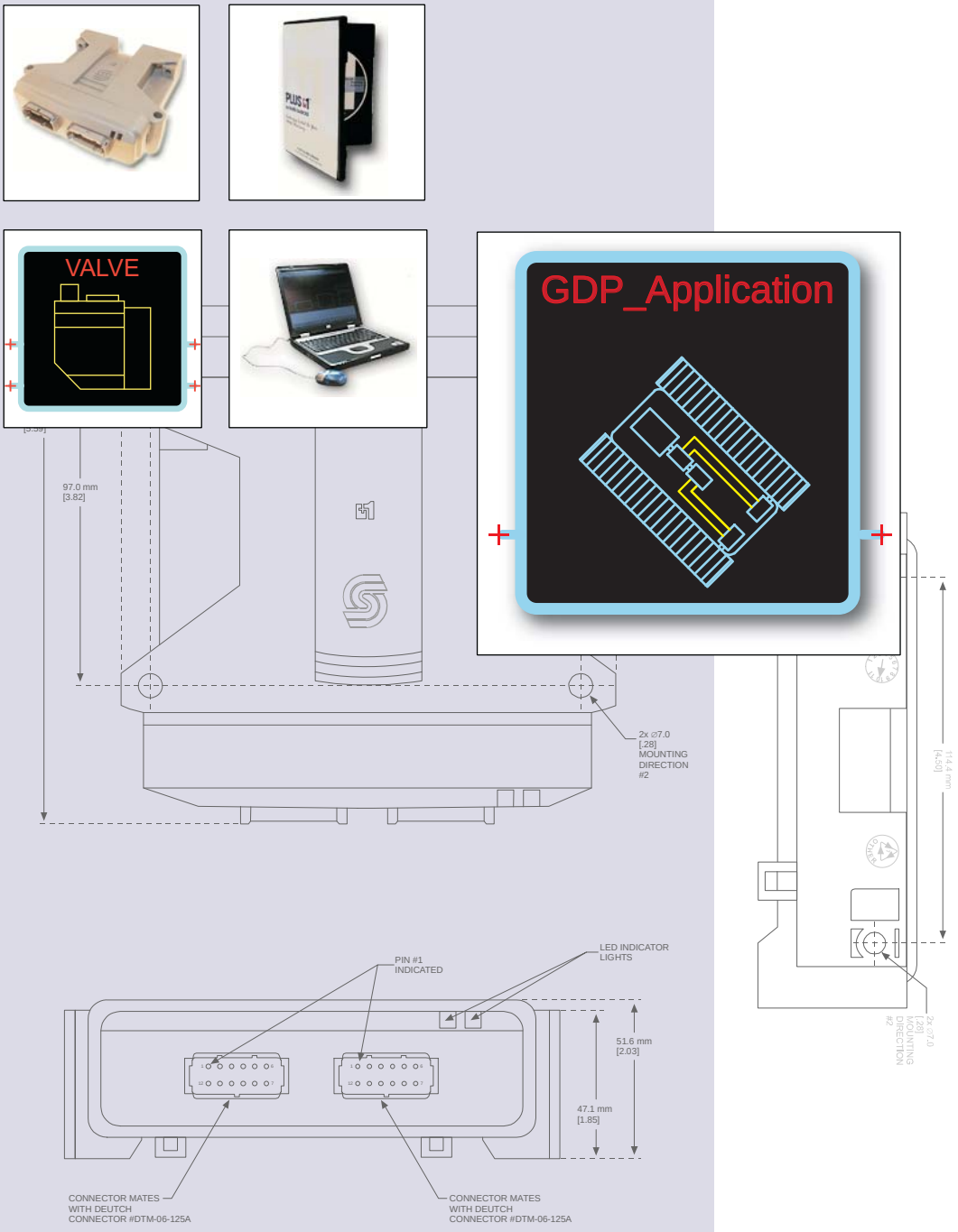
SAUER DANFOSS

PLUS+1™ GUIDE
Software

Generic Dual Path Application Block User Manual



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.

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

Revision history

Revision	Date	Comment
Rev AB	November 2009	Supports software release 1.01

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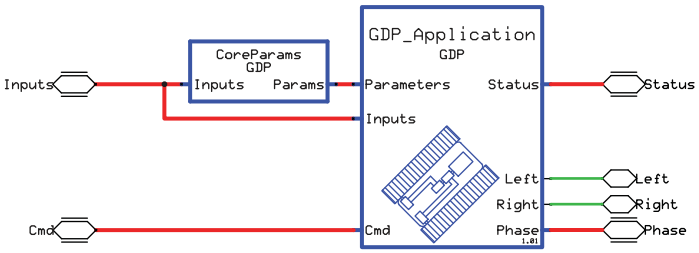
Introduction



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.”

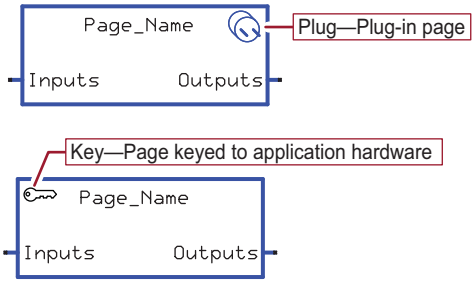
Plug-ins are software that can be used to increase the functionality of the **GDP_Application** block.

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.

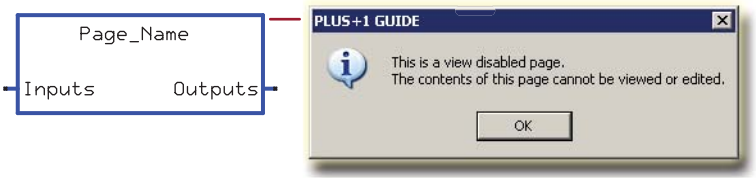
Page Symbols



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.

