



PG PLC & Automation, June 2013

# AC500 and AC Drives PS553-DRIVES Library for AC500

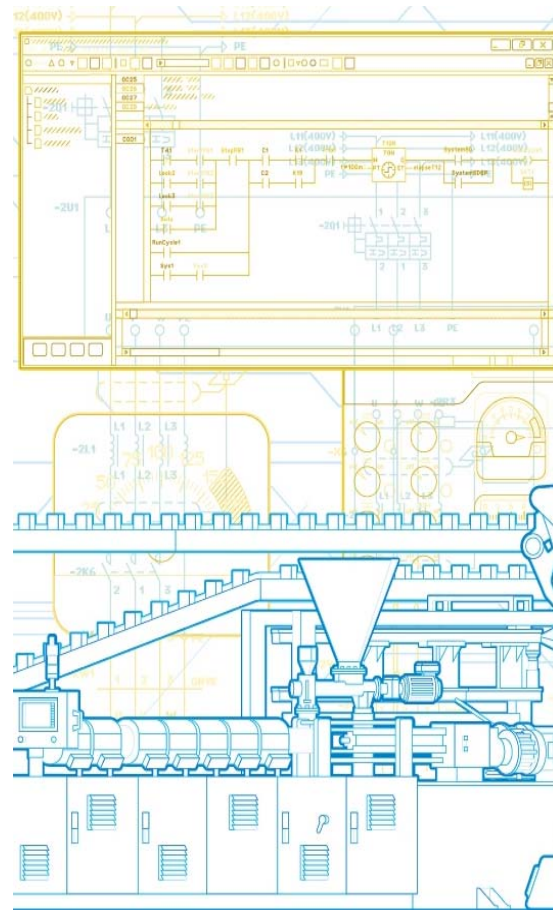
# PS553-DRIVES: AC500 Library Package

## Overview of the Library

ACS355_Control	
ACS_DRIVES_CTRL_STANDARD_GEN	
EN	DONE
START	ERR
STOP_EMCI_COAST	ERR
STOP_EMCI_RAMP	READY
STOP_COAST	OPERATING
RESET	TRIPPED
EXT_CTRL_LOC	ALARM
SW	EXT_RUN_ENABLE
	LOCAL_CTRL
EXT_CTRL_LOC_ACT	
CS	

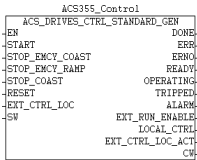
ACS_DRIVES_CTRL_STANDARD_GEN	
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SW	EXT_RUN_ENABLE
	LOCAL_CTRL
EXT_CTRL_LOC_ACT	
CS	

- Covers all major AC500 Communication networks for AC drives in industrial applications
- Standard speed and torque applications (Motion Control covered by PS552-MC)
- Pre-engineered function blocks and visualizations for control and diagnostics
- Fast and easy programming
- Flexible functionality



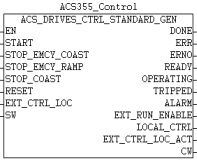
# PS553-DRIVES: AC500 Library Package Structure

- Overview AC Drives Fieldbus Configuration
- Configuration of AC Drives for AC500 Fieldbus Control
  - Workflow, Configuration Tools, Settings
- PS553-DRIVES Library
  - Update Package, Library details
  - Fieldbus independent blocks
  - Modbus RTU: Generic servers / ACSXXX
  - Modbus TCP
  - Control Blocks
  - Help and Documentation
  - Visualizations, Examples
- Benefits



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# Overview AC Drives Fieldbus Configuration

## Dedicated Drives

Libraries are released for the following drives:

Industrial:

**ACS800, ACS850, ACS880**

Machinery:

**ACS310, ACS355, ACSM1**

HVAC:

**ACH550, ACS550**

Water:

**ACQ810**



# Overview AC Drives Fieldbus Configuration

## Many different configurations possible



# Overview AC Drives Fieldbus Configuration

## Possible fieldbus connections 1 / 2

[ACS Drives - AC500 overview fieldbus connectivity.xls](#)

Fieldbusses supported by AC500	AC500 communication module	ACS310	ACS350 ACS355	ACS850	ACQ810	ACSM1	ACS880	ACS580 ACH580
<b>Modbus-RTU</b>	onboard or CM574-RS		FMBA-01 FRSA-00	FSCA-01	FSCA-01	FSCA-01	-	-
<b>Modbus-RTU embedded</b>	onboard or CM574-RS	em- bedded	-	embedded	embedded	-	embedded	embedded
<b>Modbus TCP</b>	onboard or CM577-ETH		FENA-01	FENA-11	FENA-11	FENA-11	FENA-11	FENA-11
<b>Profibus DP</b>	CM572-DP	-	FPBA-01	FPBA-01	FPBA-01	FPBA-01	FPBA-01	FPBA-01
<b>ProfiNet IO</b>	CM579-PNIO		FENA-01	FENA-11	FENA-11	FENA-11	FENA-11	FENA-11
<b>CANopen</b>	CM578-CN		FCAN-01	FCAN-01	-	FCAN-01	FCAN-01	FCAN-01
<b>EtherCAT</b>	CM579-ETHCAT		FECA-01	FECA-01	-	FECA-01	FECA-01	FECA-01





# Overview AC Drives Fieldbus Configuration

## Possible fieldbus connections 2 / 2

[ACS Drives - AC500 overview fieldbus connectivity.xls](#)

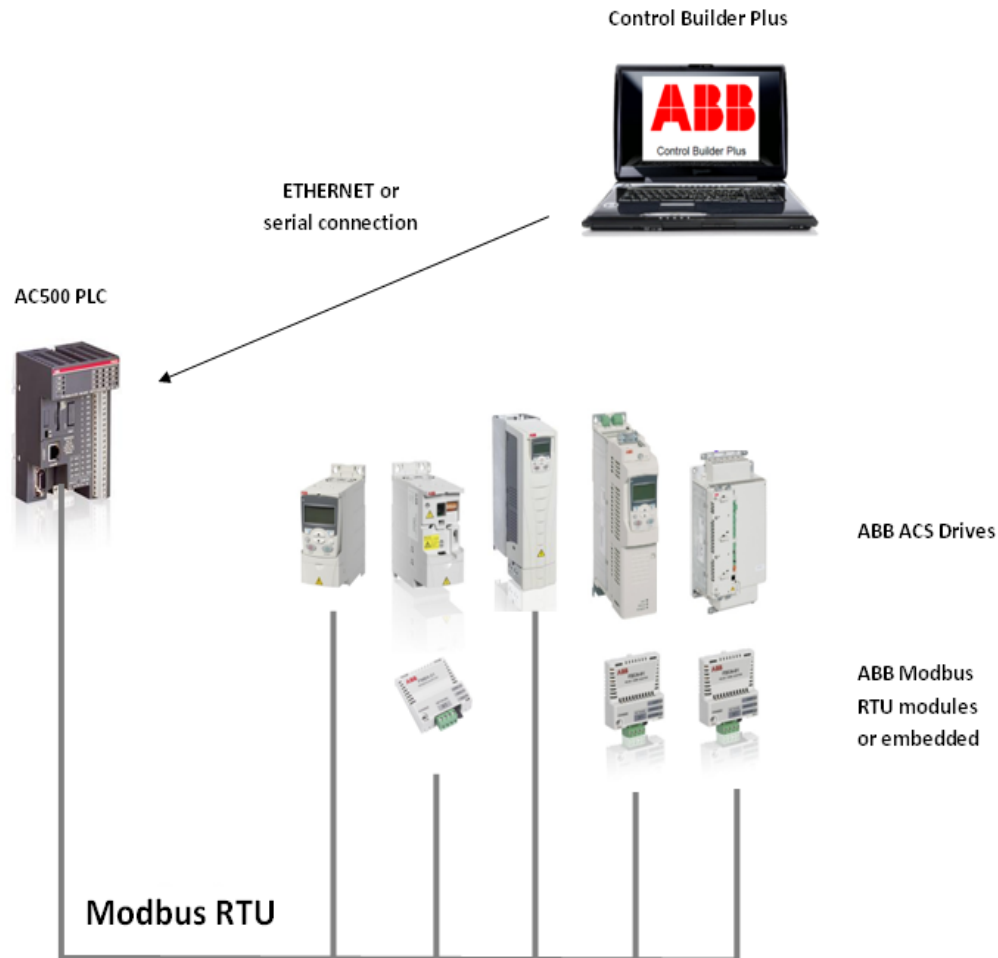
Fieldbusses supported by AC500	AC500 communication module	ACS550	ACH550	ACS800	DCS800
Modbus-RTU	onboard or CM574-RS	-	-	RMBA-01	RMBA-01
Modbus-RTU embedded	onboard or CM574-RS	embedded	embedded	-	-
Modbus TCP	onboard or CM577-ETH	RETA-01 RETA-02	RETA-01	RETA-01 RETA-02	RETA-01 RETA-02
Profibus DP	CM572-DP	RPBA-01	RPBA-01	RPBA-01 NPBA-12	RPBA-01
ProfiNet IO	CM579-PNIO	RETA-02	RETA-02	RETA-02	RETA-01
CANopen	CM578-CN	RCAN-01	RCAN-01	RCAN-01	RCAN-01
EtherCAT	CM579-ETHCAT	RECA-01	-	RECA-01	RECA-01





