

# Demo project Guide

## ABB PLC and drives integration using PROFIBUS DP



**PROFI<sup>®</sup>**  
**BUS**



Power and productivity  
for a better world™



## Contents

Introduction .....	4
Safety instructions .....	4
Limitations .....	4
Setup .....	5
Hardware physical connection .....	6
AC500 and CM572 PROFIBUS Master .....	6
ABB Drive and PROFIBUS adapter .....	6
PROFIBUS connector .....	7
Drive configuration .....	8
Starting up ACS355 drives .....	8
<i>ACS355 Minimum required parameter settings (based on factory default settings)</i> .....	9
<i>ACS850 Minimum required parameter settings (based on factory default settings)</i> .....	10
Starting up ACS880 drives .....	11
<i>ACS880 Minimum required parameter settings (based on factory default settings)</i> .....	11
Starting up ACSM1 drives .....	12
<i>ACSM1 Minimum required parameter settings (based on factory default settings)</i> .....	13
Starting up ACS550 drives (supported by Drive Manager from CBP version 2.3) .....	14
<i>ACS550 Minimum required parameter settings (based on factory default settings)</i> .....	14
Starting up ACS800 drives (not supported by Drive Manager) .....	15
<i>ACS800 Minimum required parameter settings (based on factory default settings)</i> .....	15
Control Builder Plus for PLC and Drives .....	16
Install PS553-DRIVES library .....	16
Install GSD files .....	17
Open the project .....	18
PLC change .....	18
IP configuration of CPU (for Ethernet connection between PC and PLC) .....	19
CODESYS .....	20
CODESYS tabs .....	20
Download program to PLC .....	21
Create boot project .....	22

Visualizations .....23

Drive Manager .....26

    General Drive Manager tips .....28

Other useful documentation .....31

Revision .....31

## Introduction

This guide belongs to the AC500 demo project “AC500\_ABBDrives\_PB\_Demo\_RevX”. The project is built up with an AC500 CPU, a CM572 PROFIBUS master and ABB drives ACS355, ACS850, ACS880, ACSM1 Speed, ACSM1 Motion, ACS550 and ACS800 connected to the PROFIBUS network. To be able to run and play with the project, one or more of these drive types must be connected physically to the PROFIBUS network.

The guide includes instructions for PROFIBUS adaptation of drive parameters, change of CPU type in the Control Builder Plus project, download of the project, use of visualization objects to control the drives, use of Drive Manager etc.

ABB-specific ready-made function blocks and visualizations from the PS553-DRIVES library are used for the control of the drives.

Drive Manager is an integrated tool in Control Builder Plus, which for instance include online parameter handling of ABB drives.

## Safety instructions

Follow all safety instructions delivered with the used components:

- Read the complete safety instructions for the used drive before you install, commission or use the drive. The complete safety instructions are given at the beginning of the drives user’s manual (e.g. for ACS355: 3AUA0000066143 [English]).
- Read all safety and installation instructions of the used PLC. See the online help in CODESYS (Help → Contents → Target System → AC500 / S500 → Introduction → Overview → Regulations).

## Limitations

The following limitations are valid for this guide:

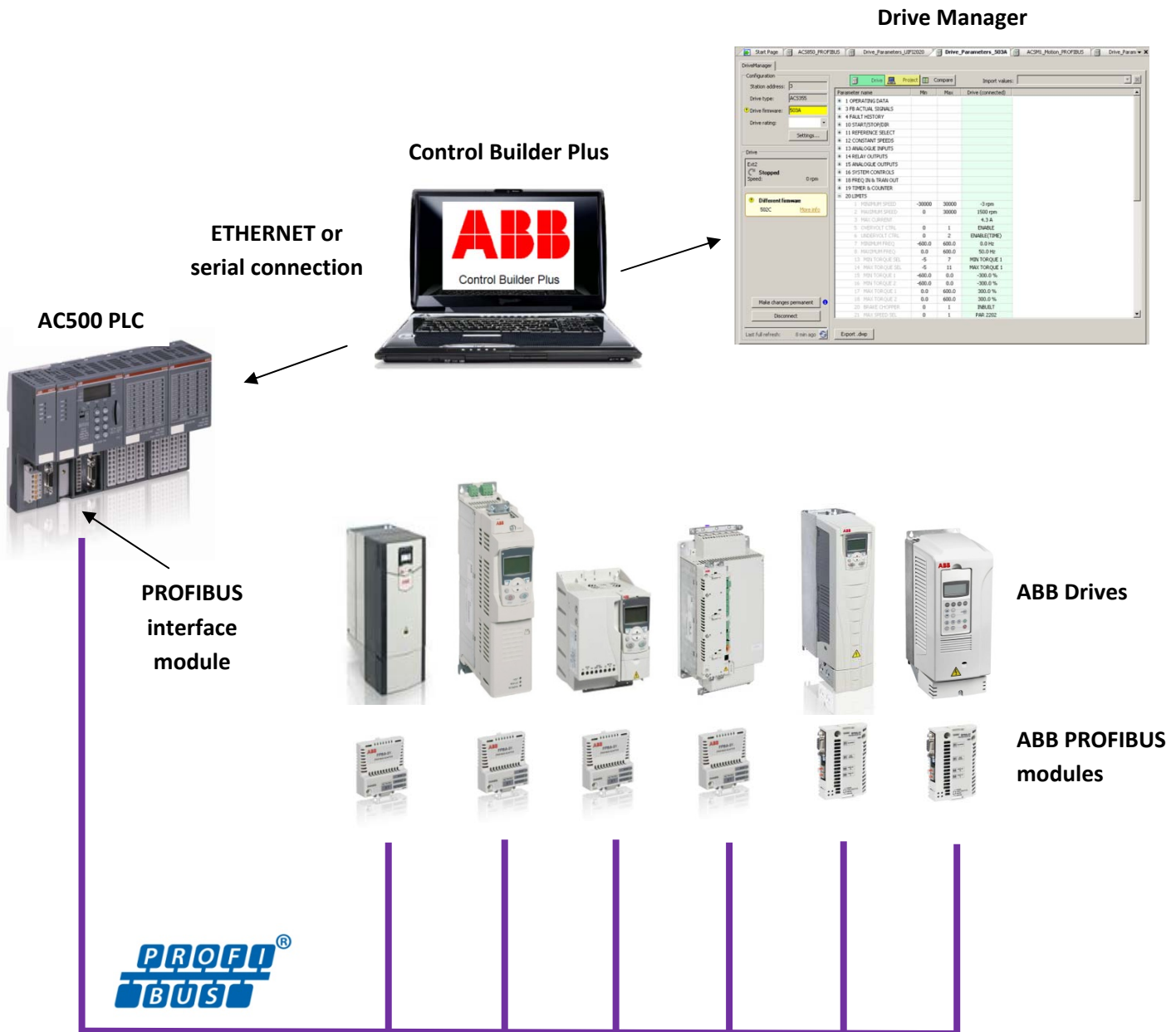
- For all use
  - All instructions in this guide are based on default settings in PLC and drives
  - PS501 Control Builder Plus version 2.2 or later
  - Any PROFIBUS-compatible AC500 PLC can be used
  - The PLC must be equipped with a CM572 PROFIBUS interface module
  - The drive must be equipped with a PROFIBUS adapter
  - Only one drive of each type can be connected to the PROFIBUS network in this project
- Function block and visualization library PS553-DRIVES compatibility
  - PROFIBUS DP protocol: DP-V0 or DP-V1
  - PROFIBUS DP Communication profile: ABB drives
  - Drive types: All PROFIBUS-compatible ABB drives

## Demo project Guide

### ABB PLC and drives integration using PROFIBUS DP

- Application types: speed/frequency control or torque control
- Drive Manager compatibility
  - PROFIBUS DP protocol: DP-V1
  - Drive types: ACS355, ACS850, ACS880, ACSM1 Speed, ACSM1 Motion (**Note!** More drive types, such as ACS550, will be added in the near future).
  - Application types: speed/frequency control, torque control or motion control.

## Setup

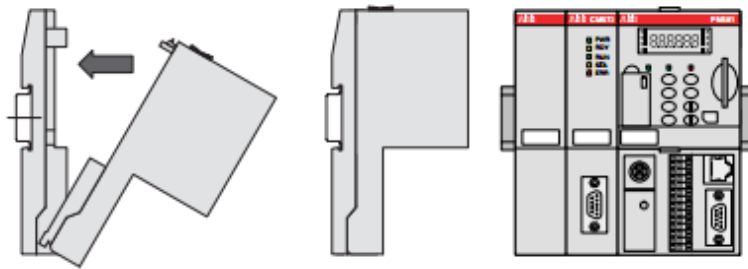


## Hardware physical connection

In the following chapter, physical connection of the hardware will be explained briefly.

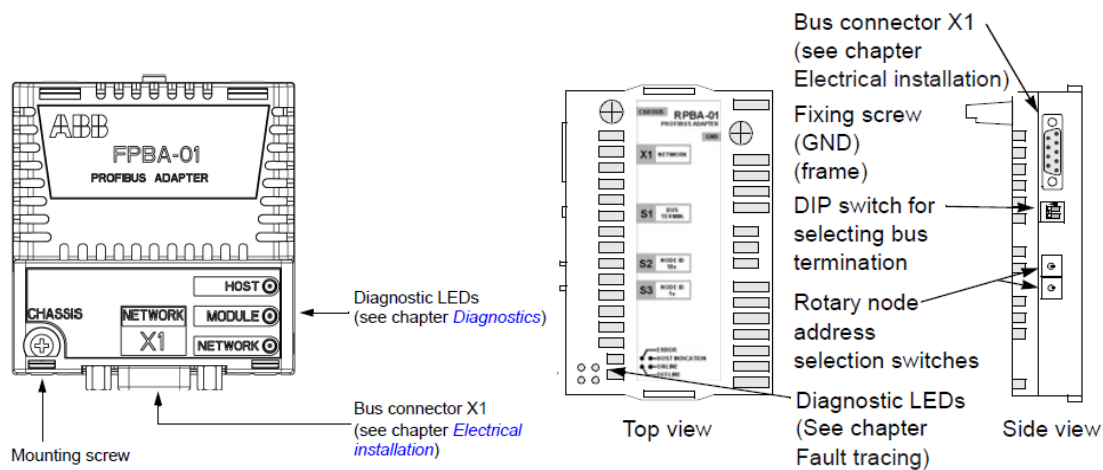
### AC500 and CM572 PROFIBUS Master

The PROFIBUS coupler (CM572) is inserted to the lower part of the terminal base, then clicked in above in the coupler slot to the left next to the CPU.