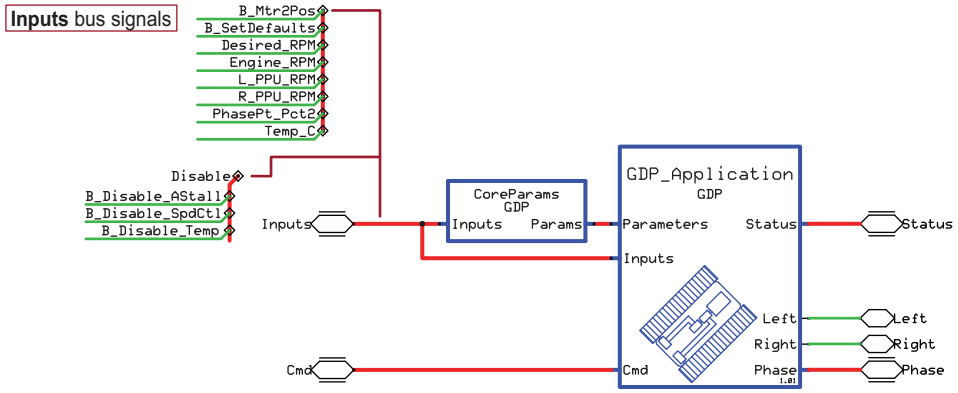
Additional Documentation

- PLUS+1 Controller Family Technical Information (Sauer-Danfoss part 520L0719)
- Recommended Machine Electronic Control System Start-up Procedures (Sauer-Danfoss part11010667)
- 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

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

Inputs *Bus Signals*

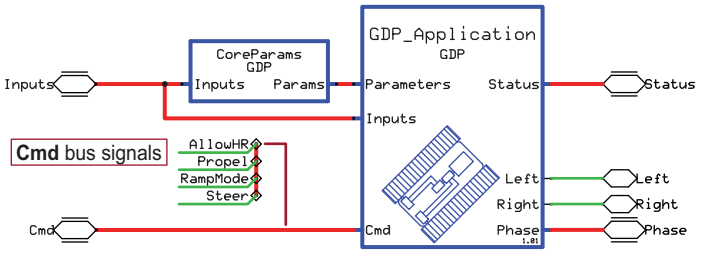
Bus/Signal	Data Type	Description
Disable sub-bus	——	Inputs required for installed plug-ins.
B_Disable_AStall signal‡	BOOL	T = Enable the **Antistall** plug-in. F = Disable the **Antistall** plug-in. (Enabling and disabling the **Antistall** plug-in also enables and disables the **Trackstall** plug-in.)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

*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.

GDP_Application Block Signals



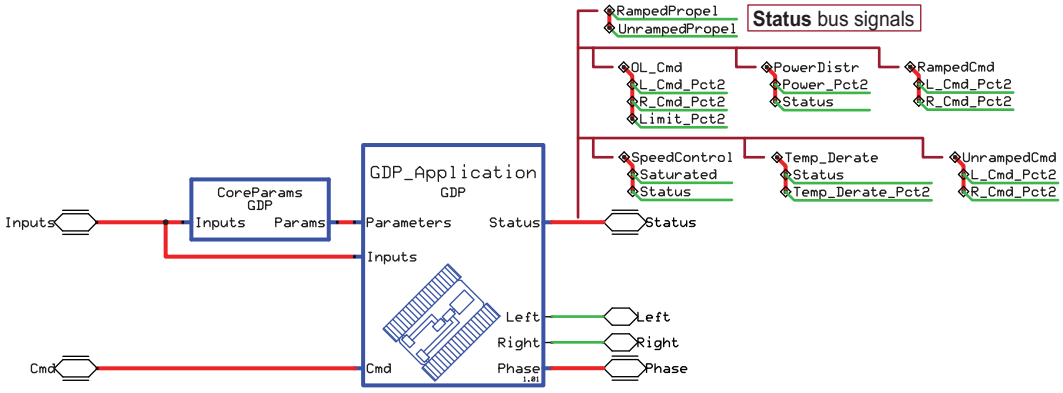
Cmd Bus Signals

Bus/Signal	Data Type	Description
Cmd bus	——	Required command signals for the **GDP_Application** block.
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.

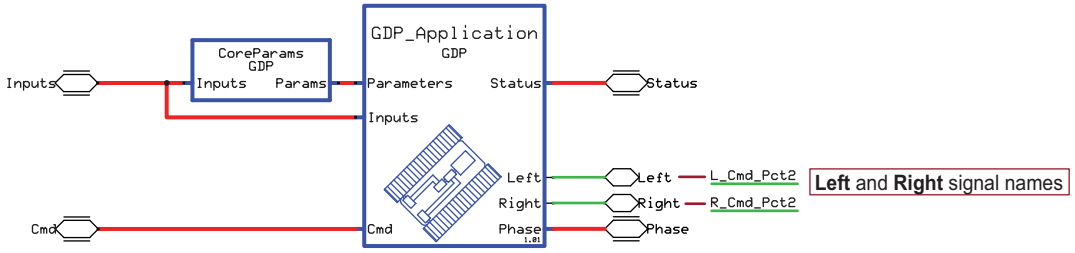


Status Bus Signals

Bus/Signal	Data Type	Description
Status bus	——	Outputs signals that report the status of the **GDP_Application** block and any plug-ins that are installed inside this block.
RampedPropel signal	S16	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%)
UnrampedPropel signal	S16	Rate-limited propel command without any smoothing. Range: 0–±10000 (10000 = 100.00%)
Status/OL_Cmd bus	——	Outputs open-loop propel command and propel command related signals.
L_Cmd_Pct2 signal	S16	Left speed command before the **Tracker** plug-in applies error correction. Range: ±10000 (10000 = 100.00%)
R_Cmd_Pct2 signal	S16	Right speed command before the **Tracker** plug-in applies error correction. Range: ±10000 (10000 = 100.00%)
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%)