# Overview AC Drives Fieldbus Configuration

## Typical Configuration Modbus RTU



# Overview AC Drives Fieldbus Configuration

## Typical Configuration CANopen

CANopen

Control Builder Plus



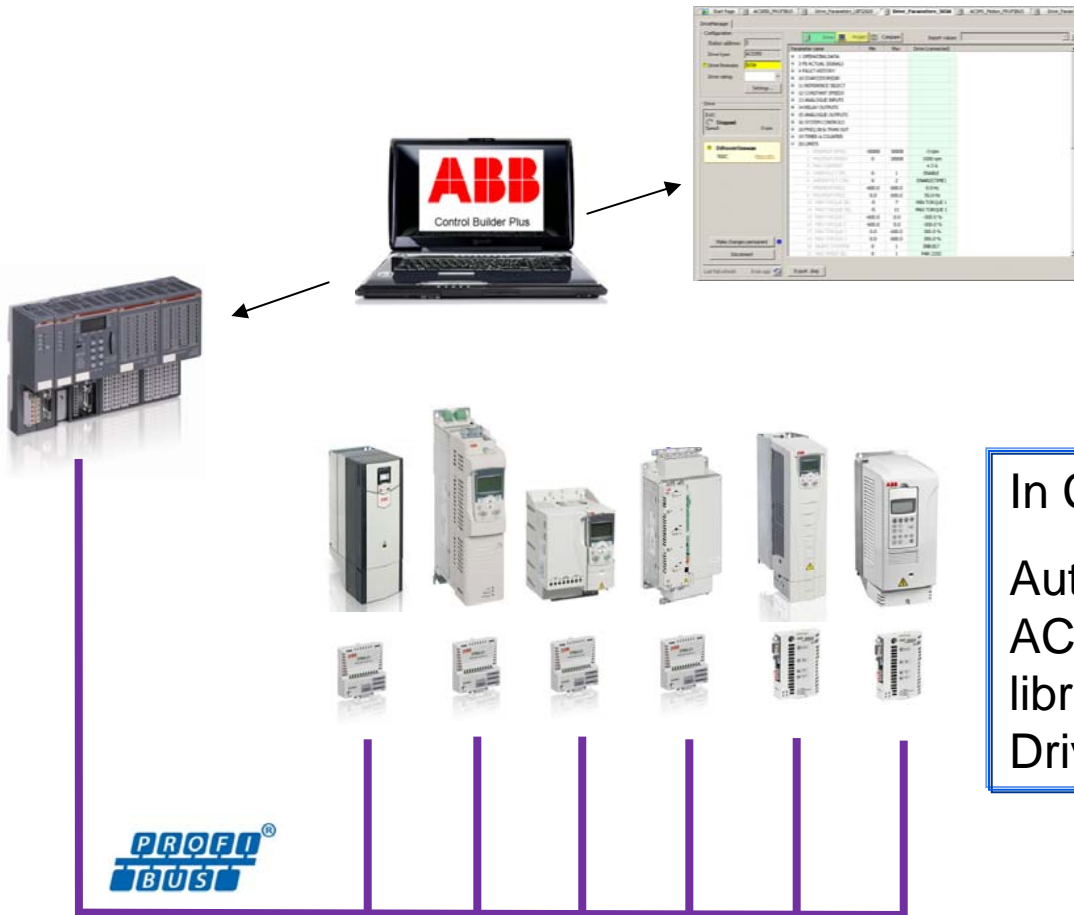
ETHERNET or  
serial connection

AC500 PLC



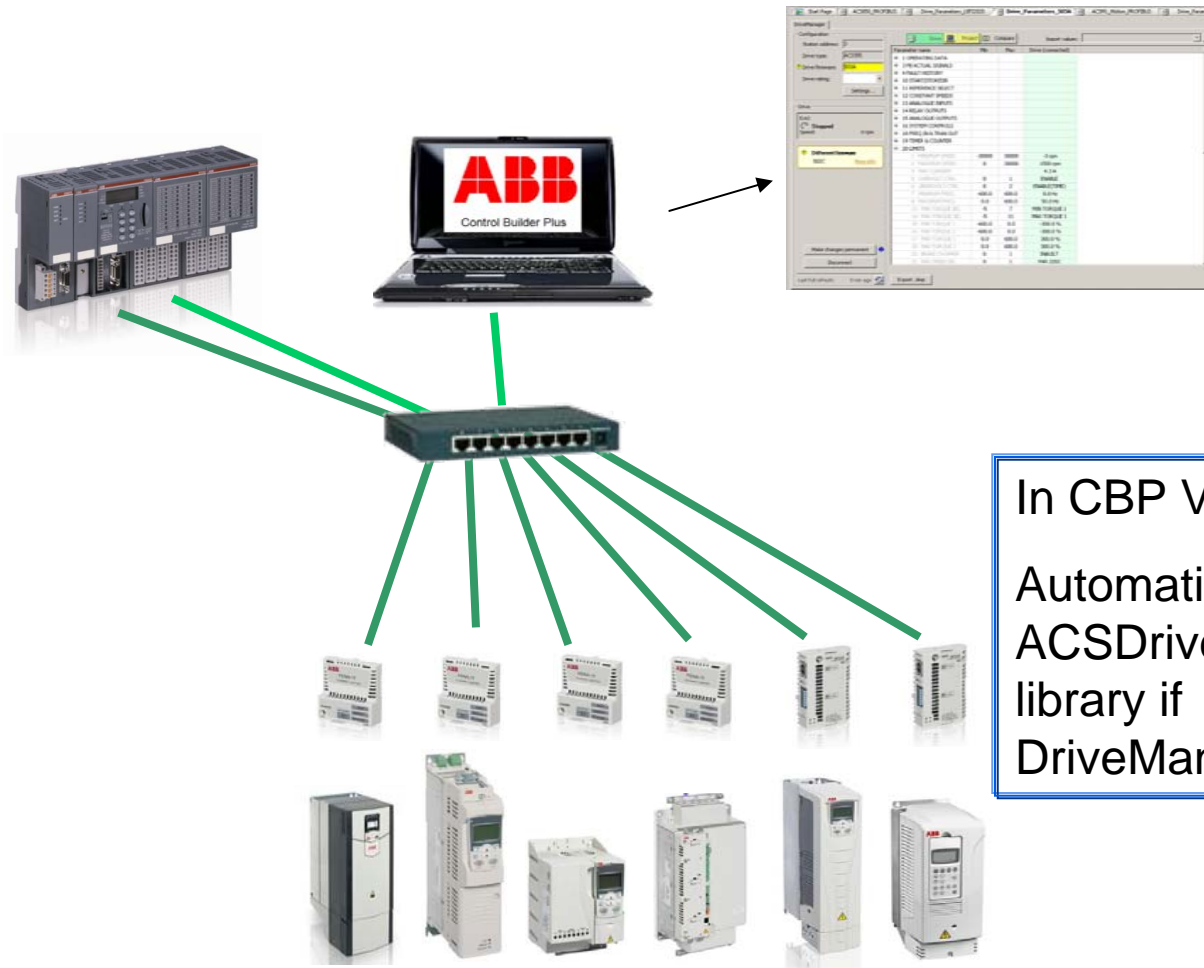
CANopen

# Overview AC Drives Fieldbus Configuration Typical Configuration PROFIBUS



# Overview AC Drives Fieldbus Configuration

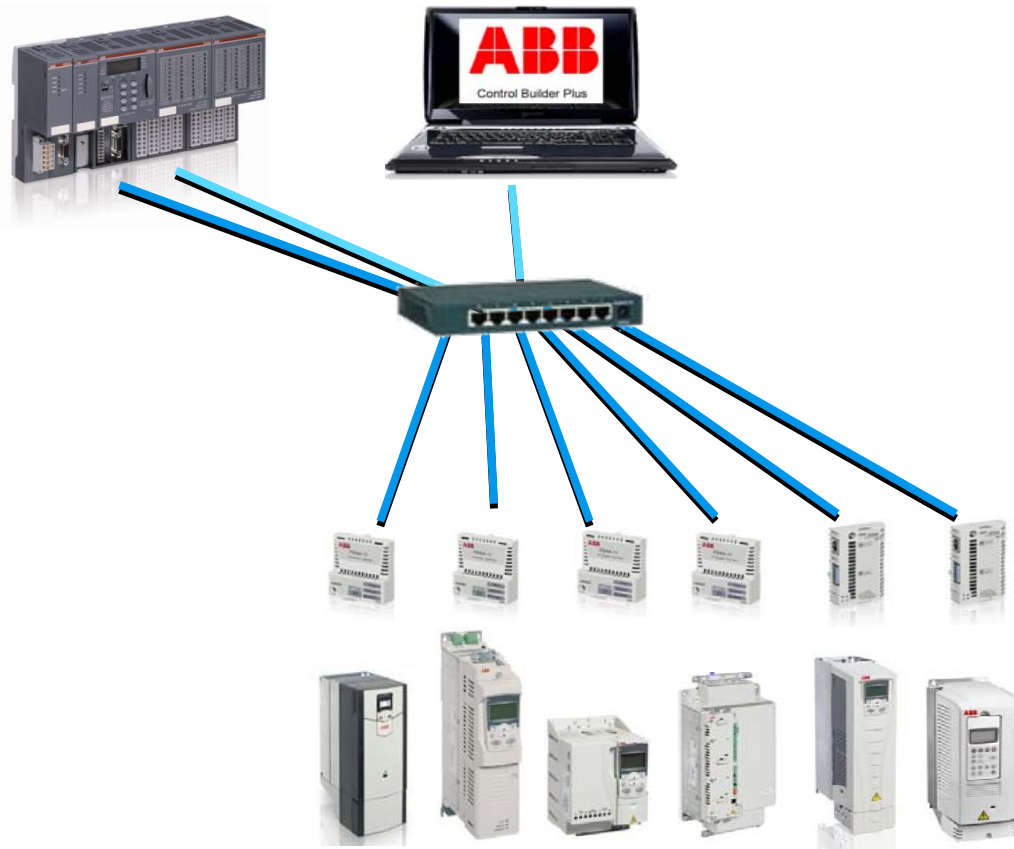
## Typical Configuration PROFINET



In CBP V2.3:  
Automatic load of  
ACSDrivesBase  
library if  
DriveManager is used