### ABB Drive and PROFIBUS adapter

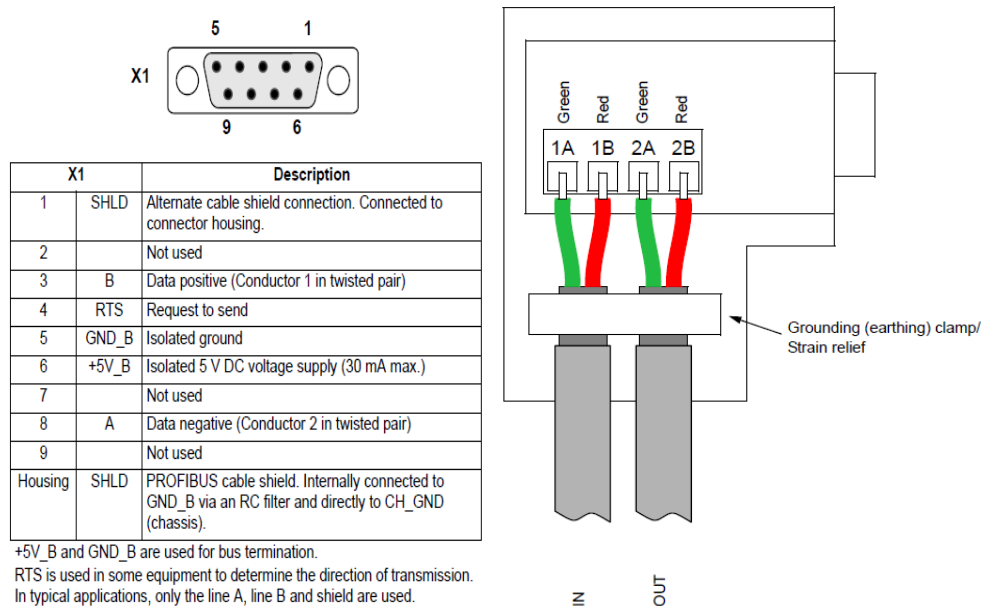
Depending on drive type, an FPBA-01 or RPBA-01 PROFIBUS adapter is used. The adapter is mounted in one of the drive slots (slot number depends on drive type).



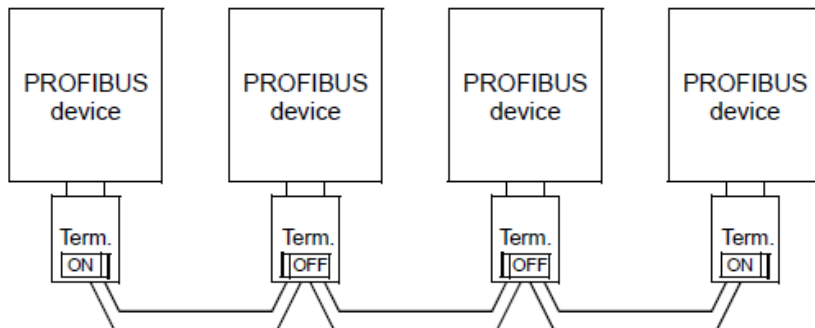
## PROFIBUS connector

Connect the bus cable to connector X1 on the adapter module. The connector pin allocation described below follows the PROFIBUS standard.

It is recommended to use a PROFIBUS-approved D-SUB 9 connector. These connectors have a built-in termination network and inductors for station capacitance compensation. Connect the cable to the D-SUB connector according to picture below.



Bus termination is required to prevent signal reflections from the bus cable ends. The adapter module is not equipped with internal bus termination. Therefore, the D-SUB connectors at the first and last modules of the bus must have built-on termination switched on as shown in the diagram below. The adapter module is able to supply power for an active-type termination circuitry (30 mA max).



## Drive configuration

The following drive configuration steps will adapt the drive to PROFIBUS DP control based on ABB-specific drives library PS553-DRIVES as well as prepare the drive for Drive Manager handling.

Drive parameters can be set from the drive's control panel or from drive-specific pc tool (*DriveWindow Light* for ACS355 and ACS550, *DriveStudio* for ACS850 and ACSM1, *Drive Composer* for ACS880 and *DriveWindow* for ACS800). It is also possible to do most of the settings from Drive Manager, see chapter "Drive Manager".

**Note!** All parameter settings are based on drive default settings. If the drive has been parameterized previously, return to default settings before continuing. It can be done by:

- Changing macro (and then changing back again) in parameter **99.02** for ACS355 and ACS550.
- Setting parameter **99.03 APPLIC RESTORE** to **YES** in ACS800.
- Setting parameter **16.04 Param restore** to **Restore defs** in ACS850 and ACSM1.
- Setting parameter **96.06 Parameter restore** to **Restore defaults** in ACS880.

## Starting up ACS355 drives

1. Power up the drive.
2. Enable the communication between the adapter module and the drive by setting parameter **98.02 COMM PROT SEL** to **EXT FBA**.
3. Set the FPBA-01 configuration parameters in group 51. At the minimum, set the required node address in parameter **51.02** and the communication profile in **51.05 = 1** (ABB Drives).
4. With parameter **30.18 COMM FAULT FUNC**, select how the drive reacts to a fieldbus communication break.
5. With parameter **30.19 COMM FAULT TIME**, define the time between communication break detection and the selected action.
6. Define the process data transferred to and from the drive in the FPBA-01 configuration parameter groups 54 and 55. **Note!** The adapter module sets the Status word and actual value automatically in parameters **54.01** and **54.02**, and Control word and reference in parameters **55.01** and **55.02**.
7. Validate the settings made in parameter groups 51, 54 and 55 by setting parameter **51.27 FBA PAR REFRESH** to **REFRESH**.
8. Set the relevant drive control parameters to control the drive according to the application.



*ACS355 Minimum required parameter settings (based on factory default settings)*

Parameter	Description	Setting	Comment
<b>98.02</b>	COMM PROT SEL	EXT FBA	Activates fieldbus module
<b>51.02</b>	NODE ADDRESS	<b>3</b>	PROFIBUS DP node address of the drive
<b>51.05</b>	PROFILE	1	Communication profile "ABB Drives"
<b>54.01</b>	FBA DATA IN1	4	Status Word as Data Word 1 from drive
<b>54.02</b>	FBA DATA IN2	5	Actual Speed as Data Word 2 from the drive (+/- 20.000)
<b>55.01</b>	FBA DATA OUT1	1	Control Word as Data Word 1 to drive
<b>55.02</b>	FBA DATA OUT2	2	Speed reference as Data Word 2 to the drive (+/- 20.000)
<b>51.27</b>	FBA PAR REFRESH	REFRESH	Updates fieldbus settings (groups 51 to 55)
<b>10.01</b>	EXT 1 COMMANDS	COMM	Fieldbus interface as source for start and stop
<b>11.02</b>	EXT1/EXT2 SEL	COMM	Fieldbus interface as source to switch to EXT2
<b>11.03</b>	REF1 SELECT	COMM	Fieldbus interface as source for speed reference
<b>16.04</b>	FAULT RESET SEL	COMM	Fieldbus interface as source for fault reset
<b>(11.05)</b>	REF1 MAX	[Scale max]	Max speed/frequency scaling value (used in function block/visualization input "SPEED_REF_MAX"). Must be less or equal to drive parameter max speed/frequency.

## Starting up ACS850 drives

1. Power up the drive.
2. Enable the communication between the adapter module and the drive by setting parameter **50.01 Fba enable** to **Enable**.
3. With parameter **50.02 Comm loss func**, select how the drive reacts to a fieldbus communication break. Note that this function monitors both communication between the fieldbus master and the adapter module and communication between the adapter module and the drive.
4. With parameter **50.03 Comm loss t out**, define the time between communication break detection and the selected action.

5. Select application-specific values for parameters **50.04...50.11**.
6. Set the FPBA-01 configuration parameters in group 51. At the minimum, set the required node address in parameter **51.02 FBA par2** and the communication profile in **51.05 = 1** (ABB Drives).
7. Define the process data transferred to and from the drive in the FPBA-01 configuration parameter groups 52 and 53. **Note!** The adapter module sets the Status word and actual value automatically in parameters **52.01** and **52.02**, and Control word and reference in parameters **53.01** and **53.02**.
8. Validate the settings made in parameter groups 51, 52 and 53 by setting parameter **51.27 FBA par refresh** to **Refresh**.
9. Set the relevant drive control parameters to control the drive according to the application.

*ACS850 Minimum required parameter settings (based on factory default settings)*

Parameter	Description	Setting	Comment
<b>50.01</b>	Fba enable	Enable	Activates fieldbus module
<b>51.02</b>	NODE ADDRESS	<b>4</b>	PROFIBUS DP node address of the drive
<b>51.05</b>	PROFILE	1	Communication profile "ABB Drives"
<b>52.01</b>	FBA data in1	4	Status Word as Data Word 1 from drive
<b>52.02</b>	FBA data in2	5	Actual Speed as Data Word 2 from the drive (+/- 20.000)
<b>53.01</b>	FBA data out1	1	Control Word as Data Word 1 to drive
<b>53.02</b>	FBA data out2	2	Speed reference as Data Word 2 to the drive (+/- 20.000)
<b>51.27</b>	FBA par refresh	Refresh	Updates fieldbus settings (groups 50 to 53)
12.01	EXT1/EXT2 SEL	P.02.22 bit 15	Fieldbus interface as source to switch to EXT2
<b>10.01</b>	Ext1 start func	FB	Fieldbus interface as source for start and stop
<b>21.01</b>	Speed ref1 sel	FBA ref1	Fieldbus interface as source for speed reference
<b>10.10</b>	Fault reset sel	P.02.22 bit 8	Fieldbus interface as source for fault reset
<b>(19.01)</b>	Speed scaling	[Scale max]	Max speed/frequency scaling value (used in function block/visualization input "SPEED_REF_MAX"). Must be less or equal to drive parameter max speed/frequency.

