</td>
<td>U16</td>
<td>Rate-limited left speed command.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Range: ±10000 (10000 = 100.00%)</td>
</tr>
<tr>
<td>7</td>
<td>Right signal</td>
<td>U16</td>
<td>Rate-limited right speed command.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Range: ±10000 (10000 = 100.00%)</td>
</tr>
<tr>
<td>8</td>
<td>Phase bus</td>
<td>——</td>
<td>Outputs motor-related signals.</td>
</tr>
</tbody>
</table>
The **CoreParams** page contains:

- Two non-volatile memory (EE) components whose signals define:
  - Differential steering.
  - Shift values for two-position motors and a limit for proportional motors if the `AllowHR` signal = F.
- A **Ramps** page with EE components whose signals define propel, steering, and braking ramps.

### CoreParams Page

<table>
<thead>
<tr>
<th>Callout</th>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PARAMETER OPEN</td>
<td>Marks the open of a location that uses values from a GDP Defaults file.</td>
</tr>
</tbody>
</table>
|         | component        | The comma-separated file used to create the GDP Defaults file has a **TypeName** value. The **TypeName** value becomes part of the GDP Defaults file. PARAMETER OPEN component output signal = T when the **TypeName** value in the GDP Defaults file matches the PARAMETER OPEN component's **TYPE** field (GDP here). If the PARAMETER OPEN component signal = T, then when:  
|         |                  | - SetDefs_AppBlock signal = T—set the EE components in this page to their default (IN) values.  
|         |                  | - B_Set_Defaults signal = T—set all the EE components in this page and elsewhere in the application to their default (IN) values. |
| 2       | PARAMETER CLOSE  | Marks the close of a location that uses values from a GDP Defaults read-only parameter file. The COMMENT field (GDP Defaults here) is a non-compiled comment. |
### CoreParams Page

<table>
<thead>
<tr>
<th>Callout</th>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Ramps page</td>
<td>Contains EE components whose signals define propel and steering ramps.</td>
</tr>
<tr>
<td>4</td>
<td>EE_Core_DiffSteer_Pct2</td>
<td>Outputs the DiffSteer_Pct2 signal.</td>
</tr>
<tr>
<td></td>
<td>EE component</td>
<td>In a turn, the inside track speed command always decreases. The outside track speed command can stay the same or increase. This signal sets how much of the decrease in the inside track speed command gets added to the outside track speed command. The greater the DiffSteer_Pct2 value, the greater the differential steering effect. In a turn, a DiffSteer_Pct2 value of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– 10000 (100.00%) adds 100% of the decrease in the inside track speed command to the outside track speed command. Enter a value of 10000 (100.00%) for full differential steering.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– 6000 (60.00%) adds 60% of the decrease in the inside track speed command to the outside speed command.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– 0 (0%) does not increase the outside track speed command.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Range: 0–10000 (10000 = 100.00%)</td>
</tr>
<tr>
<td>5</td>
<td>EE_Core_ShiftHyst_Pct2</td>
<td>Outputs the ShiftHyst_Pct2 signal. Applications with two-position motors use this signal. This signal sets the percentage that the speed command with the highest value must drop below the PhasePt_Pct2 value before the motors downshift to low-speed. (The ShiftHyst_Pct2 value should never be larger than the PhasePt_Pct value. Otherwise motors once shifted to high will never downshift to low.)</td>
</tr>
<tr>
<td></td>
<td>EE component</td>
<td>Example—A machine with two-position motors has a:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– ShiftHyst_Pct2 value of 500 (5.00%).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– PhasePt_Pct value of 5000 (50.00%).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The motors upshift when the highest speed command reaches 5000 (50.00%). The highest speed command must drop below 4500 (45.00%) before the motors downshift.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Range: 0–10000 (100.00%)</td>
</tr>
</tbody>
</table>
About Differential Steer Percent

In a turn, the `DiffSteer_Pct2` value sets what percentage of the decrease in the inside track speed command gets added to the outside track speed command.

The greater the `DiffSteer_Pct2` value, the greater the differential steering effect. A `DiffSteer_Pct2` value of 10000 (100.00%) gives the maximum differential steering effect.

In this example, the:

- Propel command stays constant at 4000 (40.00%).
- Steer command ranges from 0–20000 (200.00%).
  (A steer command greater than 10000 (100.00%) starts counter-rotation.)
- The `DiffSteerPct_2` values are 0 (0%), 6000 (60.00%), and 10000 (100.00%).
In this example, the:

- Propel command stays constant at 8000 (80.00%).
- Steer command ranges from 0–20000 (200.00%).
  