# Overview AC Drives Fieldbus Configuration

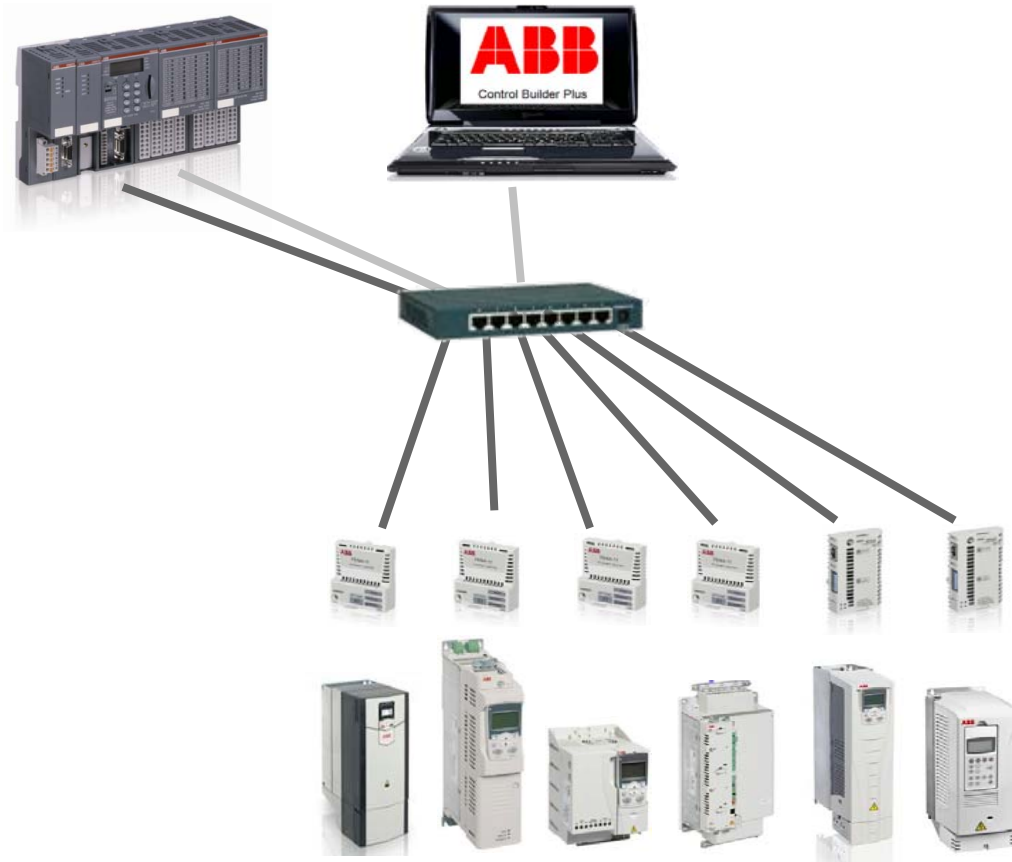
## Typical Configuration Modbus TCP



# Overview AC Drives Fieldbus Configuration

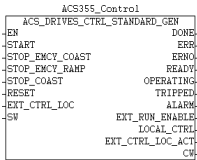
## Typical Configuration Ethercat

EtherCAT<sup>®</sup>



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# Configuration of AC Drives for AC500 Fieldbus Control Workflow - Steps to make a system run

1. Commissioning of drive
  - Panel or Drive Tool (Motor data, ID Run, local control)
2. Configuration of drive for fieldbus control
  - Panel or Drive Tool (activate fieldbus, node-number...)
3. Configuration of AC500 fieldbus
  - Control Builder Plus  
(configure drive as slave, parameter mappings,...)
4. Create programm to control the drive
  - function block programming
  - visualization

# Configuration of AC Drives for AC500 Fieldbus Control Tools and drive panels

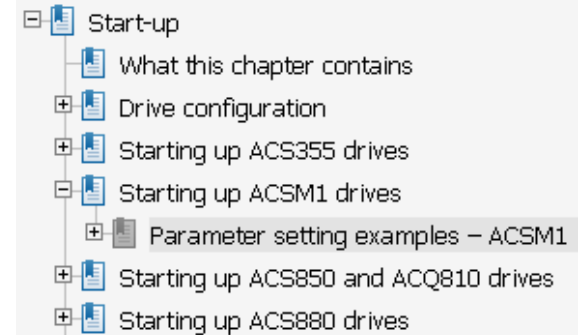
Drive Configuration Tools		ACS800	ACS310	ACS350 ACS355	ACS550	ACH550	ACS850	ACQ810	ACSM1	ACS880	ACS580 ACH580
Drive Window Optical Link		X									
Drive Window Light COM - Serial Link			X	X	X	X					
Drive Studio COM -Serial Link							X	X	X		
Drive Composer USB Link via Panel										X	X
Drive control panels											
		CDP312R	ACS-CP-x							ACS-AP-I	
Drive Manager in Control Builder Plus Profibus ProfiNet  *) only Profibus	V2.1			X			X		X		
	V2.2			X			X		X	X	
	V2.3			X	X *)		X	X	X	X	

# Configuration of AC Drives for AC500 Fieldbus Control Drives Settings in Documentations

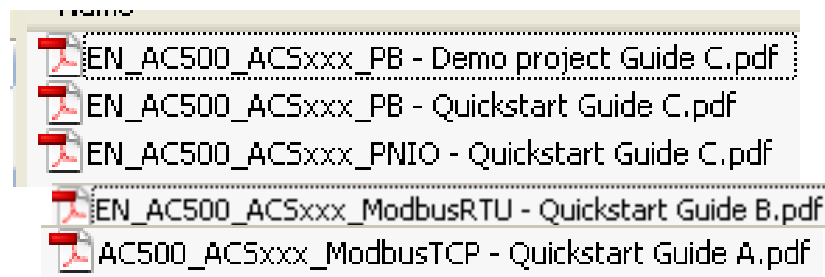


Fieldbus coupler manuals:

E.g. EN\_FPBA01\_UM\_E.pdf



Quickstart Guides in  
PS553-DRIVES package



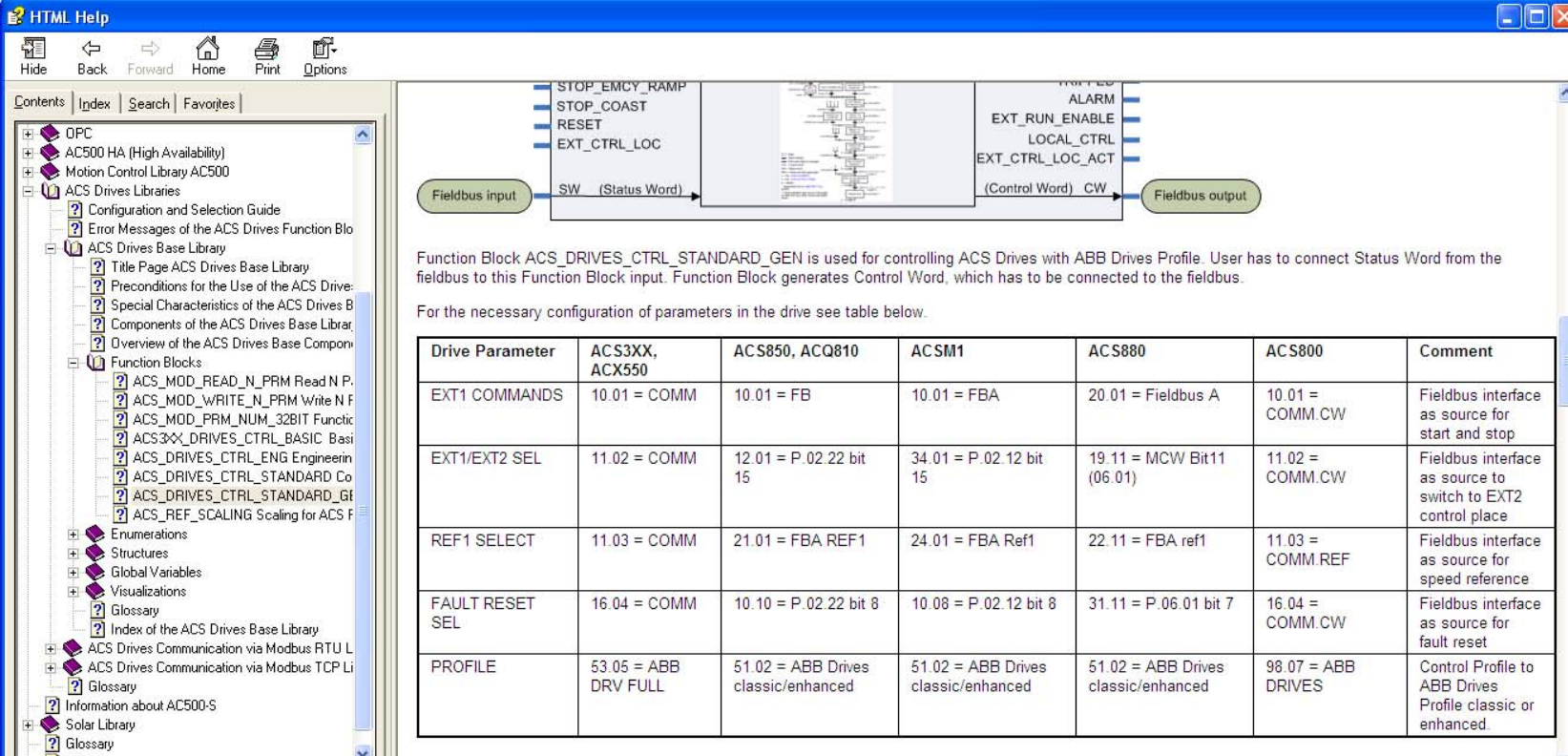
Drive configuration .....	
Starting up ACS355 drives .....	
ACS355 Minimum required parami	
ACS355 More actual values or par	
ACS355 More parameters to be wr	
Starting up ACS850 drives .....	
ACS850 Minimum required parami	
ACS850 More actual values or par	
ACS850 More parameters to be wr	
Starting up ACS880 drives .....	
ACS880 Minimum required parami	
ACS880 More actual values or par	
ACS880 More parameters to be wr	
Starting up ACSM1 drives .....	