### Starting up ACS880 drives

1. Power up the drive.
2. Enable the communication between the adapter module and the drive by setting parameter **50.01 FBA A Enable** to **Enable**.
3. With parameter **50.02 FBA A comm loss func**, select how the drive reacts to a fieldbus communication break. Note that this function monitors both communication between the fieldbus master and the adapter module and communication between the adapter module and the drive.
4. With parameter **50.03 FBA A comm loss t out**, define the time between communication break detection and the selected action.
5. Select application-specific values for the rest of the parameters in group 50, starting from **50.04**.
6. Set the FPBA-01 configuration parameters in group 51. At the minimum, set the required node address in parameter **51.02 Node address** and the communication profile in **51.05 = 1** (ABB Drives).
7. Define the process data transferred to and from the drive in FPBA-01 configuration parameter groups 52 and 53. **Note!** The adapter module sets the Status word and Control word automatically in parameters **52.01** and **53.01**.
8. Validate the settings made in parameter groups 51, 52 and 53 by setting parameter **51.27 FBA par refresh** to **Configure**.
9. Save the valid parameter values to permanent memory by setting parameter **96.07 Param save** to **Save**.
10. Set the relevant drive control parameters to control the drive according to the application.

### ACS880 Minimum required parameter settings (based on factory default settings)

Parameter	Description	Setting	Comment
<b>50.01</b>	FBA A Enable	Enable	Activates fieldbus module
<b>51.02</b>	NODE ADDRESS	<b>5</b>	PROFIBUS DP node address of the drive
<b>51.05</b>	PROFILE	1	Communication profile "ABB Drives"
<b>52.01</b>	FBA data in1	4	Status Word as Data Word 1 from drive
<b>52.02</b>	FBA data in2	5	Actual Speed as Data Word 2 from the drive (+/- 20.000)
<b>53.01</b>	FBA data out1	1	Control Word as Data Word 1 to drive
<b>53.02</b>	FBA data out2	2	Speed reference as Data Word 2 to the drive (+/- 20.000)
<b>51.27</b>	FBA par refresh	Configure	Updates fieldbus settings (groups 50 to 57)

<b>20.01</b>	Ext 1 commands	Fieldbus A	Fieldbus interface as source for start and stop
<b>20.02</b>	Ext1 start trigger	Level	To directly restart after Coast Stop (Off3)
19.11	Ext1/Ext2 selection	Mcw Bit11 (06.01)	Fieldbus interface as source to switch to EXT2 control location
<b>22.11</b>	Speed ref1 selection	FB A ref1	Fieldbus interface as source for speed reference
<b>31.11</b>	Fault reset selection	P.06.01 bit 7	Fieldbus interface as source for fault reset
<b>(46.01)</b>	Speed scaling	[Scale max]	Max speed/frequency scaling value (used in function block/visualization input "SPEED_REF_MAX"). Must be less or equal to drive parameter max speed/frequency.

### Starting up ACSM1 drives

1. Power up the drive.
2. Enable the communication between the adapter module and the drive by setting parameter **50.01 FBA ENABLE** to **Enable**.
3. With parameter **50.02 COMM LOSS FUNC**, select how the drive reacts to a fieldbus communication break. Note that this function monitors both communication between the fieldbus master and the adapter module and communication between the adapter module and the drive.
4. With parameter **50.03 COMM LOSS T OUT**, define the time between communication break detection and the selected action.
5. Select application-specific values for parameters **50.04...50.11**.
6. Set the FPBA-01 configuration parameters in group 51. At the minimum, set the required node address in parameter **51.02** and the communication profile in **51.05 = 1** (ABB Drives).
7. Define the process data transferred to and from the drive in the FPBA-01 configuration parameter groups 52 and 53. **Note!** The adapter module sets the Status word and Control word automatically in parameters **52.01** and **53.01**.
8. Validate the settings made in parameter groups 51, 52 and 53 by setting parameter **51.27 FBA PAR REFRESH** to **REFRESH**.
9. Set the relevant drive control parameters to control the drive according to the application.

*ACSM1 Minimum required parameter settings (based on factory default settings)*

Parameter	Description	Setting	Comment
<b>50.01</b>	FBA ENABLE	Enable	Activates fieldbus module
<b>51.02</b>	NODE ADDRESS	<b>6</b> (Speed) <b>7</b> (Motion)	PROFIBUS DP node address of the drive
<b>51.05</b>	PROFILE	1	Communication profile “ABB Drives”
<b>52.01</b>	FBA DATA IN1	4	Status word as Data Word 1 from the drive
<b>52.02</b>	FBA DATA IN2	5	ACT1 – Actual speed as Data Word 2 from the drive (+/- 20.000)
<b>53.01</b>	FBA DATA OUT1	1	Control word as Data Word 1 to the drive
<b>53.02</b>	FBA DATA OUT2	2	REF1 – Speed reference as Data Word 2 to the drive (+/- 20.000)
<b>51.27</b>	FBA PAR REFRESH	REFRESH	Updates fieldbus settings (groups 50 to 53)
<b>10.01</b>	EXT1 START FUNC	FBA	Fieldbus interface as source for start and stop
<b>34.01</b>	EXT1/EXT2 SEL	P.02.12 bit15	Fieldbus interface as source to switch to EXT2 control location
<b>24.01</b>	SPEED REF1 SEL	FBA REF1	Fieldbus interface as source for speed reference
<b>10.08</b>	FAULT RESET SEL	P.02.12 bit 8	Fieldbus interface as source for fault reset
<b>(25.02)</b>	SPEED SCALING	[Scale max]	Max speed/frequency scaling value (used in function block/visualization input “SPEED_REF_MAX”). Must be less or equal to drive parameter max speed/frequency.

### Starting up ACS550 drives (supported by Drive Manager from CBP version 2.3)

1. Power up the drive.
2. Enable the communication between the adapter module and the drive by setting parameter **98.02** *COMM PROT SEL* to **EXT FBA**.
3. Set the RPBA-01 configuration parameters in group 51. At the minimum, set the required node address in parameter **51.02**.
4. With parameter **30.18** *COMM FAULT FUNC*, select how the drive reacts to a fieldbus communication break.
5. With parameter **30.19** *COMM FAULT TIME*, define the time between communication break detection and the selected action.
6. Define the process data transferred to and from the drive in the RPBA-01 configuration parameter group 51.  
**Note!** The Status Word, Actual Speed, Control Word and Speed Reference are fixed in ACS550 and not necessary to set.
7. Validate the settings made in parameter group 51 by setting parameter **51.27** *FBA PAR REFRESH* to **REFRESH**.
8. Set the relevant drive control parameters to control the drive according to the application.

### ACS550 Minimum required parameter settings (based on factory default settings)

Parameter	Description	Setting	Comment
<b>98.02</b>	COMM PROT SEL	EXT FBA	Activates fieldbus module
<b>51.02</b>	NODE ADDRESS	<b>2</b>	PROFIBUS DP node address of the drive
<b>51.21</b>	DP MODE	[DP MODE]	<b>1 for DPV1</b> (necessary for Drive Manager), 0 for DPV0
<b>51.27</b>	FBA PAR REFRESH	REFRESH	Updates fieldbus settings (group 51)
<b>10.01</b>	EXT 1 COMMANDS	COMM	Fieldbus interface as source for start and stop
<b>11.02</b>	EXT1/EXT2 SEL	COMM	Fieldbus interface as source to switch to EXT2
<b>11.03</b>	REF1 SELECT	COMM	Fieldbus interface as source for speed reference
<b>16.04</b>	FAULT RESET SEL	COMM	Fieldbus interface as source for fault reset
<b>(11.05)</b>	REF1 MAX	[Scale max]	Max speed/frequency scaling value (used in function block/visualization input "SPEED_REF_MAX"). Must be less or equal to drive parameter max speed/frequency.

### Starting up ACS800 drives (not supported by Drive Manager)

1. Power up the drive.
2. Enable the communication between the adapter module and the drive by setting parameter **98.02 COMM. MODULE LINK** to **FIELD BUS**.
3. Set the RPBA-01 configuration parameters in group 51. At the minimum, set the required node address in parameter **51.02**.
4. With parameter **30.18 COMM FLT FUNC**, select how the drive reacts to a fieldbus communication break.
5. With parameter **30.19 MAIN REF DS T-OUT**, define the time between communication break detection and the selected action.
6. Define the process data transferred to and from the drive in the RPBA-01 configuration parameter group 51.  
**Note!** The Status Word, Actual Speed, Control Word and Speed Reference are configured as default.
7. Validate the settings made in parameter group 51 by setting parameter **51.27 FBA PAR REFRESH** to **REFRESH**.
8. Set the relevant drive control parameters to control the drive according to the application.