  (A steer command greater than 10000 (100.00%) starts counter-rotation.)
- The DiffSteerPct_2 values are 0 (0%), 6000 (60.00%), and 10000 (100.00%).
The Ramps page contains non-volatile memory (EE) components whose signals define the ramps output by Soft_Ramp and Time_Ramp function blocks. Both of these blocks are locked inside the GDP_Application block.

- The Soft_Ramp function block smoothes propel command changes.
- The Time_Ramp function block smoothes the effects of steering command changes.

Keep the total of EE_Ramp_Soft_Start and EE_Ramp_Soft_End values below 100 (100%). Values greater than 100 (100%) produce erratic acceleration and deceleration behavior.

The two Encode components output arrays. Array elements are the propel ramp times. The RampMode signal (which comes from outside the GDP_Application block) selects ramp times by picking array elements.

By default, RampMode signal values of 0, 1, 2 select ramp modes (ramp times) of Normal, Decel, and Brake.

For more ramp modes:
- Add more EE components to increase the number of elements in the arrays.
- Add logic to increase the number of RampMode signal values.

### Ramps Page

<table>
<thead>
<tr>
<th>Callout</th>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1 | EE_Ramp_Normal_DecTm | Outputs the A_DecTm_ms signal. This signal applies in deceleration when the RampMode signal = 0 (the default RampMode of Normal). This signal sets the decrement time of a Soft_Ramp function block that is locked inside the GDP_Application block. This function block smooths changes in propel commands. Decrement time is the time (in ms) that it takes for the propel command to decrease from ±10000 to 0. Partial decreases in the propel command take a time that is proportional to the total decrement time. With a A_DecTm_ms value of 2000 (2000 ms):
- A 100.00% decrease in the propel command from 10000 to 0 takes 2000 ms.
- A 50.00% decrease in the propel command from 7500 to 2500 takes 1000 ms.
For more about the Soft_Ramp function block, refer to the PLUS+1 GUIDE Basic Function Blocks Library User Manual (Sauer-Danfoss part 10103409). Range: Loop Time–65535 (1000 = 1000 ms) |
| 2 | EE_Ramp_Brake_Tm | Outputs the A_DecTm_ms signal. This signal applies in deceleration when the RampMode signal = 2 (the default RampMode of Brake). This signal sets the decrement time of a Soft_Ramp function block that is locked inside the GDP_Application block. This function block smooths changes in propel commands. Decrement time is the time (in ms) that it takes for the propel command to decrease from ±10000 to 0. Partial decreases in the propel command take a time that is proportional to the total decrement time. With a A_DecTm_ms value of 500 (500 ms):
- A 100.00% decrease in the propel command from 10000 to 0 takes 500 ms.
- A 50.00% decrease in the propel command from 7500 to 2500 takes 250 ms.
For more about the Soft_Ramp function block, refer to the PLUS+1 GUIDE Basic Function Blocks Library User Manual (Sauer-Danfoss part 10103409). Range: Loop Time–65535 (1000 = 1000 ms) |
| 3 | EE_Ramp_Decel_Tm | Outputs the A_DecTm_ms signal. This signal applies in deceleration when the RampMode signal = 1 (the default RampMode of Decel). This signal sets the decrement time of a Soft_Ramp function block that is locked inside the GDP_Application block. This function block smooths changes in propel commands. Decrement time is the time (in ms) that it takes for the propel command to decrease from ±10000 to 0. Partial decreases in the propel command take a time that is proportional to the total decrement time. With a A_DecTm_ms value of 700 (700 ms):
- A 100.00% decrease in the propel command from 10000 to 0 takes 700 ms.
- A 50.00% decrease in the propel command from 7500 to 2500 takes 350 ms.
For more about the Soft_Ramp function block, refer to the PLUS+1 GUIDE Basic Function Blocks Library User Manual (Sauer-Danfoss part 10103409). Range: Loop Time–65535 (1000 = 1000 ms) |
### Ramps Page