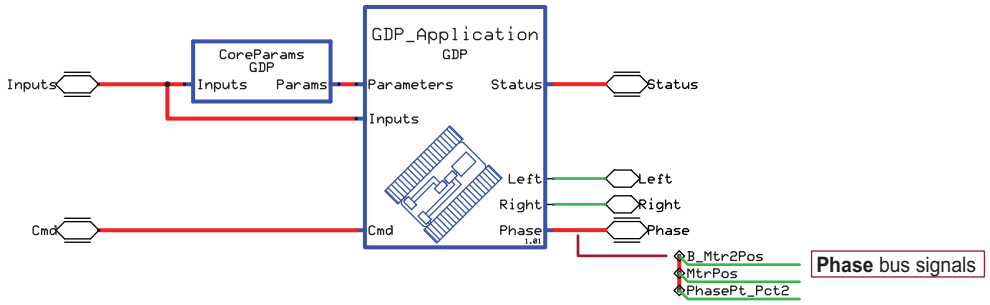
Status *Bus Signals*

Bus/Signal	Data Type	Description
Status/PowerDistr bus	——	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).
Power_Pct2 signal	——	——
Status signal	——	——
Status/RampedCmd bus	——	Speed commands after ramping but before power distribution (antistall) scaling. Compare the signals in this bus with the signals in the **Status/UnrampedCmd** bus.
L_Cmd_Pct2 signal	S16	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%)
R_Cmd_Pct2 signal	S16	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%)
Status/SpeedControl bus	——	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).
Saturated signal	——	——
Status signal	——	——
Status/Temp_Derate bus	——	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).
Status signal	——	——
Temp_Derate_Pct2 signal	——	——
Status/UnrampedCmd bus	——	Speed commands without ramping and before power distribution (antistall) scaling. Compare the signals in this bus with the signals in the **Status/RampedCmd** bus.
L_Cmd_Pct2 signal	S16	Left speed command without smoothing and before power distribution (antistall) scaling. Range: ±10000 (10000 = 100.00%)
R_Cmd_Pct2 signal	S16	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%)



Left and *Right* Signals

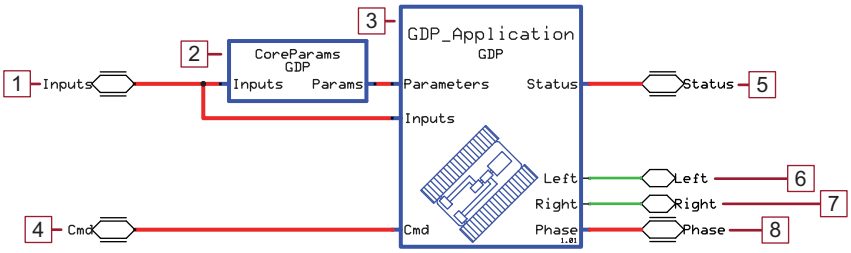
Signal	Data Type	Description
L_Cmd_Pct2 signal	S16	Rate-limited left speed command, after scaling by any plug-ins in use. Range: ±10000 (10000 = 100.00%)
R_Cmd_Pct2 signal	S16	Rate-limited right speed command, after scaling by any plug-ins in use. Range: ±10000 (10000 = 100.00%)



Phase Bus Signals

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

GDP Application



The GDP Application contains a:

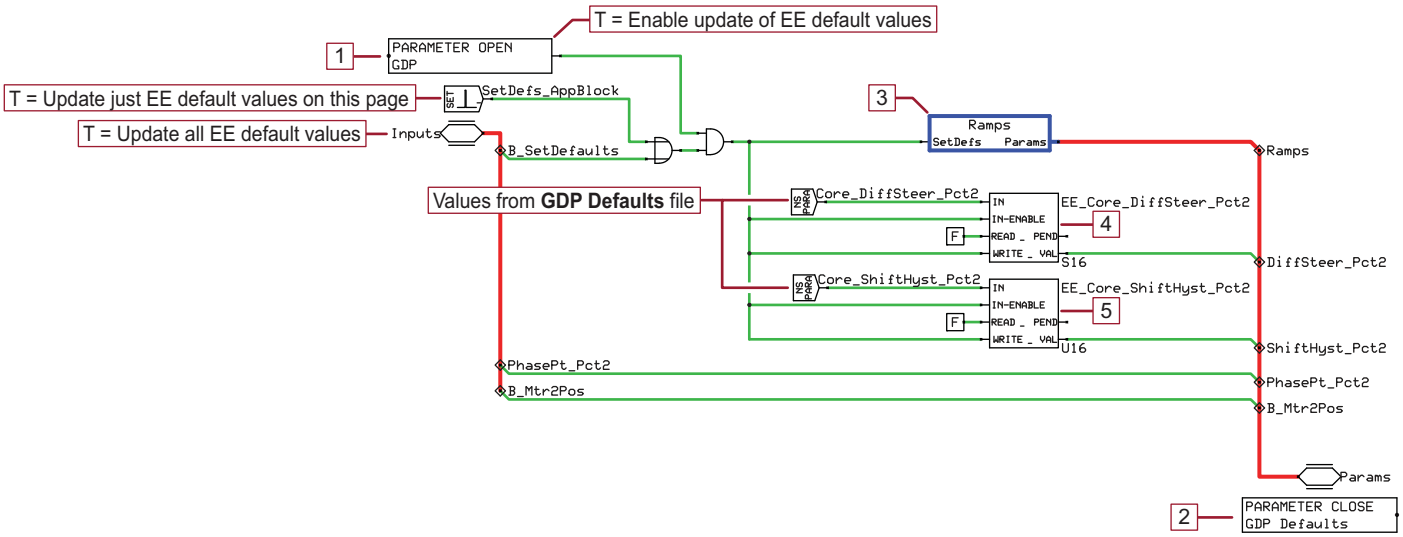
- **CoreParams** page with non-volatile memory (EE) components whose output signals configure the **GDP_Application** block.
- **GDP_Application** block that is a wrapper for a keyed **GDP_Application** page. The keyed **GDP_Application** page has:
  - Logic that provides the basic functionality for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

GDP Application

Callout	Item	Data Type	Description
1	**Inputs** bus	——	Inputs signals required by: – The **GDP_Application** block. – Any plug-in plug-ins that are installed in the **GDP_Application** block.
2	**CoreParams** page	——	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.
3	**GDP_Application** block	——	Is a wrapper page 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. The keyed **GDP_Application** page can only be downloaded to similarly keyed application hardware.
4	**Cmd** bus	——	Inputs command signals to the **GDP_Application** block.
5	**Status** bus	——	Outputs signals that report the status of: – The **GDP_Application** block. – Any plug-ins that are installed inside the **GDP_Application** block.
6	**Left** signal	U16	Rate-limited left speed command. Range: ±10000 (10000 = 100.00%)
7	**Right** signal	U16	Rate-limited right speed command. Range: ±10000 (10000 = 100.00%)
8	**Phase** bus	——	Outputs motor-related signals.