### ACS800 Minimum required parameter settings (based on factory default settings)

Parameter	Description	Setting	Comment
<b>98.02</b>	COMM. MODULE LINK	FIELD BUS	Activates fieldbus module
<b>98.07</b>	COMM PROFILE	ABB DRIVES	Communication profile "ABB Drives"
<b>51.02</b>	NODE ADDRESS	<b>8</b>	PROFIBUS DP node address of the drive
<b>51.21</b>	DP MODE	[DP MODE]	<b>1 for DPV1</b> (necessary for Drive Manager), 0 for DPV0
<b>51.27</b>	FBA PAR REFRESH	REFRESH	Updates fieldbus settings (groups 51 to 55)
<b>10.01</b>	EXT 1 STRT/STP/DIR	COMM.CW	Fieldbus interface as source for start and stop
<b>11.02</b>	EXT1/EXT2 SELECT	COMM.CW	Fieldbus interface as source to switch to EXT2 control location
<b>11.03</b>	EXT REF1 SELECT	COMM.REF	Fieldbus interface as source for speed reference
<b>16.04</b>	FAULT RESET SEL	COMM.CW	Fieldbus interface as source for fault reset
<b>(11.05)</b>	EXT REF1 MAXIMUM	[Scale max]	Max speed/frequency scaling value (used in function block/visualization input "SPEED_REF_MAX"). Must be less or equal to drive parameter max speed/frequency.

## Control Builder Plus for PLC and Drives

### Install PS553-DRIVES library

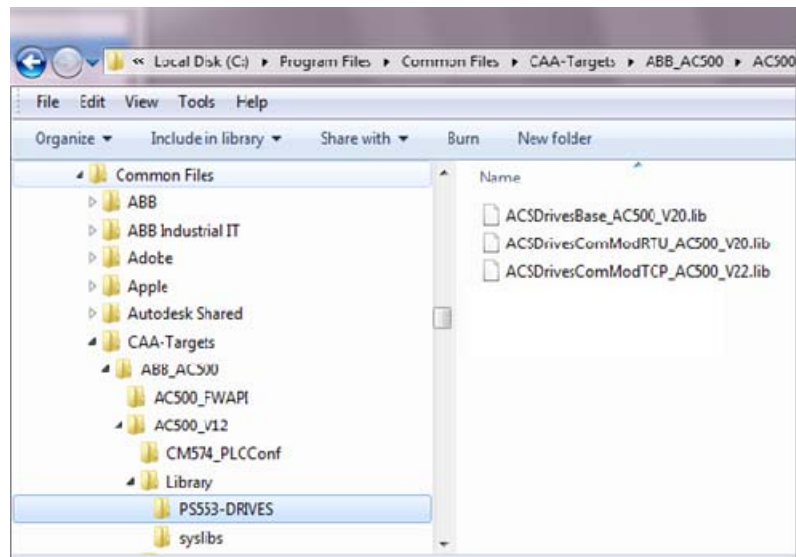
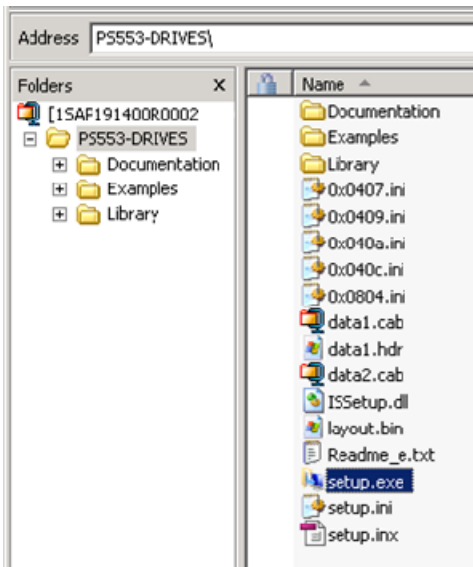
**Note!** In Control Builder Plus V2.3 and later, the ACSDrivesBase library is already installed. You can find it in the subfolder "PS553-DRIVES" of the default library folder (see right picture below)

**Note!** The version of the library can differ, nevertheless the name will stay the same! Creation date and main changes can be seen in the library manager of CODESYS only.

For older Versions of Control Builder Plus you can download the installation package in the following way from:

- [www.abb.com/PLC](http://www.abb.com/PLC):
- On right side menu under heading "Your preferences": Select "English" as language ... (country doesn't matter).
- On right side menu under "More Info Links" : Click on "PS501 Updates".
- Select "PS501-UPDA: PS553-DRIVES..." to download \*.zip file.

Install the drives library "PS553-DRIVES" with ready-made function blocks and visualization objects by unzipping to a temporary directory and clicking on the file "setup.exe" (see left picture below).





---

## Demo project Guide

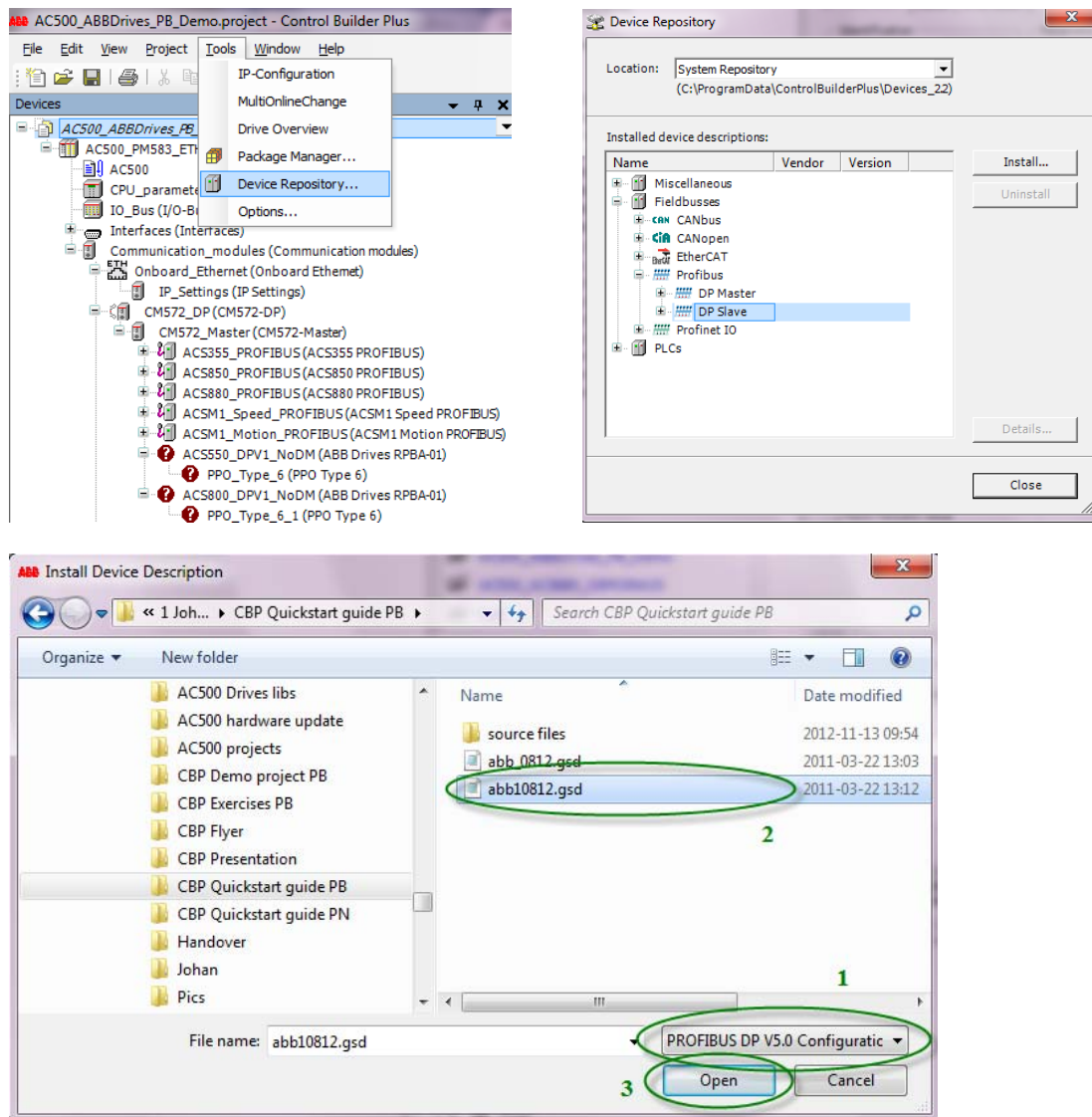
### ABB PLC and drives integration using PROFIBUS DP

---

#### Install GSD files

In the installation of Control Builder Plus version 2.2.0 and later, GSD files for the ABB PROFIBUS module FPBA-01 are included. However, for RPBA-01 PROFIBUS modules (used in drives ACS550 and ACS800) you need to install the GSD file manually (RPBA-01 GSD file for DP-V1 is included in this package). In later versions of Control Builder Plus, also GSD files for RPBA-01 will be included in the installation.

To install a GSD file, open Control Builder Plus and choose “Device Repository” from the “Tools” menu. Click “Install”, choose to display PROFIBUS objects (1), select the GSD file included in this package (2) and click “Open”. Close the Device Repository window and check that the question marks have disappeared from ACS550 and ACS800 in the Control Builder Plus device tree.