<table>
<thead>
<tr>
<th>Callout</th>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
</table>
| 4 | EE_Ramp_Normal_IncTm | Outputs the \texttt{A\_IncTm\_ms} signal. This signal applies during acceleration. This signal sets the increment time of a \texttt{Soft\_Ramp} function block that is locked inside the \texttt{GDP\_Application} block. This function block smoothes changes in propel commands. Increment time is the time (in ms) that it takes for the propel command to increase from 0 to \pm 10000. Partial increases in the propel command take a time that is proportional to the total increment time. With an \texttt{A\_IncTm\_ms} value of 2000 (2000 ms):  
  - A 100.00\% increase in the propel command from 0 to 10000 takes 2000 ms.  
  - A 50.00\% increase in the propel command from 2500 to 7500 takes 1000 ms. For more about the \texttt{Soft\_Ramp} function block, refer to the \texttt{PLUS+1 GUIDE Basic Function Blocks Library User Manual} (Sauer-Danfoss part 10103409). Range: Loop Time–65535 (1000 = 1000 ms) |
| 5 | EE_Ramp_Soft_Start | Outputs the \texttt{SftStrt\_Pct} signal. This signal sets the soft start percentage of a \texttt{Soft\_Ramp} function block that is locked inside the \texttt{GDP\_Application} page. This function block smoothes changes in propel commands. Soft start percentage is the percent of total ramp time in which a soft acceleration occurs. For more about the \texttt{Soft\_Ramp} function block, refer to the \texttt{PLUS+1 GUIDE Basic Function Blocks Library User Manual} (Sauer-Danfoss part 10103409). Range: 0–99 (1 = 1\%) |
| 6 | EE_Ramp_Soft_End | Outputs the \texttt{SftEnd\_Pct} signal. This signal sets the soft end percentage of a \texttt{Soft\_Ramp} function block that is locked inside the \texttt{Application} page. This function block smoothes changes in propel commands. Soft end percentage is the percent of total ramp time in which a soft deceleration occurs. For more about the \texttt{Soft\_Ramp} function block, refer to the \texttt{PLUS+1 GUIDE Basic Function Blocks Library User Manual} (Sauer-Danfoss part 10103409). Range: 0–99 (1 = 1\%) |
| 7 | EE_PwrSclDecTm | T = Reduce the propel ramp decrease time by the output of the \texttt{PowerDistr} (antistall) page plug-in. F = Do not use the output of the \texttt{PowerDistr} to reduce the propel ramp decrease time. |
| 8 | EE_Ramp_Steer_IncTm | Outputs the \texttt{IncTm\_ms} signal. This signal sets the increment time of two \texttt{Time\_Ramp} function blocks that are locked inside the \texttt{GDP\_Application} page. These function blocks smoothes changes in steer commands. Increment time is the time (in ms) that it takes for a steering multiplier to increase from 0 to \pm 10000 (from pivot steer to straight ahead). Partial increases in the steering multiplier take a time that is proportional to the total increment time. With an \texttt{IncTm\_ms} value of 444 (444 ms):  
  - A 100.00\% increase in the steering multiplier from 0 to 10000 takes 444 ms.  
  - A 50.00\% increase in the steering multiplier from 2500 to 7500 takes 222 ms. For more about the \texttt{Time\_Ramp} function block, refer to the \texttt{PLUS+1 GUIDE Basic Function Blocks Library User Manual} (Sauer-Danfoss part 10103409). Range: Loop Time–65535 (1000 = 1000 ms) |
### Ramps Page

<table>
<thead>
<tr>
<th>Callout</th>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
</table>
| 9       | EE_Ramp_Steer_DecTm | Outputs the DecTm_ms signal. This signal sets the decrement time of two Time_Ramp function blocks that are locked inside the GDP_Application block. These function blocks smooth changes in steer commands. Decrement time is the time (in ms) that it takes for the steering multiplier to decrease from ±10000 to 0 (from straight ahead to pivot steer). Partial decreases in the steering multiplier take a time that is proportional to the total decrement time. With a DecTm_ms value of 444 (444 ms):
- A 100.00% decrease in the steering multiplier from 10000 to 0 takes 444 ms.
- A 50.00% decrease in the steering multiplier from 7500 to 2500 takes 222 ms. For more about the Time_Ramp function block, refer to the PLUS+1 GUIDE Basic Function Blocks Library User Manual (Sauer-Danfoss part 10103409). Range: Loop Time–65535 (1000 = 1000 ms) |
The **GDP_Application** page has a:

- Keyed **GDP_Application** page that contains:
  - The logic that provides the basic functionality for this application. The **GDP_Application** page properties are set to disable viewing or editing this logic.
  - Socket pages for optional plug-ins. The **GDP_Application** page properties are set to enable access to these socket pages.

  The keyed **GDP_Application** page only downloads to similarly keyed application hardware.

- A pass-through **Parameter** page with descriptions of the parameters that originate in the **CoreParams** page.