# Configuration of AC Drives for AC500 Fieldbus Control

## Drives Settings in Documentations

AC500 Help – ACS Drives Libraries:

E.g. ACS\_DRIVES\_CTRL\_STANDARD\_GEN



The screenshot shows the HTML Help window for ACS Drives Libraries. The left pane displays the 'Contents' tree, and the right pane shows the 'ACS\_DRIVES\_CTRL\_STANDARD\_GEN' function block diagram and a table of drive parameters.

**Function Block Diagram:**

The diagram illustrates the function block **ACS\_DRIVES\_CTRL\_STANDARD\_GEN**. It has two main inputs: **Fieldbus input** (SW - Status Word) and **Fieldbus output** (CW - Control Word). The block is connected to a central logic block, which is further connected to a **Fieldbus output** block. The logic block also receives inputs from **STOP\_EMCMY\_RAMP**, **STOP\_COAST**, **RESET**, and **EXT\_CTRL\_LOC**. The output block generates **EXT\_RUN\_ENABLE**, **LOCAL\_CTRL**, and **EXT\_CTRL\_LOC\_ACT**.

**Text Description:**

Function Block ACS\_DRIVES\_CTRL\_STANDARD\_GEN is used for controlling ACS Drives with ABB Drives Profile. User has to connect Status Word from the fieldbus to this Function Block input. Function Block generates Control Word, which has to be connected to the fieldbus.

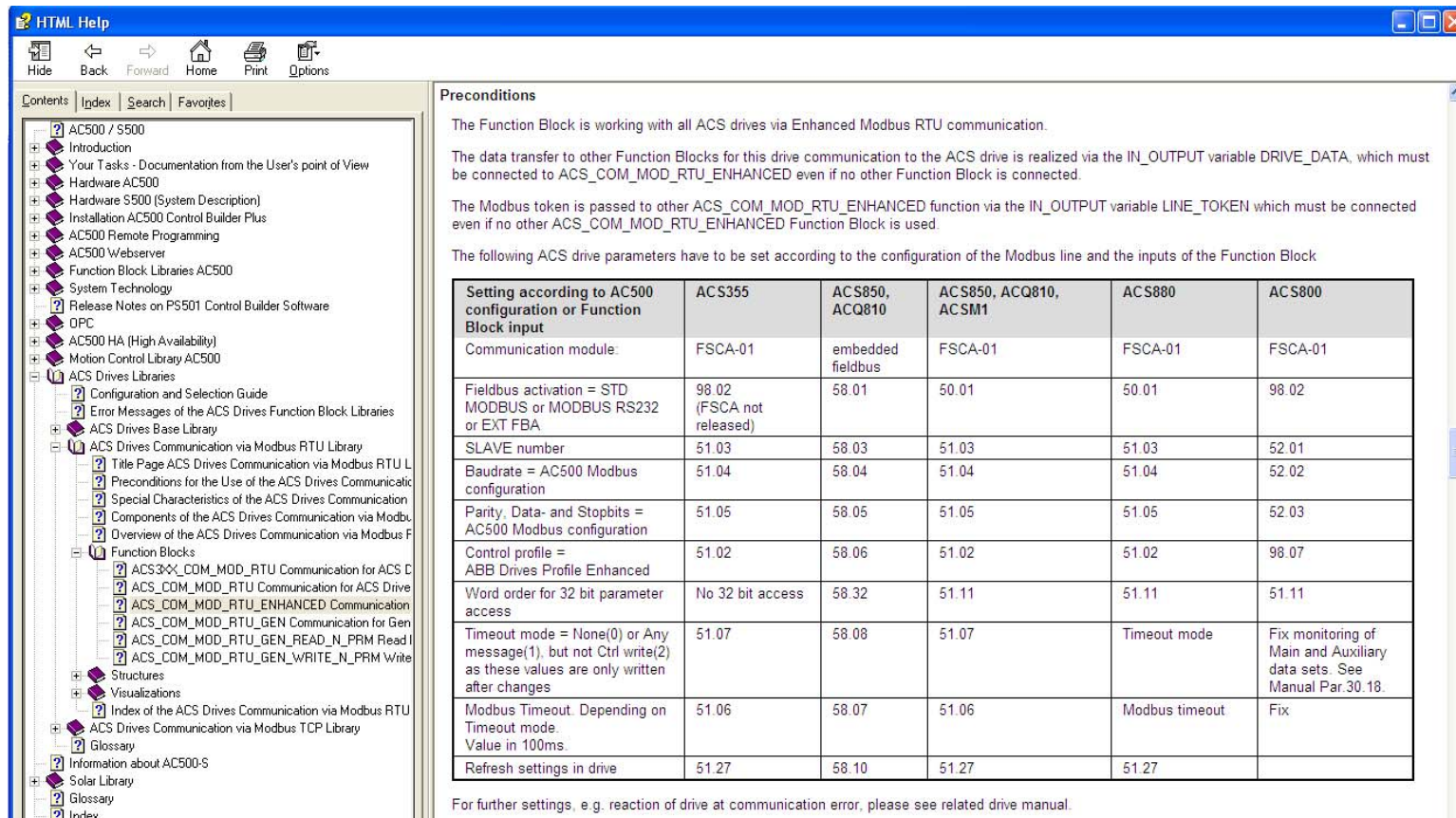
For the necessary configuration of parameters in the drive see table below.

Drive Parameter	ACS3XX, ACX550	ACS850, ACQ810	ACSM1	ACS880	ACS800	Comment
EXT1 COMMANDS	10.01 = COMM	10.01 = FB	10.01 = FBA	20.01 = Fieldbus A	10.01 = COMM.CW	Fieldbus interface as source for start and stop
EXT1/EXT2 SEL	11.02 = COMM	12.01 = P.02.22 bit 15	34.01 = P.02.12 bit 15	19.11 = MCW Bit11 (06.01)	11.02 = COMM.CW	Fieldbus interface as source to switch to EXT2 control place
REF1 SELECT	11.03 = COMM	21.01 = FBA REF1	24.01 = FBA Ref1	22.11 = FBA ref1	11.03 = COMM.REF	Fieldbus interface as source for speed reference
FAULT RESET SEL	16.04 = COMM	10.10 = P.02.22 bit 8	10.08 = P.02.12 bit 8	31.11 = P.06.01 bit 7	16.04 = COMM.CW	Fieldbus interface as source for fault reset
PROFILE	53.05 = ABB DRV FULL	51.02 = ABB Drives classic/enhanced	51.02 = ABB Drives classic/enhanced	51.02 = ABB Drives classic/enhanced	98.07 = ABB DRIVES	Control Profile to ABB Drives Profile classic or enhanced.

# Configuration of AC Drives for AC500 Fieldbus Control Drives Settings in Documentations

## AC500 Help – ACS Drives Libraries:

E.g. ACS\_COM\_MOD\_RTU\_ENHANCED



The screenshot shows the HTML Help window for ACS Drives Libraries. The left pane displays the table of contents, with the following path selected: **ACS Drives Libraries** > **ACS Drives Communication via Modbus RTU Library** > **ACS\_COM\_MOD\_RTU\_ENHANCED Communication**. The right pane shows the **Preconditions** section, which includes text about the Function Block's compatibility with ACS drives and the Modbus token. Below this text is a table titled "Setting according to AC500 configuration or Function Block input" that lists various parameters and their values for different ACS drive models.

**Preconditions**

The Function Block is working with all ACS drives via Enhanced Modbus RTU communication.

The data transfer to other Function Blocks for this drive communication to the ACS drive is realized via the IN\_OUTPUT variable DRIVE\_DATA, which must be connected to ACS\_COM\_MOD\_RTU\_ENHANCED even if no other Function Block is connected.

The Modbus token is passed to other ACS\_COM\_MOD\_RTU\_ENHANCED function via the IN\_OUTPUT variable LINE\_TOKEN which must be connected even if no other ACS\_COM\_MOD\_RTU\_ENHANCED Function Block is used.

The following ACS drive parameters have to be set according to the configuration of the Modbus line and the inputs of the Function Block

Setting according to AC500 configuration or Function Block input	ACS355	ACS850, ACQ810	ACS850, ACQ810, ACSM1	ACS880	ACS800
Communication module:	FSCA-01	embedded fieldbus	FSCA-01	FSCA-01	FSCA-01
Fieldbus activation = STD MODBUS or MODBUS RS232 or EXT FBA	98.02 (FSCA not released)	58.01	50.01	50.01	98.02
SLAVE number	51.03	58.03	51.03	51.03	52.01
Baudrate = AC500 Modbus configuration	51.04	58.04	51.04	51.04	52.02
Parity, Data- and Stopbits = AC500 Modbus configuration	51.05	58.05	51.05	51.05	52.03
Control profile = ABB Drives Profile Enhanced	51.02	58.06	51.02	51.02	98.07
Word order for 32 bit parameter access	No 32 bit access	58.32	51.11	51.11	51.11
Timeout mode = None(0) or Any message(1), but not Ctrl write(2) as these values are only written after changes	51.07	58.08	51.07	Timeout mode	Fix monitoring of Main and Auxiliary data sets. See Manual Par.30.18.
Modbus Timeout. Depending on Timeout mode. Value in 100ms.	51.06	58.07	51.06	Modbus timeout	Fix
Refresh settings in drive	51.27	58.10	51.27	51.27	

For further settings, e.g. reaction of drive at communication error, please see related drive manual.

# Configuration of AC Drives for AC500 Fieldbus Control Drives Setting Example ACS850 in fiedbus manual

ABB fieldbus options  
User's manual  
FENA-01/-11 Ethernet adapter module



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for a better world™ **ABB**

The table below gives the recommended drive parameter settings.

Drive parameter	Setting for ACS850/ACQ810 drives	Description
50.01 Fba enable	Enable	Enables communication between the drive and the fieldbus adapter module.
50.02 Comm loss func	Fault <sup>2)</sup>	Enables fieldbus communication fault monitoring.
50.03 Comm loss t out	3.0 s <sup>2)</sup>	Defines the fieldbus communication break supervision time.
50.04 Fb ref1 modesel	Speed	Selects the fieldbus reference 1 scaling.
51.01 FBA type	Ethernet <sup>1)</sup>	Displays the type of the fieldbus adapter module.
51.02 FBA par2 (PROTOCOL/PROFILE)	10 (= PNIO Pdrive)	Selects the PROFINET IO protocol and the PROFIdrive profile.