---

## Demo project Guide

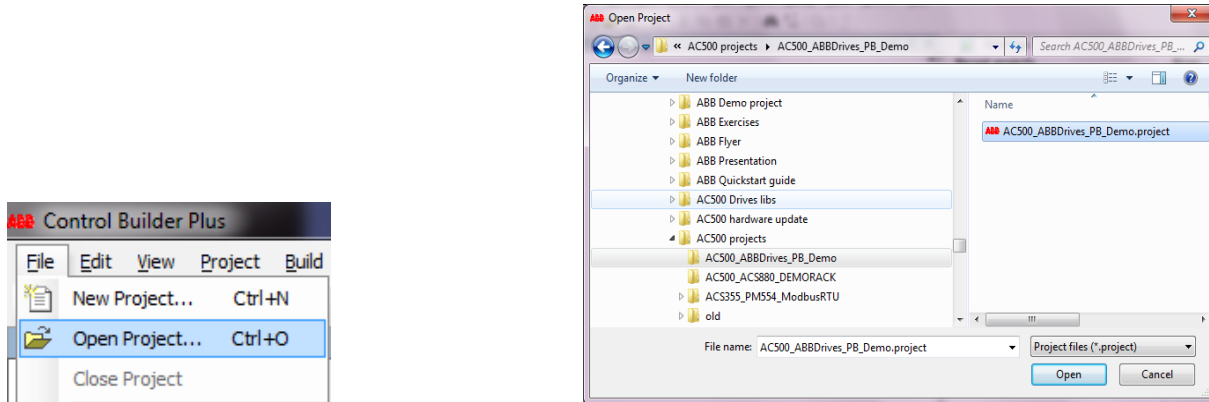
### ABB PLC and drives integration using PROFIBUS DP

---

#### Open the project

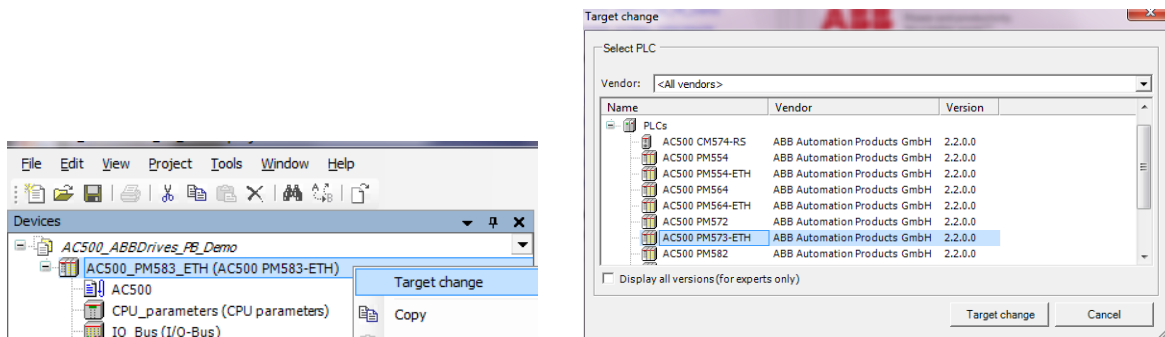
Save the AC500 PLC project to a location of your choice. Start the “Control Builder Plus” PC tool for PLC configuration and Drive Manager handling.

Choose “File → Open Project”, select the project from your location and click “Open”.



#### PLC change

The PLC in this project is of type “PM583-ETH”. If you are using another type of PLC you need to change the target by right-clicking “AC500\_PM583\_ETH” and choosing “Target change”. Then select your actual PLC type and click “Target change”.



## IP configuration of CPU (for Ethernet connection between PC and PLC)

If the CPU has an Ethernet port and the CPU IP address has not already been configured, follow the steps below.

De-activate the firewall of the PC, or allow the connection if question comes up. Connect an Ethernet cable between PC and PLC (or via a switch).

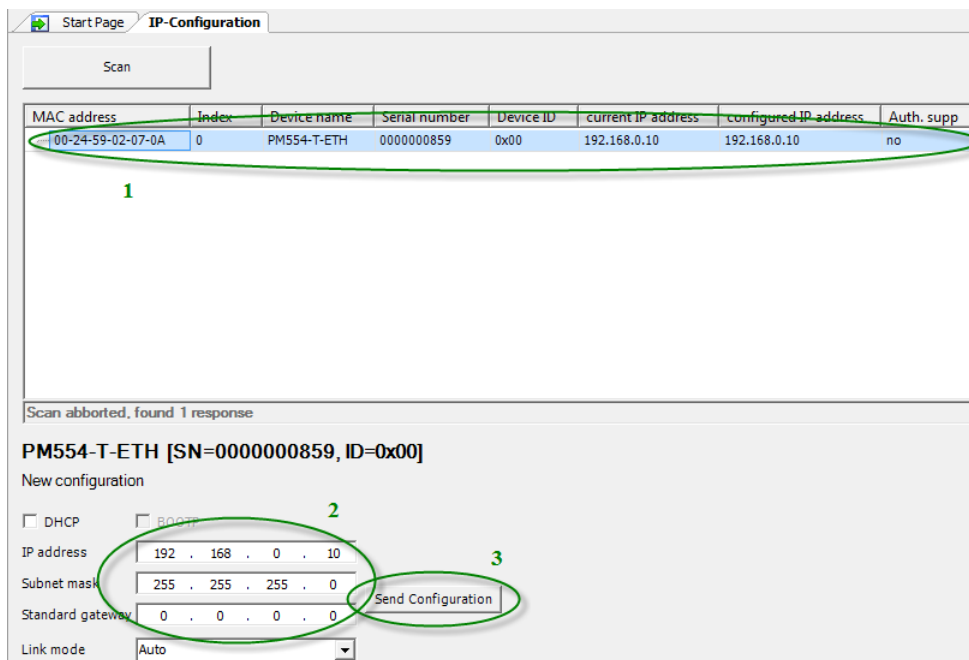
Open the IP configuration tool from the “Tools” menu and press the “Scan” button.



Select actual PLC from the scanned objects (1), make your network settings (2) and press the “Send Configuration” button. This needs to be done the first time you connect to the PLC even if the IP address is already correct.

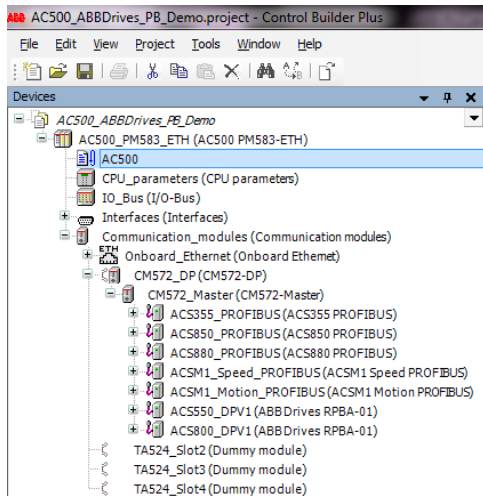
**Note!** The PLC needs to be in “STOP” mode for IP configuration.

After the new configuration was sent the PLC will automatically reboot.



## CODESYS

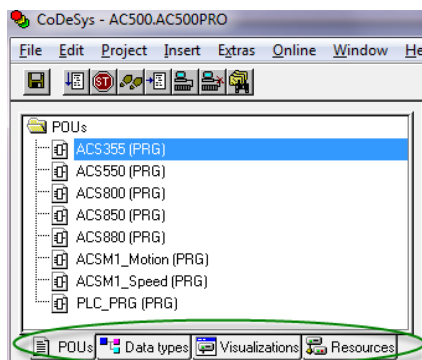
Double-click “AC500” from the Device tree in Control Builder Plus project to open CODESYS.



## CODESYS tabs

In CODESYS there are four different tabs for programming, configuration, etc.

1. POU's (Program Organization Units): This tab contains your Functions, Function blocks and Programs.
2. Data types: In this tab, along with the standard data types you can define your own user-specific data types.
3. Visualizations: In this tab you can create your own or use predefined visualizations so that you can display your project variables. In Online mode, these can then change their form/color/text/position/output in response to specified variable values.
4. Resources: In this tab you can configure and organize your project. It includes Global variables, Library manager, etc.

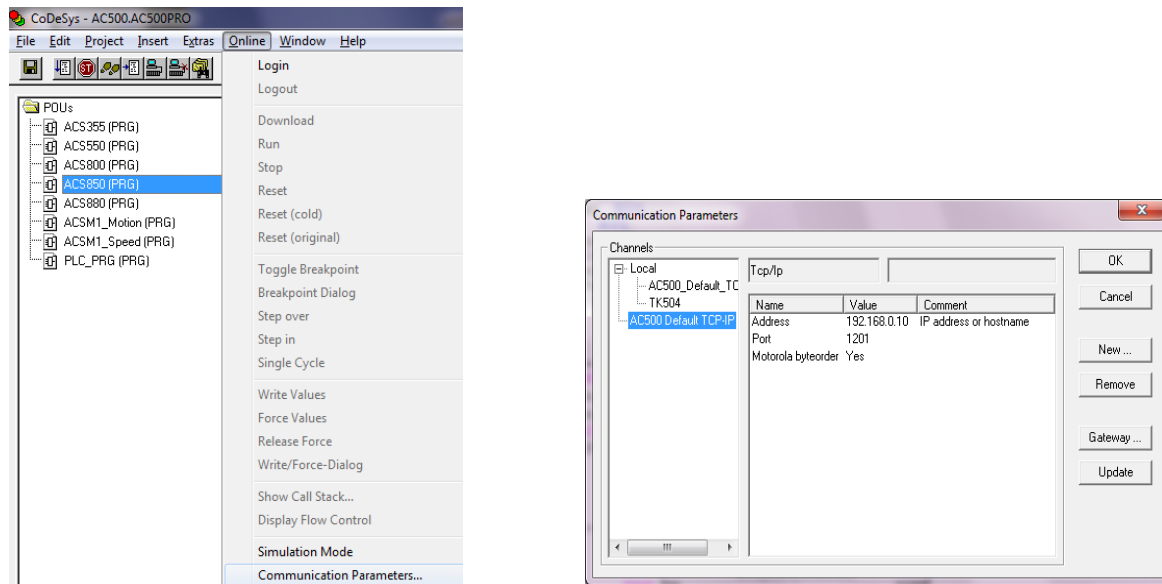


## Demo project Guide

### ABB PLC and drives integration using PROFIBUS DP

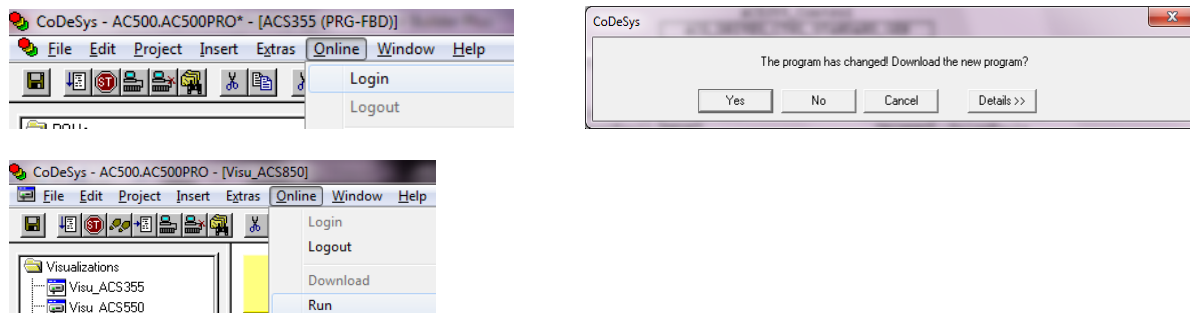
#### Download program to PLC

Choose “Communication Parameters” from the “Online” menu. Set communication Parameters according to your online connection. In the example below, the “Address” 192.168.0.10 corresponds to the IP address of actual CPU and is also the default IP address of AC500 CPUs. Note that in case of Ethernet connection, the IP address of your PC port or Ethernet adapter should belong to the same subnet as the CPU, 192.168.0.XXX (XXX between 1 and 255).