### GDP_Application Page

<table>
<thead>
<tr>
<th>Callout</th>
<th>Item</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Params</strong></td>
<td>bus</td>
<td>Inputs signals that originate from the non-volatile memory (EE) components in the <strong>CoreParams</strong> page.</td>
</tr>
<tr>
<td>2</td>
<td><strong>Parameter</strong> page</td>
<td>——</td>
<td>Passes through signals that originate in <strong>CoreParams</strong> page and contains a description of each signal.</td>
</tr>
<tr>
<td>3</td>
<td><strong>Inputs</strong></td>
<td>bus</td>
<td>Inputs signals required by the <strong>GDP_Application</strong> block and any plug-ins that are installed in the block.</td>
</tr>
<tr>
<td>4</td>
<td><strong>Cmd</strong></td>
<td>bus</td>
<td>Inputs command signals required by the application block.</td>
</tr>
</tbody>
</table>
| 5       | **Steer**  | S16       | Steer input, typically from a joystick.  
0 = Straight/±10000 = Pivot Steer/±20000 = Counter-rotate.  
Range: ±20000 (20000 = 200.00%) |
| 6       | **Propel** | S16       | Propel input, typically from a joystick.  
Range: ±10000 (10000 = 100.00%) |
### GDP Application Page

<table>
<thead>
<tr>
<th>Callout</th>
<th>Item</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>RampMode signal</td>
<td>U8</td>
<td>Selects a ramp time for the propel command from a three-element array output from the Ramps page. You can add more elements to this array to add more ramp times. The default selections are: 0 = Normal. 1 = Decel. 2 = Brake.</td>
</tr>
<tr>
<td>8</td>
<td>AllowHR signal</td>
<td>BOOL</td>
<td>Allow upshifts on two-position and proportional motors. T = Allow upshifts. F = Disable upshifts.</td>
</tr>
</tbody>
</table>
| 9       | GDP_Application page | ——— | - Contains the logic that provides the basic functionality of this application. (The properties of this page disable your ability to view or edit this logic.)  
- Provides access to socket pages where you can install optional plug-ins to extend the functionality of the application. |
| 10      | Status bus      | ———      | Outputs signals that report the status of the application block and any plug-ins that are installed inside the application block.             |
| 11      | RampedPropel signal | S16      | Rate-limited propel command, after smoothing by a Soft_Ramp function block that is locked inside the GDP_Application page.  
For more about the Soft_Ramp function block, refer to the PLUS+1 GUIDE Basic Function Blocks Library User Manual (Sauer-Danfoss part 10103409).  
Range: 0–±10000 (10000 = 100.00%) |
| 12      | UnrampedPropel signal | S16      | Rate-limited propel command without smoothing.  
Range: 0–±10000 (10000 = 100.00%) |
| 13      | RampedCmd bus   | ———      | Outputs speed command signals after they have been ramped but before power distribution (antistall) scaling.                                |
| 14      | UnrampedCmd bus | ———      | Outputs speed command signals that have not been ramped and before power distribution (antistall) scaling.                                |
| 15      | Status/OL_Cmd bus | ——— | Outputs open-loop propel command and propel command related signals.                                                                          |
| 16      | Left signal     | U16       | Rate-limited left speed command.  
Range: ±10000 (10000 = 100.00%) |
| 17      | Right signal    | U16       | Rate-limited right speed command.  
Range: ±10000 (10000 = 100.00%) |
<table>
<thead>
<tr>
<th>Callout</th>
<th>Item</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>Phase</td>
<td></td>
<td>Outputs motor-related signals.</td>
</tr>
<tr>
<td>19</td>
<td>B_Mtr2Pos</td>
<td>BOOL</td>
<td>T = Configured for two-position motors.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F = Configured for single-speed or proportional displacement motors.</td>
</tr>
<tr>
<td>20</td>
<td>PhasePt_Pct2</td>
<td>U16</td>
<td>Propel command at which:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Two position motors shift between low and high positions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Proportional motors shift between pump and motor phases.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Range: 0–10000 (10000 = 100.00%)</td>
</tr>
<tr>
<td>21</td>
<td>MtrPos</td>
<td>BOOL</td>
<td>T = Two-position motors shifted to high speed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F = Two-position motors shifted to low speed.</td>
</tr>
</tbody>
</table>
How to Access Socket Pages

Socket pages are wrappers for plug-ins that extend the application's functionality.