Drive parameter	Setting for ACS850/ACQ810 drives	Description
51.03 FBA par3 (COMMRATE)	0 (= Auto <sup>2)</sup> )	Ethernet communication rate is negotiated automatically by the device.
51.04 FBA par4 (IP CONFIGURATION)	0 (= Static IP)	Configuration will be obtained from parameters 05...13 or from the PLC via the DCP protocol.

52.01 FBA data in1	4 (= SW 16bit) <sup>1)</sup>	Status word
52.02 FBA data in2	5 (= Act1 16bit)	Actual value 1 (speed)
52.03 FBA data in3	122 <sup>2)</sup>	Power
52.05 FBA data in5	107 <sup>2)</sup>	DC bus voltage
53.01 FBA data out1	1 (= CW 16bit) <sup>1)</sup>	Control word
53.02 FBA data out2	2 (= Ref1 16bit)	Reference 1 (speed)
53.03 FBA data out3	2202 <sup>2)</sup>	Acceleration time
53.05 FBA data out5	2203 <sup>2)</sup>	Deceleration time

51.27 FBA par refresh	Refresh	Validates the FENA-11 configuration parameter settings.
-----------------------	---------	---

10.01 Ext1 start func	FB	Selects the fieldbus interface as the source of the start and stop commands for external control location 1.
21.01 Speed ref1 sel (ACS850)	FBA ref1	Selects the fieldbus reference 1 as the source for speed reference 1.
21.01 Speed ref sel (ACQ810)	FBA ref1	

<sup>1)</sup> Read-only or automatically detected/set

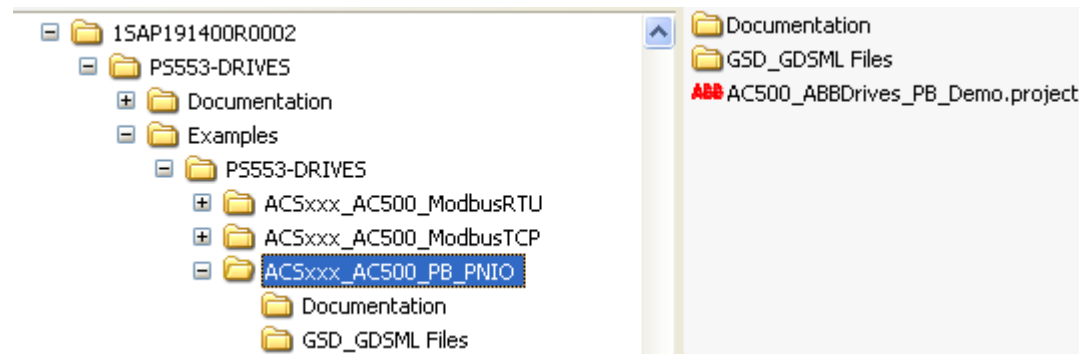
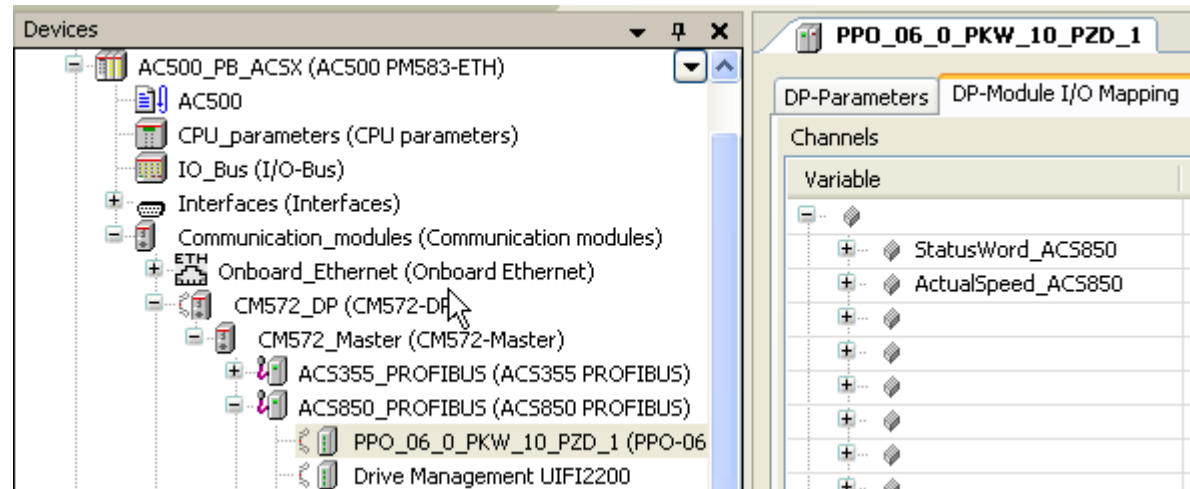
<sup>2)</sup> Example



# Configuration of AC Drives for AC500 Fieldbus Control Drives and AC500 Settings in examples and Quickstart guides



Power and productivity for a better world

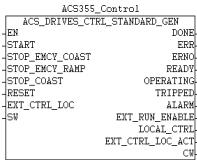


C:\Documents and Settings\All Users\Documents\ControlBuilderPlus\Examples\P5553-DRIVES



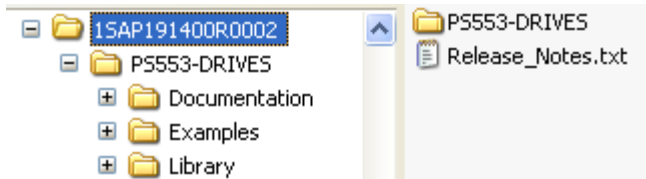
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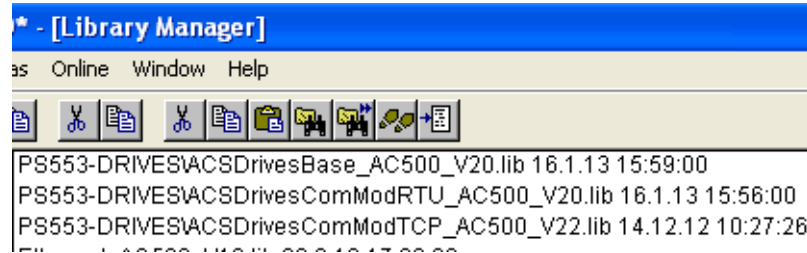
# PS553-DRIVES: AC500 Library Package

## Details of the Update Package



Included in  
Automation Builder  
1.0 (CBP V2.3)

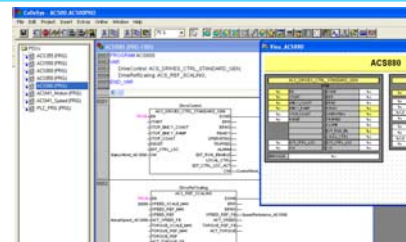
### Libraries



### Documentation in CoDeSys Help System

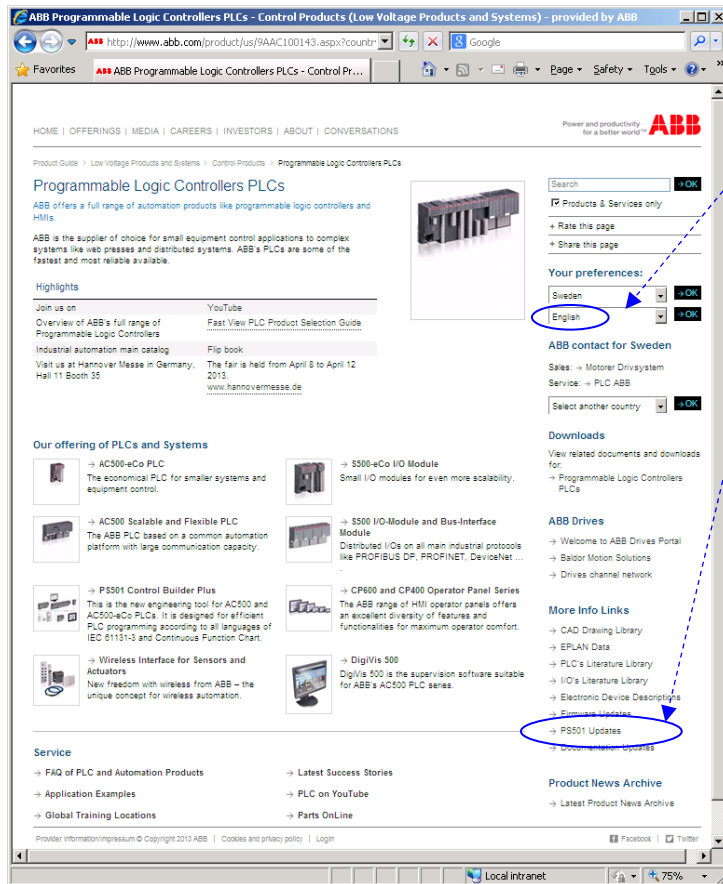


### Examples & Docu Guides



# PS553-DRIVES: AC500 Library Package

## How to get the Update Package



- Download from PLC page, English language
- Click on [“PS501 Update”](#),
- Select: **“PS501-UPDA:PS553”**

→ **PS501-UPDA: PS553-DRIVES** library update files. Contains drives interface and libraries for Modbus RTU and Modbus TCP, Profibus DP, ProfiNet, CanOpen, E ABB ACS Drives and generic Modbus RTU devices

English - 19,81MB - 1SAP191400R0002  
Doc No: 1SAP191400R0002; Document kind: Software; Language: en; File type: zip; Sum update files - Allows Update of **PS501** by adding PS553-DRIVES Library - Contains the ne and documentation for **PS501**; Owner department: ACP