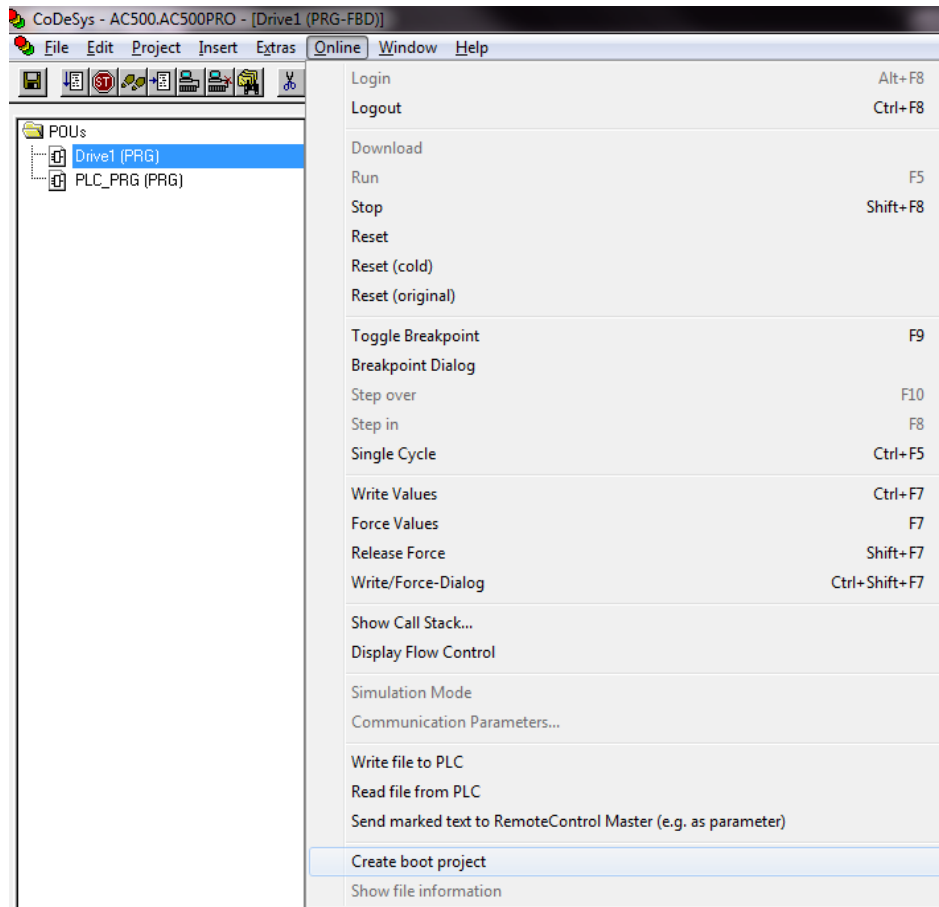
Choose “Login” from the “Online” menu and in the following pop-up window, click “Yes”. Then choose “Run” from the “Online” menu to start the PLC. Check that the CPU display shows “run”.

**Note!** If the display still shows “stop” you might have some PLC errors that you need to reset first. You can do that either by pressing the “DIAG” button on the PLC itself followed by the “OK” button until all errors are reset. You can also do it in online mode by using the “diagreset” command from the “PLC Browser” in the CODESYS “Resources” tab.



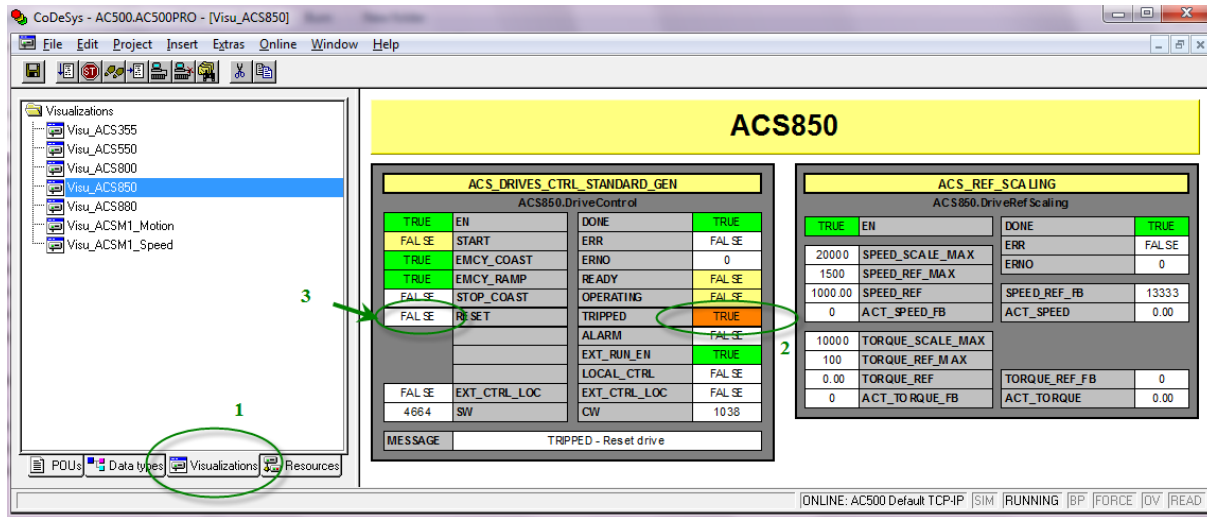
### Create boot project

In “online” mode (Login), choose “Create boot project” from the “Online” menu. With this command, the compiled project is stored to the flash in such a way that the PLC will load it automatically when restarted.

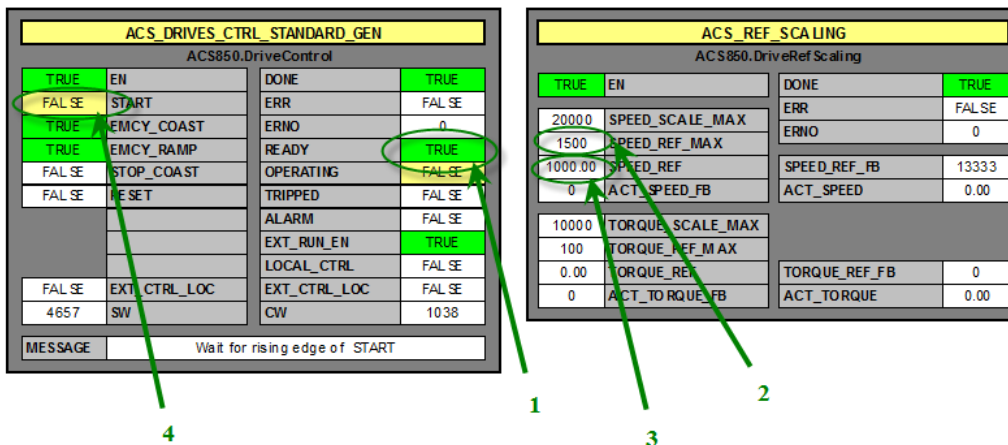


### Visualizations

Open the visualization page for actual drive by double-clicking “Visu\_ACSXXX” from the “Visualizations” tab (1). If the drive has an active fault (“TRIPPED” = TRUE) (2), then try to reset by setting “RESET” = TRUE (3).



When “READY” = TRUE (1), then set the “SPEED\_REF\_MAX” (2) according to the speed scale parameter of actual drive (rpm/Hz) and “SPEED\_REF” (3) according to desired speed (rpm/Hz). To start the drive, set “START” = TRUE (4).



## Demo project Guide

### ABB PLC and drives integration using PROFIBUS DP

Check that the drive starts (motor running and “OPERATING” = TRUE (1)). Check that the drive follows the given speed reference (2).