CoreParams Page

Path: Top ! Application ! CoreParams



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

Callout	Item	Description
1	**PARAMETER OPEN** component	Marks the open of a location that uses values from a **GDP Defaults** file. The comma-separated file used to create the **GDP Defaults** file has a **TypeFileName** value. The **TypeFileName** value becomes part of the **GDP Defaults** file. **PARAMETER OPEN** component output signal = T when the **TypeFileName** 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** component	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*

Callout	Item	Description
3	**Ramps** page	Contains EE components whose signals define propel and steering ramps.
4	**EE_Core_DiffSteer_Pct2** EE component	Outputs the **DiffSteer_Pct2** signal. 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 – 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. – 6000 (60.00%) adds 60% of the decrease in the inside track speed command to the outside speed command. – 0 (0%) does not increase the outside track speed command. Range: 0–10000 (10000 = 100.00%)
5	**EE_Core_ShiftHyst_Pct2** EE component	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.) Example—A machine with two-position motors has a: – **ShiftHyst_Pct2** value of 500 (5.00%). – **PhasePt_Pct** value of 5000 (50.00%). 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. Range: 0–10000 (100.00%)

About Differential Steer Percent

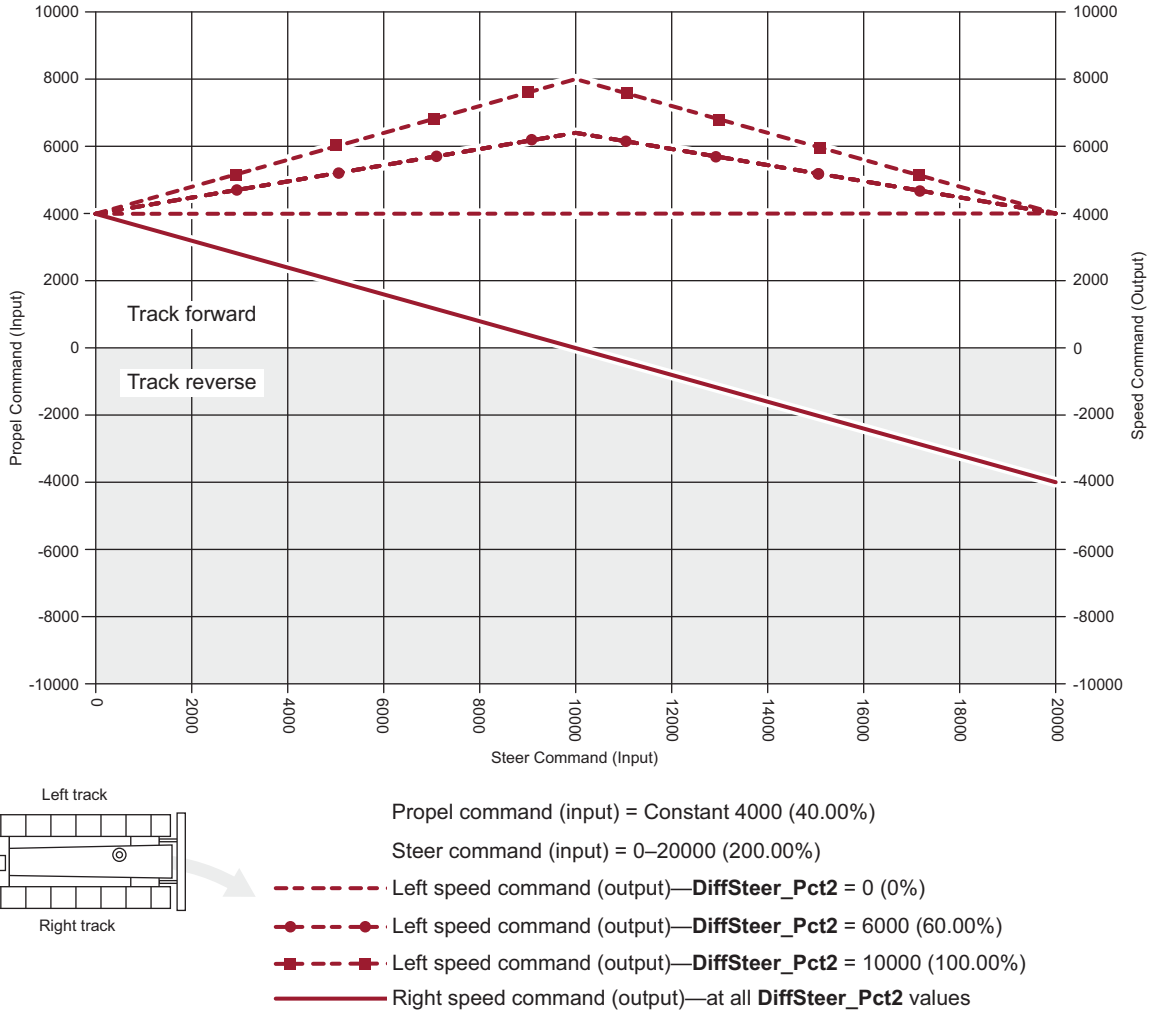
In a turn, the **DiffSteer_Pct2** value sets what percentage of the decrease in the inside track speed command gets added to the outside track speed command.

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%).