# PS553-DRIVES: AC500 Library Package

## Details of the Library



All drives using “ABB Drives Profile”						
Scope: PS553-DRIVES	AC500-eCo					
	AC500					
	Modbus RTU	Modbus TCP	PROFIBUS	PROFINET	CANopen	EtherCAT
Panel on same bus / cable	✓	✓				
ACS310	✓					
ACS355	✓	✓	✓ ✓	✓ ✓	✓	✓
ACS550	✓	✓	✓ ✓	✓	✓	✓
ACH550	✓	✓	✓	✓	✓	
ACSM1	✓	✓	✓ ✓	✓ ✓	✓	✓
ACS800	✓	✓	✓	✓	✓	✓
ACQ810	✓	✓	✓ ✓	✓ ✓		
ACS850	✓	✓	✓ ✓	✓ ✓	✓	✓
ACS880	✓	✓	✓ ✓	✓ ✓	✓	✓
		✓ ✓ = Full CBP/Engineering Integration (Drives Manager)				

# PS553-DRIVES: AC500 Library Package

## Details of the Library

One main  
Ctrl-block  
for standard  
use:

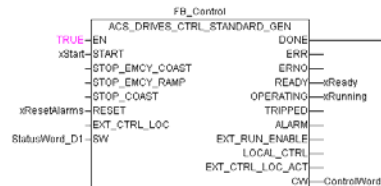
+

Additional  
blocks  
for simple  
Modbus  
handling:

### Networks



### Libraries

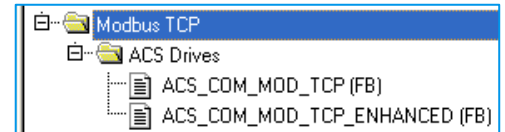
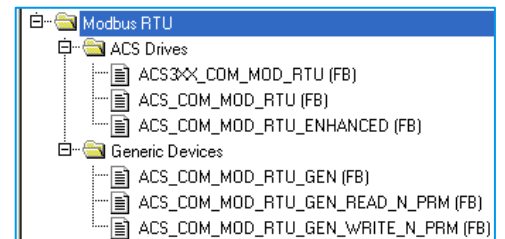
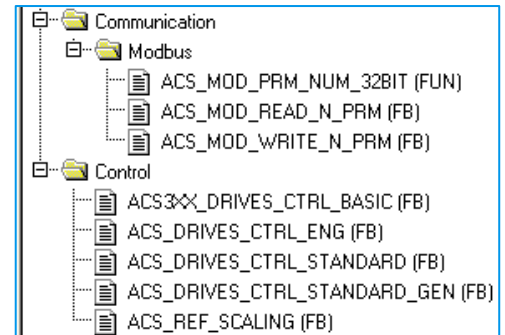


ACSDrivesBase\_AC500\_V20.lib

ACSDrivesComModRTU\_AC500\_V20.lib

ACSDrivesComModTCP\_AC500\_V22.lib

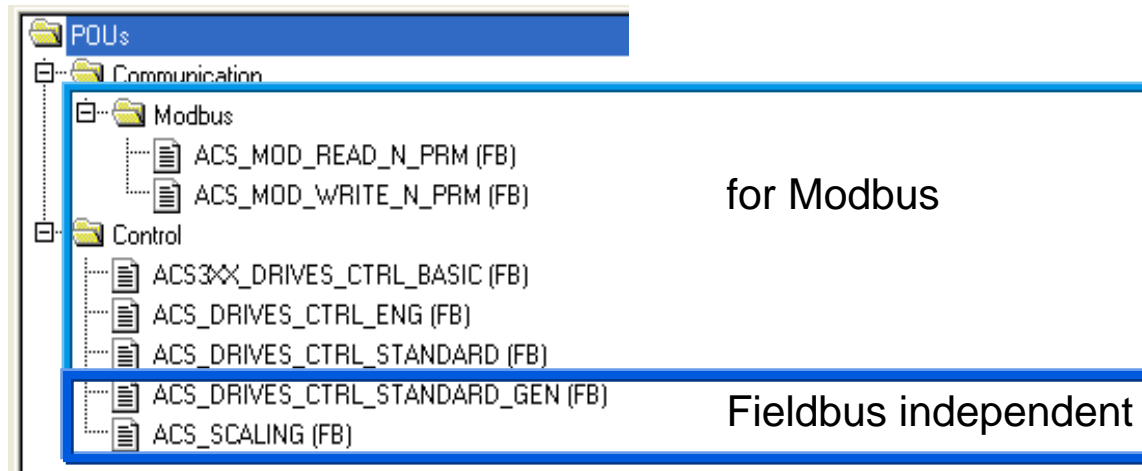
### Function Blocks



# PS553-DRIVES: AC500 Library Package

## Libraries: ACSDrivesBase\_AC500\_V20.lib

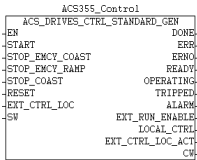
ACS355_Control	
ACS_DRIVES_CTRL_STANDARD_GEN	DONE
EN	ERR
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STOP_EMCY_COAST	READY
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STOP_COAST	TRIPPED
RESET	ALARM
EXT_CTRL_LOC	EXT_RUN_ENABLE
SW	LOCAL_CTRL
	EXT_CTRL_LOC_ACT
	CS



- Basic structures, constants
- Control blocks using ABB Drives Profile
- Read/Write Modbus blocks for both: RTU and TCP

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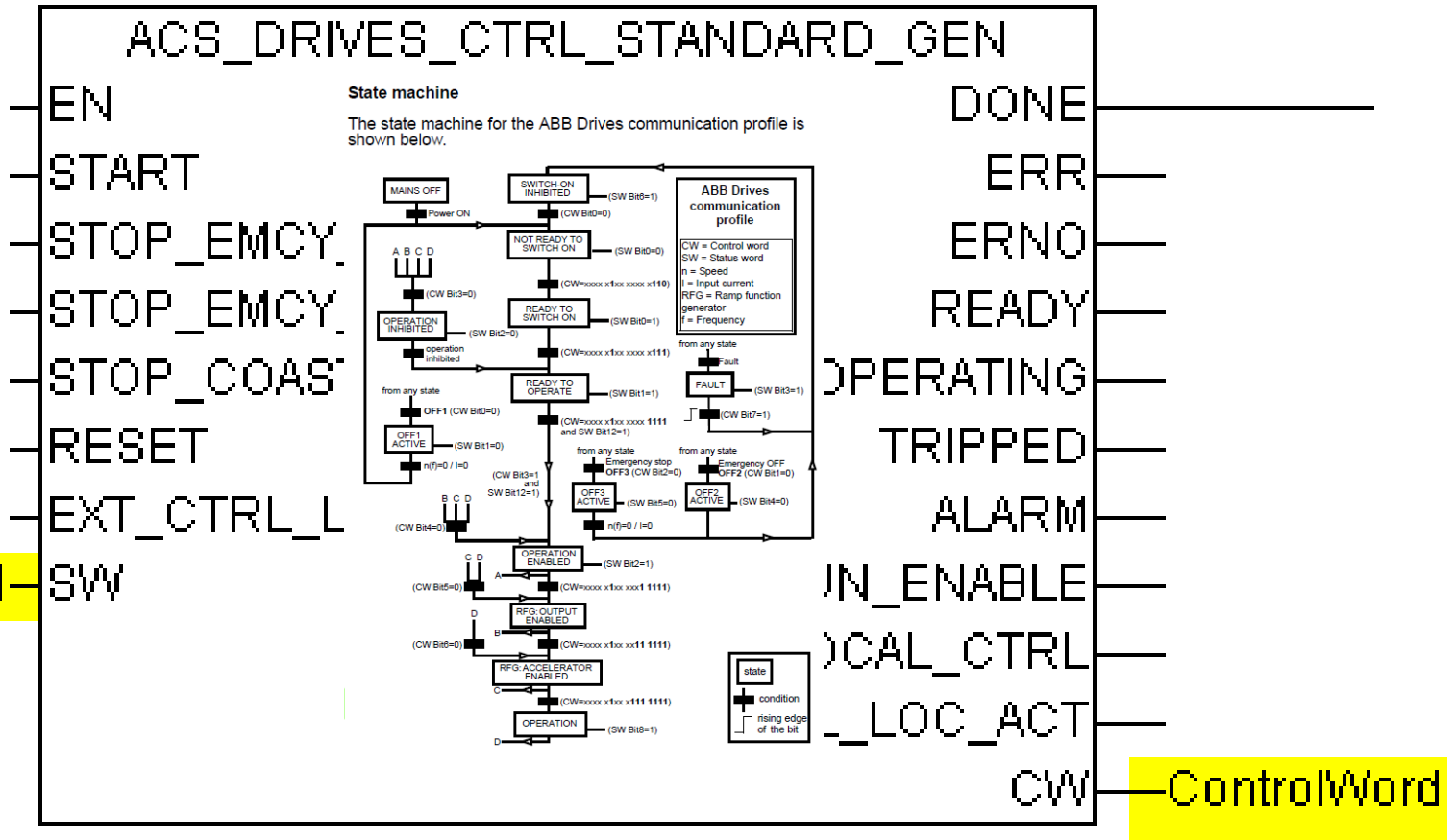