ACS_DRIVES_CTRL_STANDARD_GEN			
ACS850.DriveControl			
TRUE	EN	DONE	TRUE
TRUE	START	ERR	FALSE
TRUE	EMCY_COAST	ERNO	0
TRUE	EMCY_RAMP	READY	TRUE
FALSE	STOP_COAST	OPERATING	TRUE
FALSE	RESET	TRIPPED	FALSE
		ALARM	FALSE
		EXT_RUN_EN	TRUE
		LOCAL_CTRL	FALSE
FALSE	EXT_CTRL_LOC	EXT_CTRL_LOC	FALSE
5943	SW	CW	1151
MESSAGE			

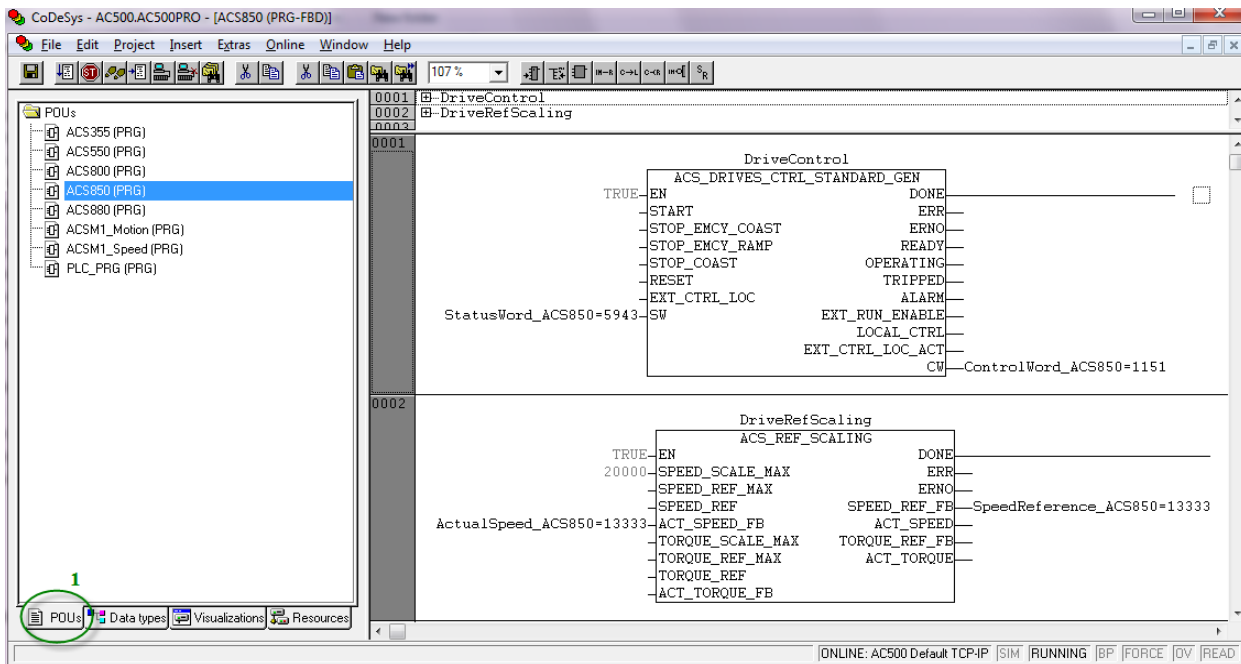
  

ACS_REF_SCALING			
ACS850.DriveRefScaling			
TRUE	EN	DONE	TRUE
	ERR		FALSE
	ERNO		0
20000	SPEED_SCALE_MAX		
1500	SPEED_REF_MAX		
1000.00	SPEED_REF	SPEED_REF_FB	13333
13333	ACT_SPEED_FB	ACT_SPEED	999.97
10000	TORQUE_SCALE_MAX		
100	TORQUE_REF_MAX		
0.00	TORQUE_REF	TORQUE_REF_FB	0
0	ACT_TORQUE_FB	ACT_TORQUE	0.00

1

2

The visualization object inputs and outputs represent the function blocks of actual drive (found from PRG of actual drive in the “POUs” tab). Block inputs which have not been connected to the function blocks in the program “PRG” can be changed from the visualization window.





**Some examples of what can be seen in the visualization:**

- SW field: actual 16-bit Status Word from the drive.
- CW field: actual 16-bit Control Word sent from the PLC to the drive.
- SPEED\_REF: speed reference, in this case in rpm.
- SPEED\_REF\_FB: unscaled speed reference sent from the PLC to the drive.
- ACT\_SPEED\_FB: unscaled value of the drive actual speed.
- ACT\_SPEED: scaled value of the drive actual speed, in this case 1003 rpm.
- MESSAGE field: information about the actual state, e.g. "Operation" or "Wait for rising edge of START".

Go offline by choosing "Logout" from the "Online" menu.

## Demo project Guide

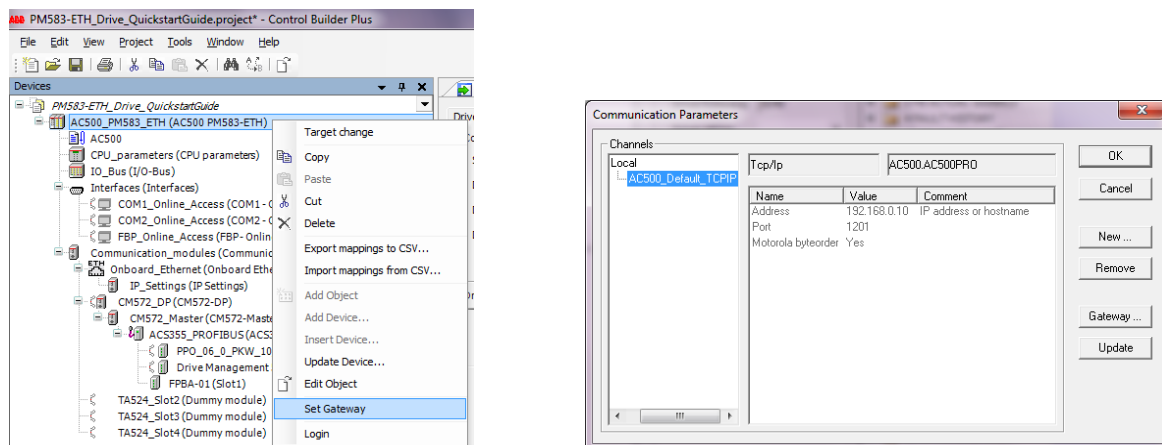
### ABB PLC and drives integration using PROFIBUS DP

## Drive Manager

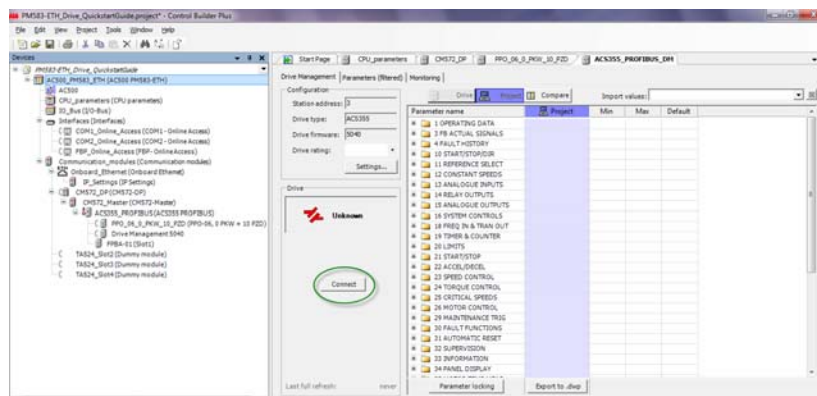
The following steps need to be fulfilled before connection to the drive can be established from Drive Manager (see also chapter “Drive configuration”):

1. Activate the drive fieldbus module from drive parameters (activate fieldbus module, set correct node number and update fieldbus settings).
2. Download the Control Builder Plus project to the PLC from CODESYS (Online -> Login).
3. Set the PLC in “Run” mode from CODESYS (Online -> Run).

Set Gateway for connection to PLC and drives. Right-click the target line and choose “Set Gateway”, see picture below. Choose the correct communication parameters, see example below for Ethernet connection to an AC500 with default settings (IP address 192.168.0.10). If Ethernet is used, make sure the Ethernet port of your PC is in the same subnet as the PLC (192.168.0.XXX), see also description in chapter “Download program to PLC”.



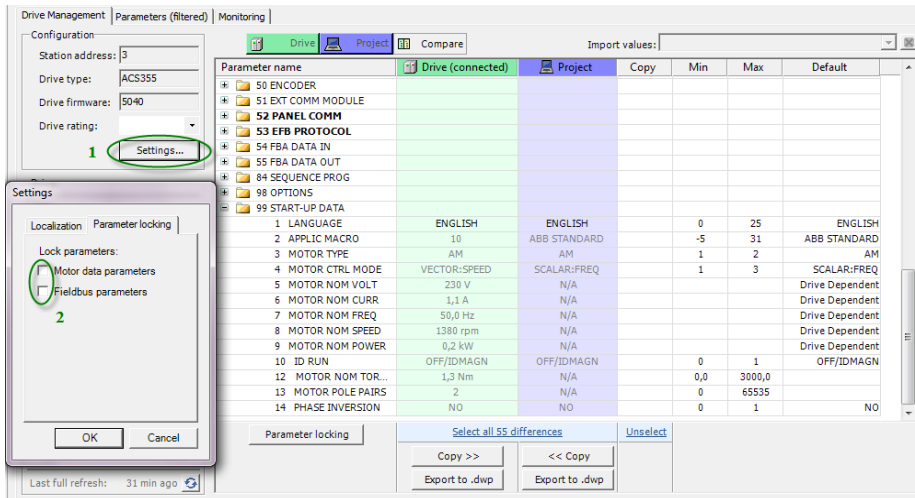
Start Drive Manager by double-clicking “Drive Management XXXX” under actual drive and click the “Connect” button.



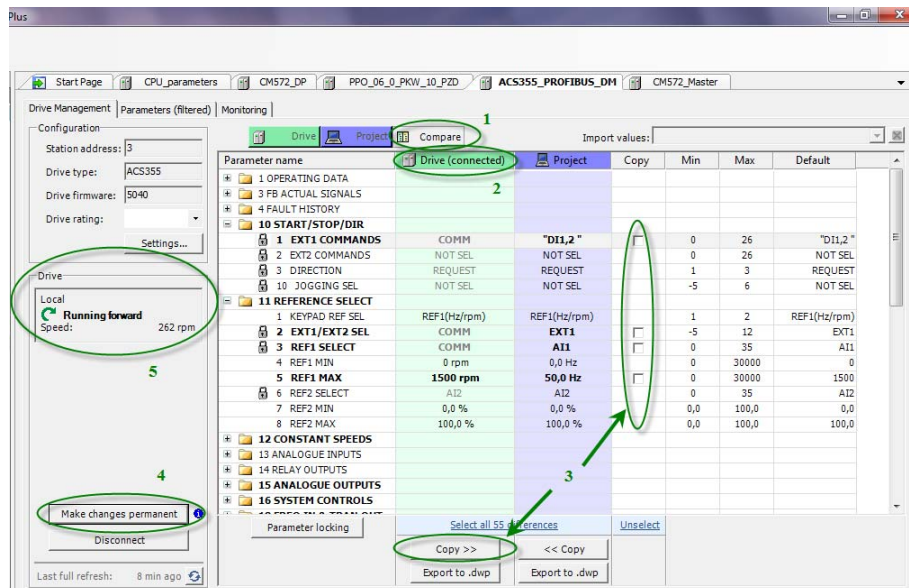
## Demo project Guide

### ABB PLC and drives integration using PROFIBUS DP

To allow settings in “Motor data parameters” and “Fieldbus parameters”, click the “Settings” button (1) and untick the boxes in the “Parameter locking” tab.