The GDP_Application page contains:

- The logic that provides the core functionality for the application. The GDP_Application page’s properties disable viewing or editing this logic.

- Socket pages for optional plug-ins that extend the application's functionality. The GDP_Application page’s properties allow access to these socket pages.

1. Enter the GDP_Application page.

   The View Disabled window displays. This window’s:

   - Page(s) list identifies the socket pages inside the GDP_Application page.

   - View pane shows the page currently highlighted in the Page(s) list.

2. From the Page(s) list in the View Disabled window, click the desired socket page.

3. In the View Disabled window, click the View pane to go to the desired socket page.
The DualPathSpdCtrl socket page is the connector page for a Tracker plug-in.

The Tracker plug-in applies closed-loop control to correct tracking errors caused by uneven track loading, hydraulic leakage, and poor calibration.

For detailed information about this plug-in, refer to the Tracker Plug-in GUIDE Programming User Manual (Sauer-Danfoss part 11057260).

- The “Before” portion of the preceding figure shows the socket page before its plug-in has been imported and connected.
- The “After” portion of the preceding figure shows the socket page after its plug-in has been imported and connected. (Some signals only become available after you import the GDP Application block into the GDP Subsystem Application.)

The folder with the GDP_Application block SCS file also has folders that contain the SCS files for the plug-ins shown in this manual.

To import a plug-in, use the GUIDE window’s File menu > Block > Import Block command.

For more information about importing blocks, refer to the PLUS+1 GUIDE User Manual (Sauer-Danfoss part 10100824).
MaxCmdScale Socket Page

Path: TOP ! GDP_Application ! GDP_Application ! MaxCmdScale

The MaxCmdScale socket page is the connector page for a Temp_Derate plug-in.

The Temp_Derate plug-in scales down propel commands when the hydraulic fluid becomes too hot.

Scaling down the propel command:

- Slows the rise of fluid temperatures.
- Helps protect the hydraulic system from damage.

For detailed information about this plug-in, refer to the Temp_Derate Plug-in GUIDE Programming User Manual (Sauer-Danfoss part 11057257).

- The “Before” portion of the preceding figure shows the socket page before its plug-in has been imported and connected.
- The “After” portion of the preceding figure shows the socket page after its plug-in has been imported and connected. (Some signals only become available after you import the GDP Application block into the GDP Subsystem Application.)

The folder with the GDP Application block SCS file also has folders that contain the SCS files for the plug-ins shown in this manual.

To import a plug-in, use the GUIDE window’s File menu > Block > Import Block command.

For more information about importing blocks, refer to the PLUS+1 GUIDE User Manual (Sauer-Danfoss part 10100824).
The PowerDistr socket page is the connector page for an Antistall plug-in.

The Antistall plug-in scales down speed commands to prevent heavy loads from stalling the engine.

For detailed information about this plug-in, refer to the Antistall Plug-in GUIDE Programming User Manual (Sauer-Danfoss part 11057258).

- The “Before” portion of the preceding figure shows the socket page before its plug-in has been imported and connected.
- The “After” portion of the preceding figure shows the socket page after its plug-in has been imported and connected. (Some signals only become available after you import the GDP Application block into the GDP Subsystem Application.)

The folder with the GDP_Application block SCS file also has folders that contain the SCS files for the plug-ins shown in this manual.

To import a plug-in, use the GUIDE window’s File menu > Block > Import Block command.

For more information about importing blocks, refer to the PLUS+1 GUIDE User Manual (Sauer-Danfoss part 10100824).
Trackstall Socket Page

Path: TOP ! GDP_Application ! GDP_Application ! Trackstall

The Trackstall socket page is the connector page for a Trackstall plug-in.

The Trackstall plug-in limits the scaling of its speed commands by the Antistall plug-in. Limiting the scaling of speed commands prevents tracks from completely stopping under antistall conditions.

For detailed information about this plug-in, refer to the Trackstall Plug-in GUIDE Programming User Manual (Sauer-Danfoss part 11057259).

- The “Before” portion of the preceding figure shows the socket page before its plug-in has been imported and connected.
- The “After” portion of the preceding figure shows the socket page after its plug-in has been imported and connected. (Some signals only become available you import the GDP Application block into the GDP Subsystem Application.)

The folder with the GDP_Application block SCS file also has folders that contain the SCS files for the plug-ins shown in this manual.

To import a plug-in, use the GUIDE window’s File menu > Block > Import Block command.

For more information about importing blocks, refer to the PLUS+1 GUIDE User Manual (Sauer-Danfoss part 10100824).
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