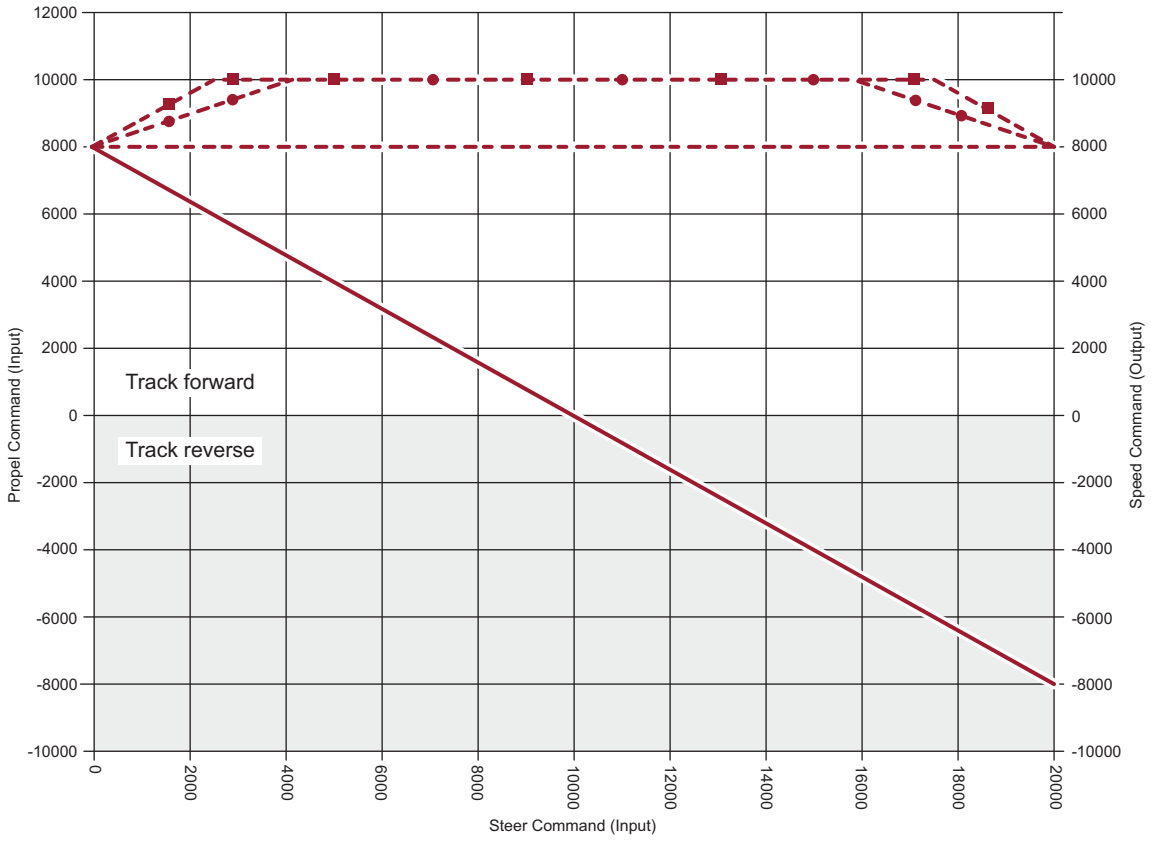
  (A steer command greater than 10000 (100.00%) starts counter-rotation.)
- The **DiffSteerPct_2** values are 0 (0%), 6000 (60.00%), and 10000 (100.00%).

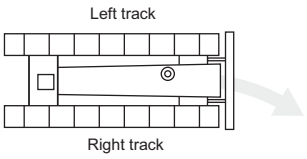


In this example, the:

- 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%).





Propel command (input) = Constant 8000 (80.00%)

Steer command (input) = 0–20000 (200.00%)

Left speed command (output)—**DiffSteer_Pct2** = 0 (0%)

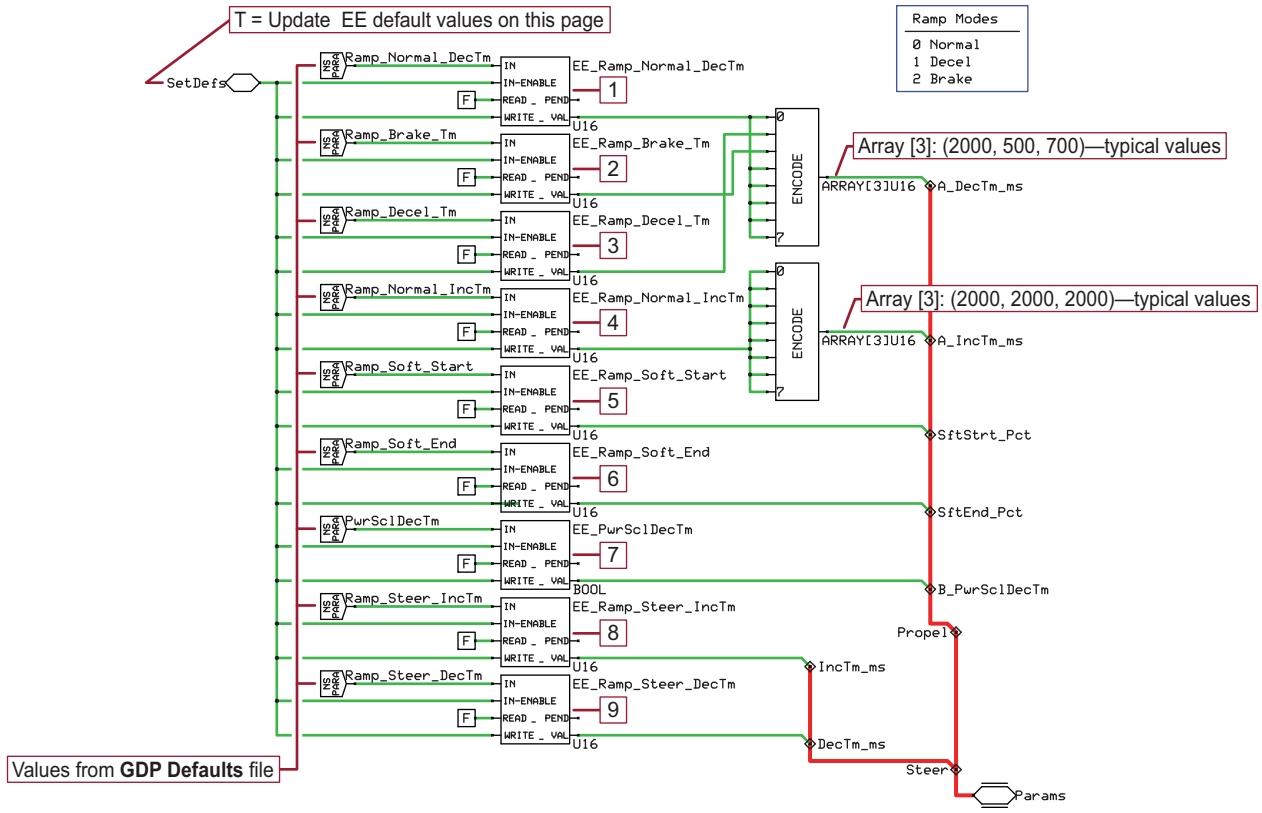
Left speed command (output)—**DiffSteer_Pct2** = 6000 (60.00%)

Left speed command (output)—**DiffSteer_Pct2** = 10000 (100.00%)

Right speed command (output)—at all **DiffSteer_Pct2** values

Ramps Page

Path: Top ! Application ! CoreParams ! Ramps



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*

Callout	Item	Description
1	**EE_Ramp_Normal_DecTm** EE value	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 smoothes 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** EE value	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 smoothes 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** EE value	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 smoothes 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*