Open the “Compare” view (1) and make your online drive parameter settings in the “Drive (connected)” column (2). If you want to copy the online parameter values to your complete project, tick the boxes for the parameters you want to copy in the “Copy” column and then click “Copy >>” (3). Parameters in **bold** indicate that there are differences in parameter settings between the online drive and the project file. To save your parameter settings to the flash memory of the drive (keep settings even after power down), click the “Make changes permanent” button (4). The “Drive” field shows the drive’s actual status (5).



# Demo project Guide

## ABB PLC and drives integration using PROFIBUS DP

### General Drive Manager tips

Monitor the status of all your drives in a single view. Connect the drives you want to see one by one by double-clicking “DriveManagement” (1) and then “Connect” (2) for actual drives. Then choose “Drive Overview” from the “Tools” menu.

The screenshot shows the Control Builder Plus interface. The left pane displays the project tree with the following structure:

- AC500\_ABBDrives\_PB\_Demo
- AC500
- CPU\_parameters (CPU parameters)
- IO\_Bus (I/O-Bus)
- Communication\_modules (Communication modules)
- Onboard\_ethernet (Onboard Ethernet)
- IP\_Settings (IP Settings)
- CM572\_DP (CM572-DP)
- CM572\_Master (CM572-Master)
- ACS355\_PROFIBUS (ACS355 PROFIBUS)
- ACS850\_PROFIBUS (ACS850 PROFIBUS)
- ACS880\_PROFIBUS (ACS880 PROFIBUS)
- ACSM1\_Speed\_PROFIBUS (ACSM1 Speed PROFIBUS)
- ACSM1\_Motion\_PROFIBUS (ACSM1 Motion PROFIBUS)

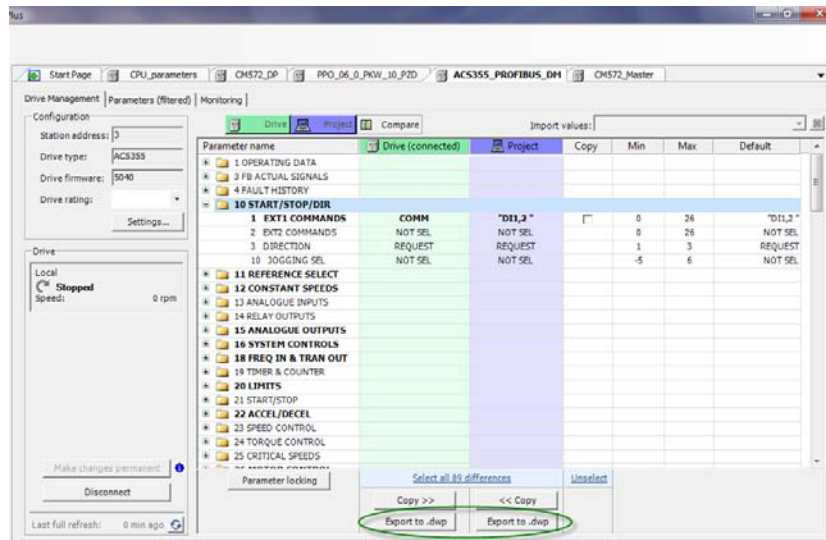
The right pane shows the 'Drive Management' tab. The 'Drive' section is expanded, showing a list of drives. The 'Connect' button is circled in green. The 'Tools' menu is open, showing the 'Drive Overview' option.

Drive Name	Drive Type	Firmware Version	Status	Speed
ACS850_PROFIBUS	ACS850 PROFIBUS	UFI2200	750	
ACSM1_Motion_PROFIBUS	ACSM1 Motion PROFIBUS	UMFI1600	1048	
ACS880_PROFIBUS	ACS880 PROFIBUS	AINFO 1.10.0.0	0	
ACS355_PROFIBUS	ACS355 PROFIBUS	5040	750	
ACSM1_Speed_PROFIBUS	ACSM1 Speed PROFIBUS	UMFI1600	0	

## Demo project Guide

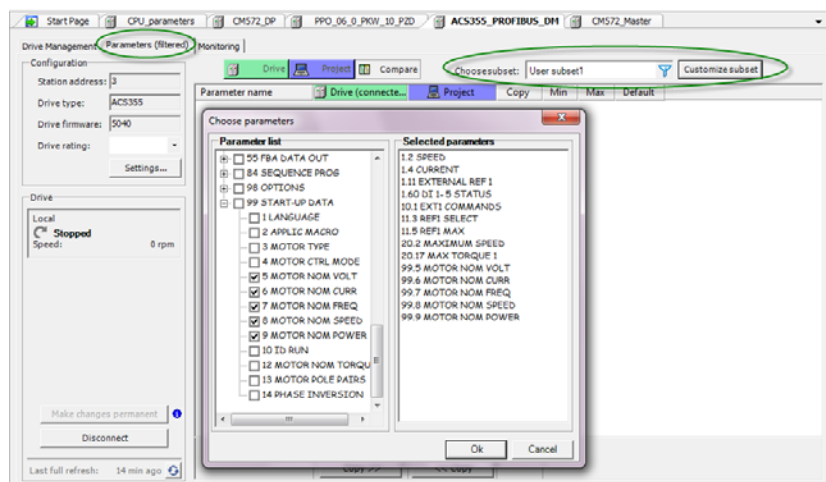
### ABB PLC and drives integration using PROFIBUS DP

Export your Online (Drive (connected)) or Project parameter file to drive-specific pc tool format. For example “.dwp” (ACS355), “.dsp” (ACS850, ACSM1) or “.dcpparamsbak” (ACS880). These files will be possible to open from *DriveWindow Light* (ACS355), *DriveStudio* (ACS850, ACSM1) or *Drive Composer* (ACS880).



Open the predefined parameter subset for a list with only the most common parameters. Open the “Parameters (filtered)” tab and choose “Default subset” from the “Choose subset” menu.

Or create your own parameter subset for a list with your preferred parameters. From the “Parameters (filtered)” tab, choose one of the User subsets from the “Choose subset” menu and click “Customize subset”. Then add parameters of your choice.



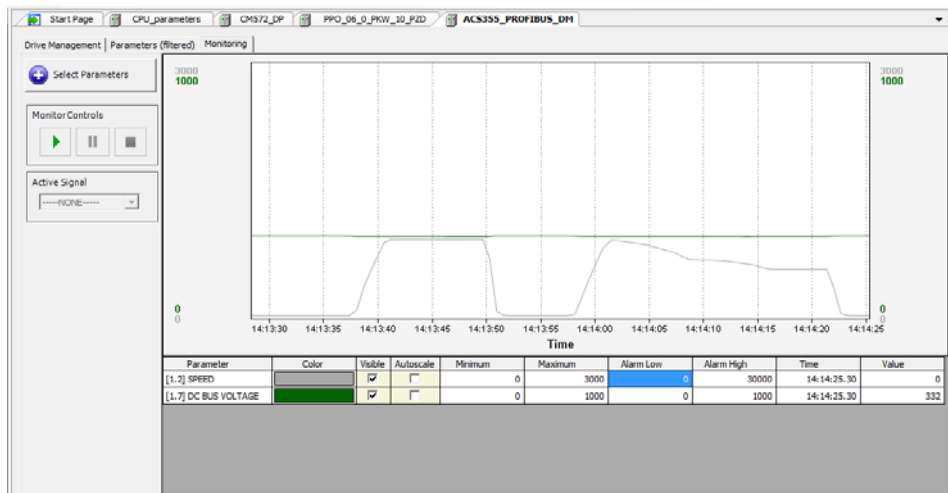
---

## Demo project Guide

### ABB PLC and drives integration using PROFIBUS DP

---

Monitor drive signals from the “Monitoring” tab.



Check out more tips in Control Builder Plus → Help → Contents → Drive Manager.

## Other useful documentation

- ABB Configurator Help (Contents → Control Builder Plus → Drive Manager)
- CODESYS Help (Contents → Target system → AC500 / S500 → ACS Drives Libraries)
- User's manual FPBA-01 PROFIBUS DP adapter module [3AFE68573271]
- User's manual PROFIBUS DP Adapter Module RPBA-01 [3AFE64504215]
- User's manual ACS355 drives [3AUA0000066143]
- ACS850 Firmware Manual Standard Control Program [3AUA0000045497]
- Firmware manual ACS880 primary control program [3AUA0000085967]
- ACSM1 Firmware Manual Speed and Torque Control [3AFE68848270]
- ACSM1 Firmware Manual Motion Control [3AFE68848270]
- User's Manual ACS550-01 Drives [3AUA0000001418]
- Firmware Manual ACS800 Standard Control Program [3AFE64527592]

## Revision

Rev	Page (P) Chap (C)	Description	Date Name
A	-	New document	2012-11-26
B	-	New Safety Instructions, Update (C) Starting up ACSxxx	2013-02-01
C	-	Update (C) Starting up ACSxxx Update (C) Install PS553-Drives library	2013-03-22
D	P 14	Correction ACS550	2013-05-13
E	P 13	Correction for ACSM1: Ext1/2 to Par34.01	2013-07-15

For more information please contact your local ABB  
representative or visit:

**[www.abb.com/drives](http://www.abb.com/drives)**

**[www.abb.com/drivespartners](http://www.abb.com/drivespartners)**

© Copyright 2012 ABB. All rights reserved.  
Specifications subject to change without notice.