# PS553-DRIVES: Fieldbus independent blocks

## ACS\_DRIVES\_CTRL\_STANDARD\_GEN

## FB\_CTRL

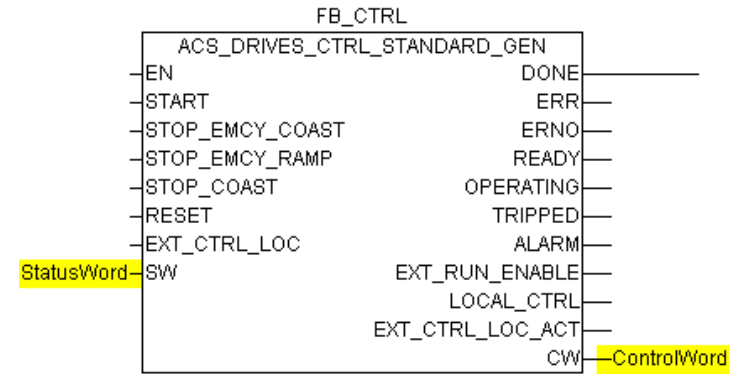


# PS553-DRIVES: Fieldbus independent blocks

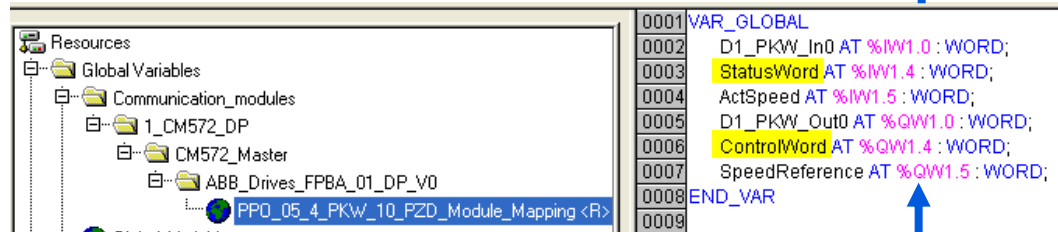
## ACS\_DRIVES\_CTRL\_STANDARD\_GEN

Status word + Control word to be configured as cyclic data on fieldbus

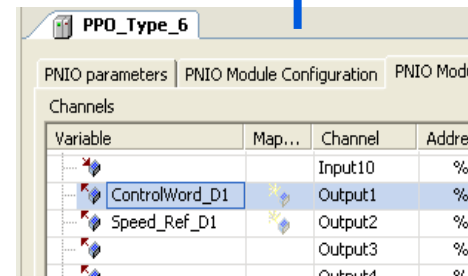
Funktionblock



Global variablelist

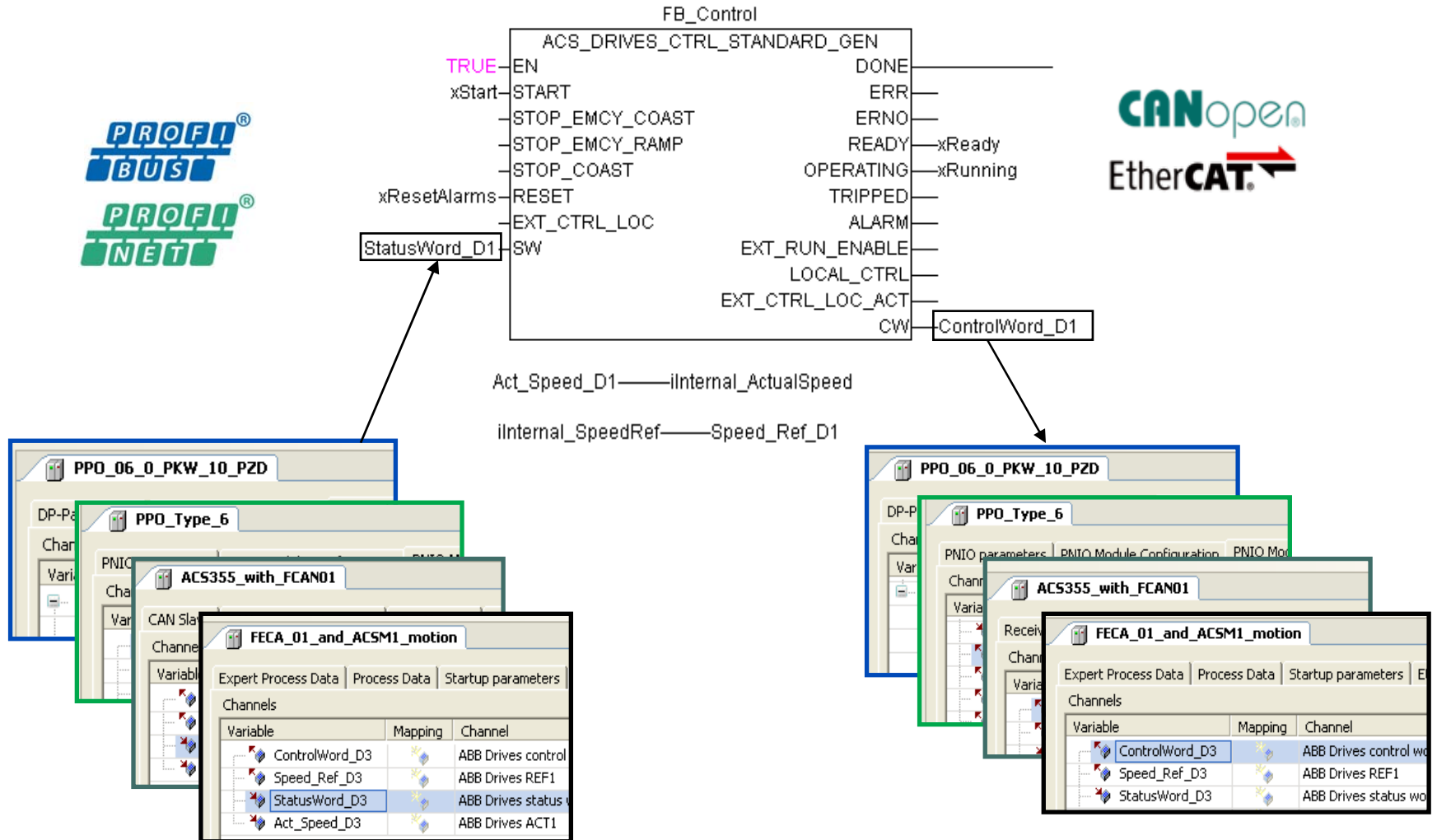


Fieldbus mapping



# PS553-DRIVES: Fieldbus independent blocks

## One drive control block for all AC500 networks



# PS553-DRIVES: Fieldbus independent blocks

## PROFINET Configuration



ACSDrivesCommunication\_V04.project\* - Control Builder Plus

File Edit View Project Tools Window Help

Devices

- ACSDrivesCommunication\_V04
  - AC500\_PM583\_ETH (AC500 PM583-ETH)
  - AC500\_7
  - CPU\_parameters (CPU parameters)
  - IO\_Bus (I/O-Bus)
  - Interfaces (Interfaces)
  - Communication\_modules (Communication modules)
  - Onboard\_Ethernet (Onboard Ethernet)
  - CM579\_PNIO (CM579-PNIO)
    - CM579\_Master (CM579-PNIO-Master)
    - ACS880\_PROFINET\_IO (ACS880 PROFINET IO)
      - PPO\_Type\_6 (PPO Type 6)
      - Drive Management AINFO 1.30.0.0
      - FENA-11 (Slot1)
  - CM572\_DP (CM572-DP)
  - CM579\_ECAT (CM579-ECAT)
  - CM578\_CAN (CM578-CAN)

PPO\_Type\_6

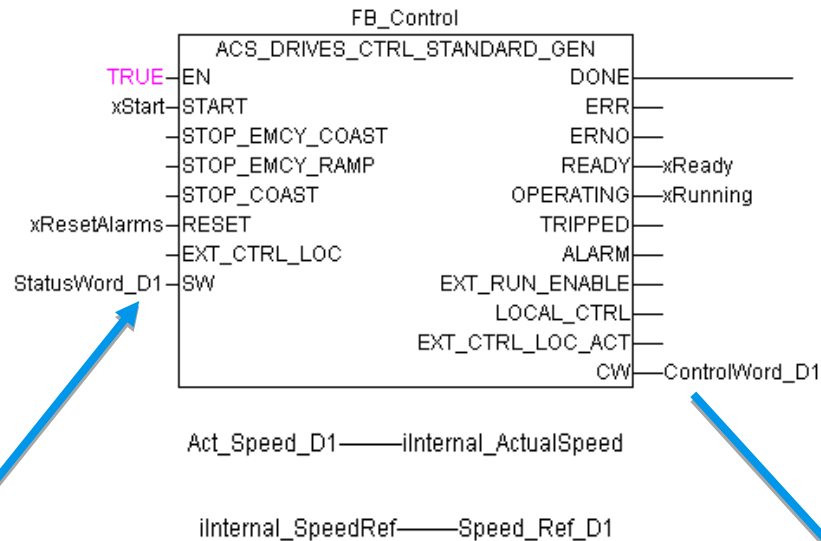
PNIO parameters | PNIO Module Configuration | PNIO Module I/O Mapping | Status | Information

Channels

Variable	Map...	Channel	Address	Type	Unit	Description
StatusWord_D1		Input1	%IW1.0	UINT		
Act_Speed_D1		Input2	%IW1.1	UINT		
		Input3	%IW1.2	UINT		
		Input4	%IW1.3	UINT		
		Input5	%IW1.4	UINT		
		Input6	%IW1.5	UINT		
		Input7	%IW1.6	UINT		
		Input8	%IW1.7	UINT		
		Input9	%IW1.8	UINT		
		Input10	%IW1.9	UINT		
ControlWord_D1		Output1	%QW1.0	UINT		
Speed_Ref_D1		Output2	%QW1.1	UINT		
		Output3	%QW1.2	UINT		

# PS553-DRIVES: Fieldbus independent blocks

## PROFINET Configuration



**PPO\_Type\_6**

PNIO parameters | PNIO Module Configuration | PNIO M

Channels

Variable	Map...	Channel	Ad
StatusWord_D1		Input1	
Act_Speed_D1		Input2	
		Input3	

**PPO\_Type\_6**

PNIO parameters | PNIO Module Configuration | PNIO Mod

Channels

Variable	Map...	Channel	Addre
		Input10	%
ControlWord_D1		Output1	%
Speed_Ref_D1		Output2	%
		Output3	%
		Output4	%