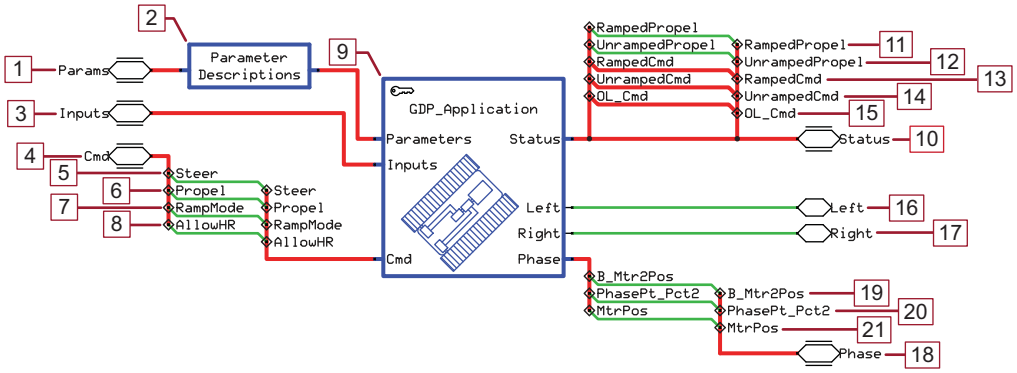
Callout	Item	Description
4	**EE_Ramp_Normal_IncTm** EE value	Outputs the **A_IncTm_ms** signal. This signal applies during acceleration. This signal sets the increment time of a **Soft_Ramp** function block that is locked inside the **GDP_Application** block. This function block smoothes changes in propel commands. Increment time is the time (in ms) that it takes for the propel command to increase from 0 to ±10000. Partial increases in the propel command take a time that is proportional to the total increment time. With an **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 **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)
5	**EE_Ramp_Soft_Start** EE value	Outputs the **SftStrt_Pct** signal. This signal sets the soft start percentage of a **Soft_Ramp** function block that is locked inside the **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 **Soft_Ramp** function block, refer to the *PLUS+1 GUIDE Basic Function Blocks Library User Manual* (Sauer-Danfoss part 10103409). Range: 0–99 (1 = 1%)
6	**EE_Ramp_Soft_End** EE value	Outputs the **SftEnd_Pct** signal. This signal sets the soft end percentage of a **Soft_Ramp** function block that is locked inside the **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 **Soft_Ramp** function block, refer to the *PLUS+1 GUIDE Basic Function Blocks Library User Manual* (Sauer-Danfoss part 10103409). Range: 0–99 (1 = 1%)
7	**EE_PwrSclDecTm** EE value	T = Reduce the propel ramp decrease time by the output of the **PowerDistr** (antistall) page plug-in. F = Do not use the output of the **PowerDistr** to reduce the propel ramp decrease time.
8	**EE_Ramp_Steer_IncTm** EE value	Outputs the **IncTm_ms** signal. This signal sets the increment time of two **Time_Ramp** function blocks that are locked inside the **GDP_Application** page. These function blocks smooth changes in steer commands. Increment time is the time (in ms) that it takes for a steering multiplier to increase from 0 to ±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 **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 **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)

***Ramps** Page*

Callout	Item	Description
9	**EE_Ramp_Steer_DecTm** EE value	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)

GDP_Application Page

Path: Top ! Application ! GDP_Application



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

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

GDP_Application *Page*

Callout	Item	Data Type	Description
7	**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.
8	**AllowHR** signal	BOOL	Allow upshifts on two-position and proportional motors. T = Allow upshifts. F = Disable upshifts.
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%)

GDP_Application *Page*

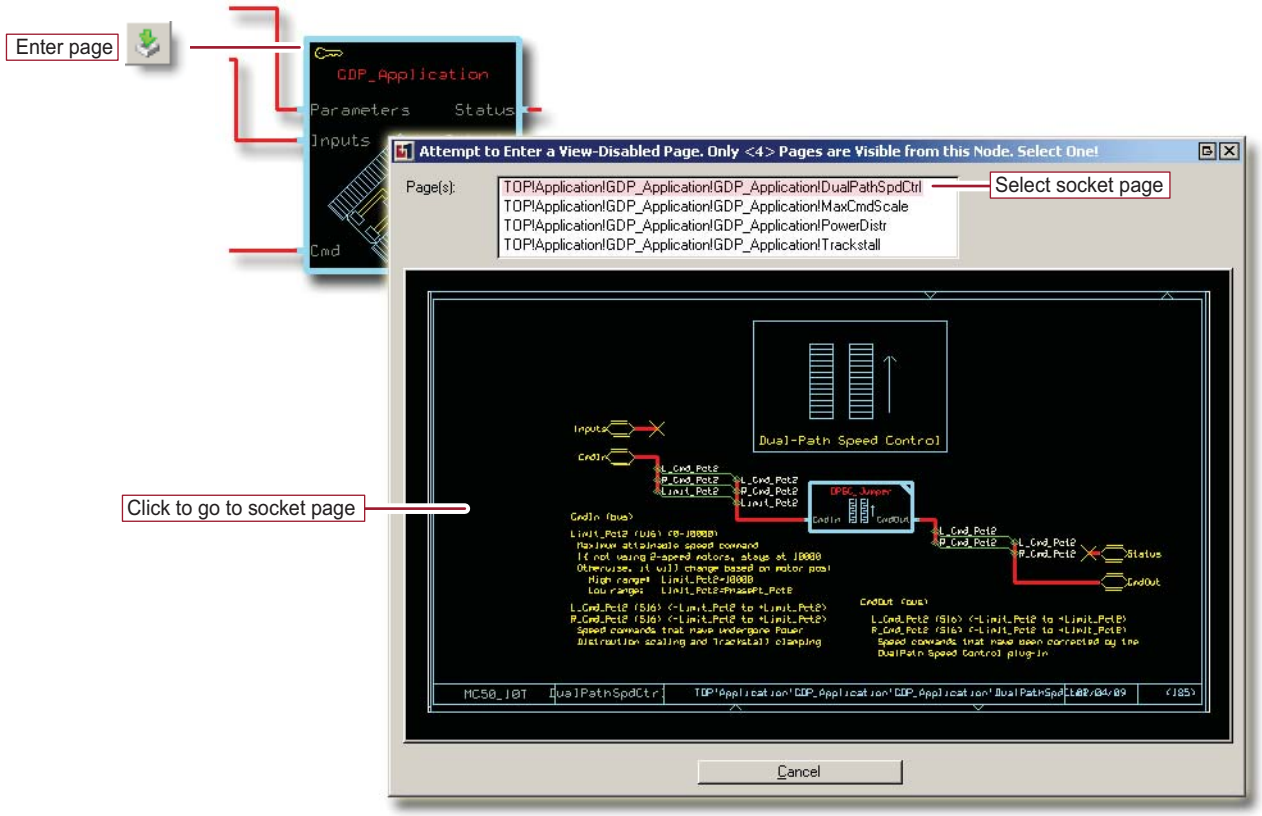
Callout	Item	Data Type	Description
18	**Phase** bus	——	Outputs motor-related signals.
19	**B_Mtr2Pos** signal	BOOL	T = Configured for two-position motors. F = Configured for single-speed or proportional displacement motors.
20	**PhasePt_Pct2** signal	U16	Propel command at which: – Two position motors shift between low and high positions. – Proportional motors shift between pump and motor phases. Range: 0–10000 (10000 = 100.00%)
21	**MtrPos** signal	BOOL	T = Two-position motors shifted to high speed. F = Two-position motors shifted to low speed.

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.

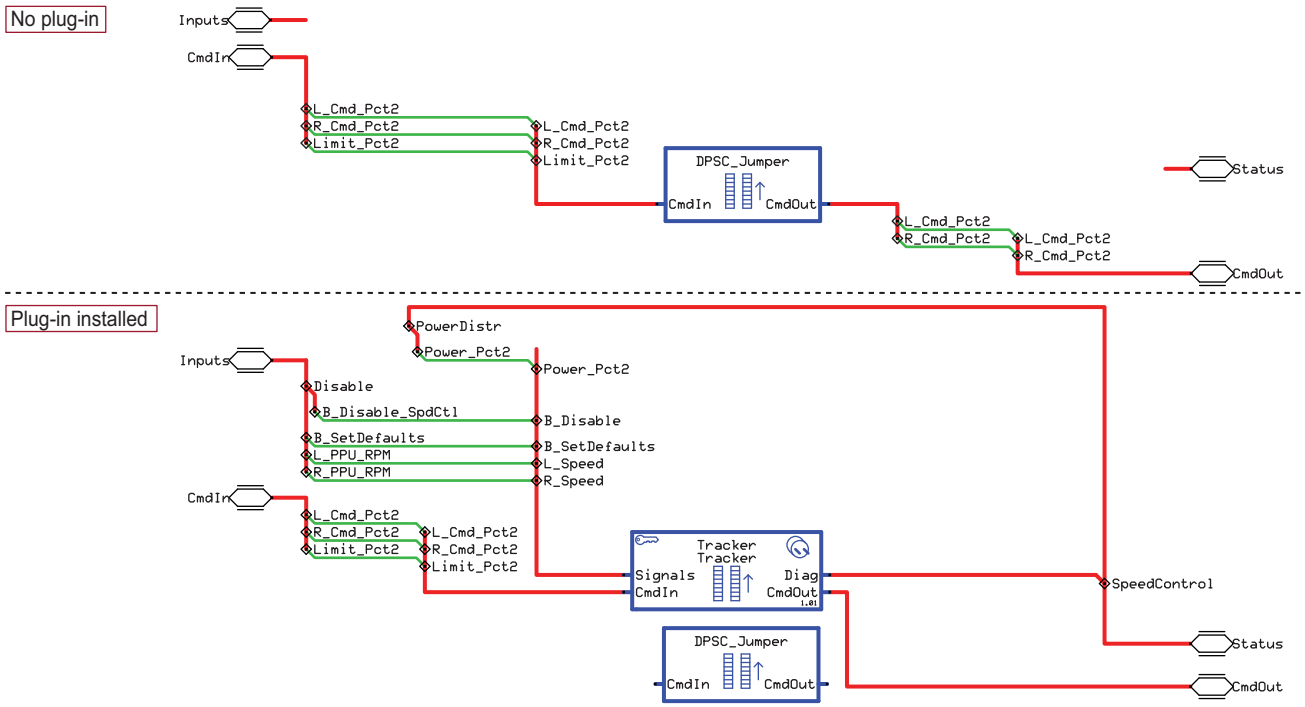
   The **View Disabled** window displays. This window's:

   - **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.

DualPathSpdCtrl Socket Page

Path: TOP ! GDP_Application ! GDP_Application ! DualPathSpdCtrl



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.)

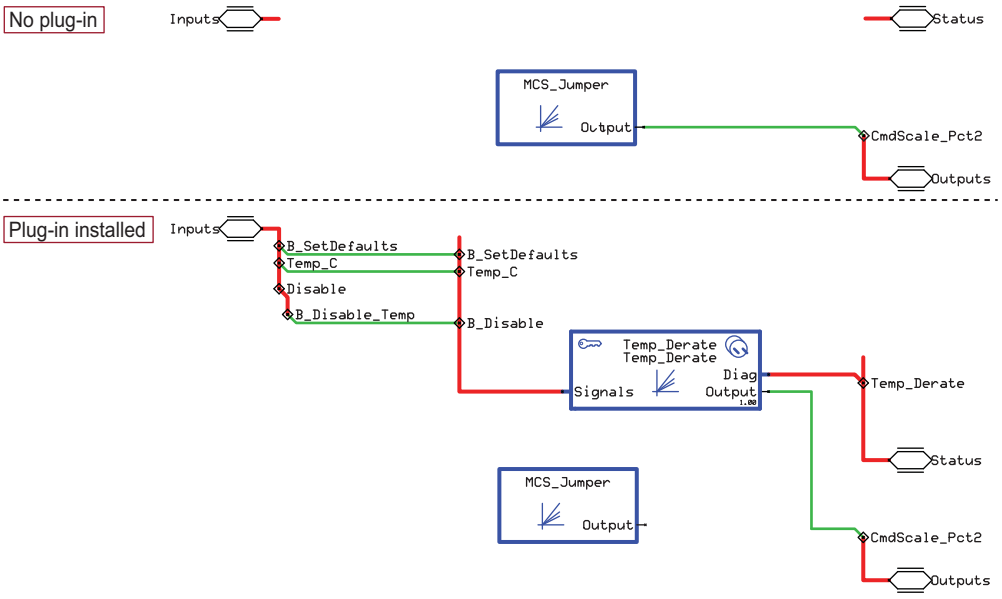
The folder with the **GDP_Application** block SCS file also has folders that contain the SCS files for the plug-ins shown in this manual.

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.)

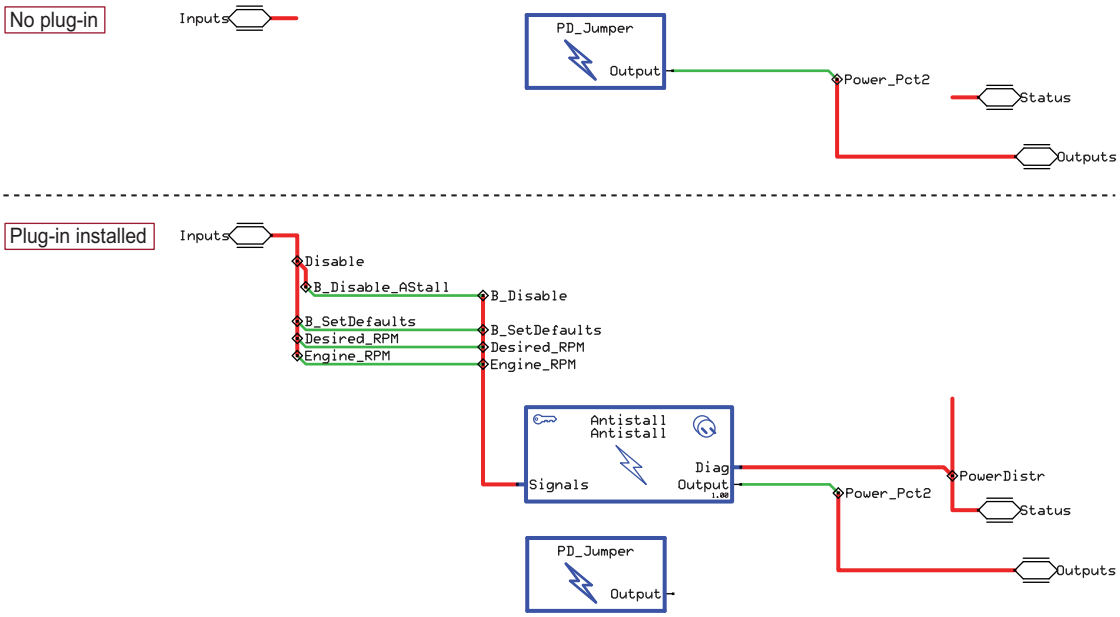
The folder with the **GDP_Application** block SCS file also has folders that contain the SCS files for the plug-ins shown in this manual.

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).

PowerDistr Socket Page

Path: TOP ! GDP_Application ! GDP_Application ! PowerDistr



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.)

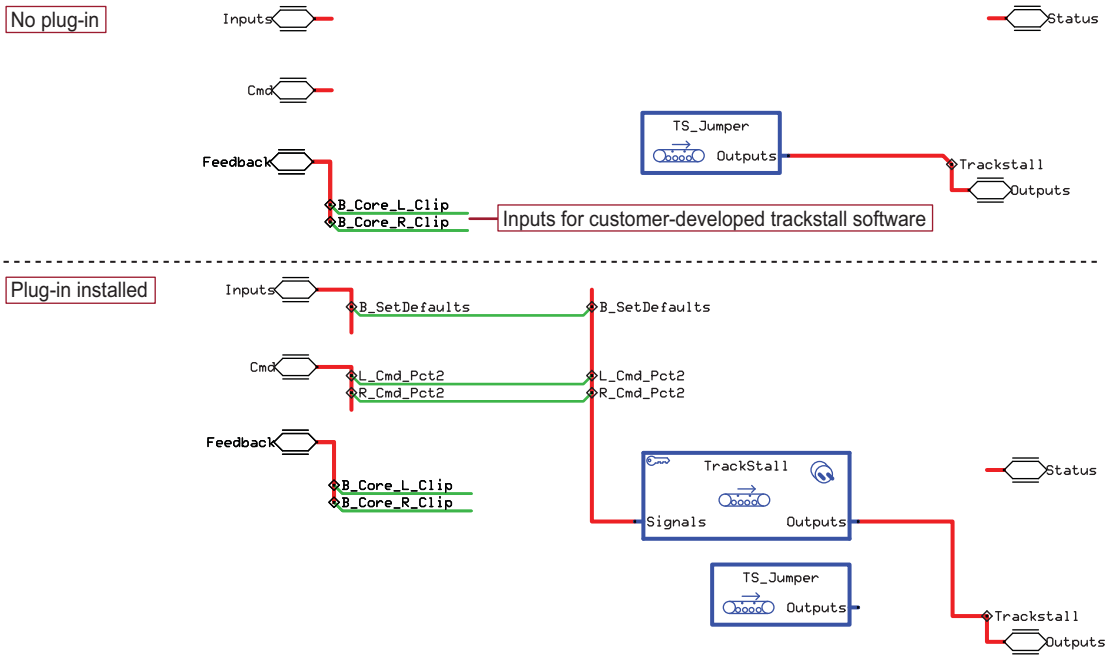
The folder with the **GDP_Application** block SCS file also has folders that contain the SCS files for the plug-ins shown in this manual.

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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Local address:
Sauer-Danfoss Inc.
3500 Annapolis Lane North
Minneapolis, MN 55447, USA
Phone: +1 763 509-2000
Fax: +1 763 559-5769

Sauer-Danfoss (US) Company
2800 East 13th Street
Ames, IA 50010, USA
Phone: +1 515 239-6000
Fax: +1 515 239-6618

Sauer-Danfoss ApS
DK-6430 Nordborg, Denmark
Phone: +45 7488 4444
Fax: +45 7488 4400

Sauer-Danfoss GmbH & Co. OHG
Postfach 2460, D-24531 Neumünster
Krokamp 35, D-24539 Neumünster, Germany
Phone: +49 4321 871-0
Fax: +49 4321 871 122

Sauer-Danfoss-Daikin LTD
Shin-Osaka TERASAKI 3rd Bldg. 6F
1-5-28 Nishimiyahara, Yodogawa-ku
Osaka 532-0004, Japan
Phone: +81 6 6395 6066
Fax: +81 6 6395 8585

www.sauer-danfoss.com

11047130 • Rev AB • November 2009