# PS553-DRIVES: Fieldbus independent blocks

## PROFIBUS Configuration



ACSDrivesCommunication\_V04.project\* - Control Builder Plus

File Edit View Project Tools Window Help

Devices

- ACSDrivesCommunication\_V04
  - AC500\_PM583\_ETH (AC500 PM583-ETH)
  - AC500\_7
  - CPU\_parameters (CPU parameters)
  - IO\_Bus (I/O-Bus)
  - Interfaces (Interfaces)
  - Communication\_modules (Communication modules)
  - Onboard\_Ethernet (Onboard Ethernet)
  - CM579\_PNIO (CM579-PNIO)
  - CM572\_DP (CM572-DP)
    - CM572\_Master (CM572-Master)
    - ACS850\_PROFIBUS (ACS850 PROFIBUS)
      - PPO\_06\_0\_PKW\_10\_PZD (PPO-06, 0 PKW)
      - Drive Management UIFI2200
      - <Empty> (<Empty>)
      - <Empty> (<Empty>)
      - FPBA-01 (Slot3)
  - CM579\_ECAC (CM579-ECAT)
  - CM578\_CAN (CM578-CAN)

PPO\_06\_0\_PKW\_10\_PZD

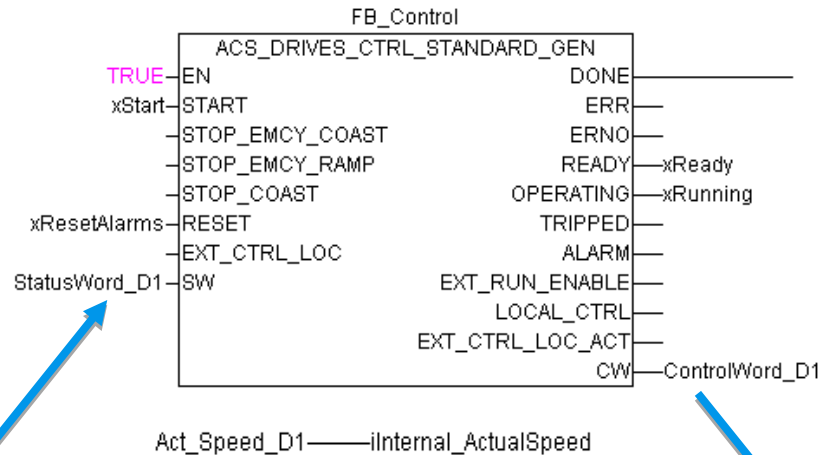
DP-Parameters DP-Module Configuration DP-Module I/O Mapping Status Information

Channels

Variable	Map...	Channel	Address	Type	Unit	Description
		Input0	%IW2.0			
StatusWord_D2		Word0	%IW2.0	WORD		
Act_Speed_D2		Word1	%IW2.1	WORD		
		Word2	%IW2.2	WORD		
		Word3	%IW2.3	WORD		
		Word4	%IW2.4	WORD		
		Word5	%IW2.5	WORD		
		Word6	%IW2.6	WORD		
		Word7	%IW2.7	WORD		
		Word8	%IW2.8	WORD		
		Word9	%IW2.9	WORD		
		Output0	%QW2.0			
ControlWord_...		Word0	%QW2.0	WORD		
Speed_Ref_D2		Word1	%QW2.1	WORD		
		Word2	%QW2.2	WORD		

# PS553-DRIVES: Fieldbus independent blocks

## PROFIBUS Configuration



PPO\_06\_0\_PKW\_10\_PZD

DP-Parameters DP-Module Configuration DP-Module I/O

Channels

Variable	Mapping	Channel
StatusWord_D2		Input0
Act_Speed_D2		Word0
		Word1
		Word2

PPO\_06\_0\_PKW\_10\_PZD

DP-Parameters DP-Module Configuration DP-Module I/O

Channels

Variable	Mapping	Channel	Ad
ControlWord_D2		Output0	
Speed_Ref_D2		Word0	
		Word1	
		Word2	

# PS553-DRIVES: Fieldbus independent blocks

## CANopen Configuration



ACSDrivesCommunication\_V04.project\* - Control Builder Plus

File Edit View Project Tools Window Help

Devices

- ACSDrivesCommunication\_V04
  - ACS00\_PM583\_ETH (ACS00 PM583-ETH)
    - ACS00\_7
      - CPU\_parameters (CPU parameters)
      - IO\_Bus (I/O-Bus)
      - Interfaces (Interfaces)
      - Communication\_modules (Communication modules)
        - Onboard\_Ethernet (Onboard Ethernet)
        - CM579\_PNIO (CM579-PNIO)
        - CM572\_DP (CM572-DP)
        - CM579\_FCAT (CM579-FCAT)
        - CM578\_CAN (CM578-CAN)
          - CM578\_CANopen (CM578-CANopen)
          - ACS355\_with\_FCAN01 (ACS355 () with FCAN01)

ACS355\_with\_FCAN01

CAN Slave | CANopen Remote Device | PDO Mapping | Receive PDO Mapping | Send PDO Mapping | Service Data Object | CANopen C

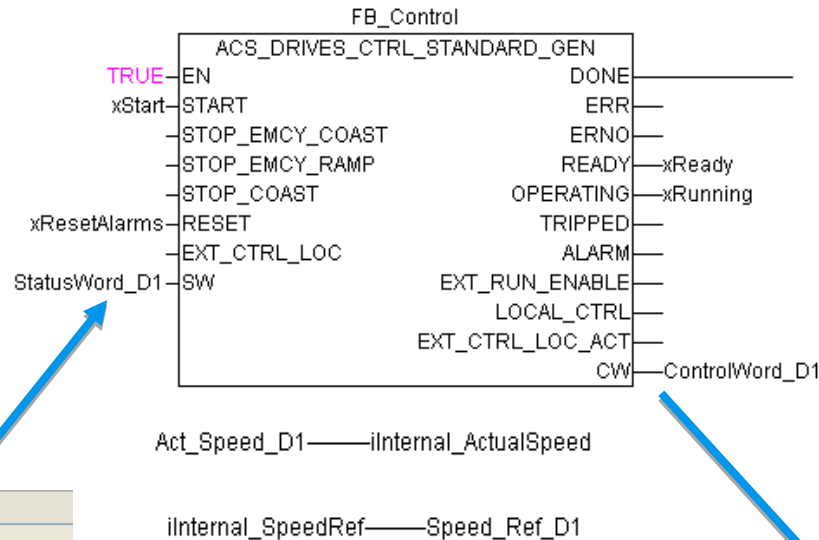
Channels

Variable	Mapping	Channel	Address	Type	Unit	Description
ControlWord_D4		Control Word	%QW4.0	UINT		
Speed_Ref_D4		VI Target Velocity	%QW4.1	INT		
StatusWord_D4		Status Word	%IW4.0	UINT		
Act_Speed_D4		VI Control Effort	%IW4.1	INT		



# PS553-DRIVES: Fieldbus independent blocks

## CANopen Configuration



ACS355\_with\_FCAN01

CAN Slave | CANopen Remote Device | PDO Mapping | Rece

Channels

Variable	Mapping	Channel
ControlWord_D4		Control Word
Speed_Ref_D4		VI Target Velocity
StatusWord_D4		Status Word
Act_Speed_D4		VI Control Effort

ACS355\_with\_FCAN01

Receive PDO Mapping | Send PDO Mapping | Service Data Object | C

Channels

Variable	Mapping	Channel	Address
ControlWord_D4		Control Word	%
Speed_Ref_D4		VI Target Velocity	%
StatusWord_D4		Status Word	%
Act_Speed_D4		VI Control Effort	%

# PS553-DRIVES: Fieldbus independent blocks

## EtherCAT Configuration



ABB ACSDrivesCommunication\_V04.project\* - Control Builder Plus

File Edit View Project Tools Window Help

Devices

- ACSDrivesCommunication\_V04
  - AC500\_PM583\_ETH (AC500 PM583-ETH)
    - AC500\_7
    - CPU\_parameters (CPU parameters)
    - IO\_Bus (I/O-Bus)
    - Interfaces (Interfaces)
    - Communication\_modules (Communication modules)
      - Onboard\_Ethernet (Onboard Ethernet)
      - CM579\_PNIO (CM579-PNIO)
      - CM572\_DP (CM572-DP)
      - CM579\_ECAC (CM579-ECAT)**
        - CM579\_Master\_1 (CM579-ECAT-Master)
          - FECA\_01\_and\_ACSM1\_motion (FECA-01 and**
      - CM578\_CAN (CM578-CAN)

FECA\_01\_and\_ACSM1\_motion

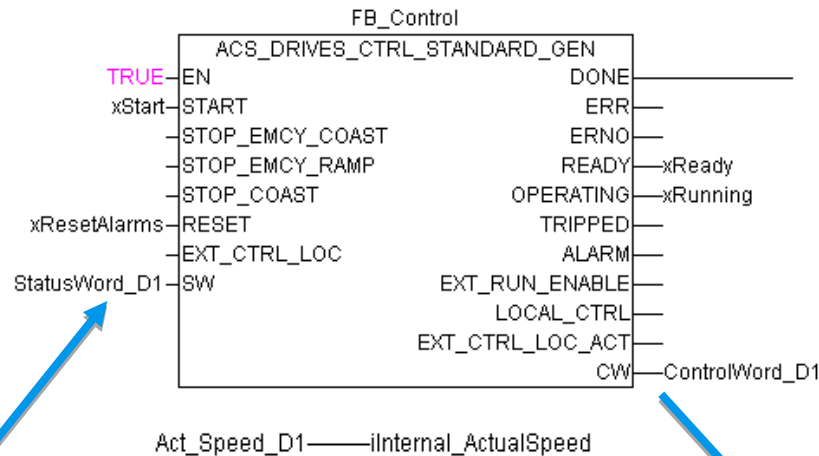
Slave Expert Process Data Process Data Startup parameters EtherCAT Configuration EtherCAT I/O Mapping

Channels

Variable	Map...	Channel	Address	Type	Unit	Description
ControlWord_D3		ABB Drives control word	%QW3.0	UINT		Controlword
Speed_Ref_D3		ABB Drives REF1	%QW3.1	UINT		
StatusWord_D3		ABB Drives status word	%IW3.0	UINT		Statusword
Act_Speed_D3		ABB Drives ACT1	%IW3.1	UINT		

# PS553-DRIVES: Fieldbus independent blocks

## EtherCAT Configuration



FECA\_01\_and\_ACSM1\_motion

Expert Process Data | Process Data | Startup parameters | EtherCAT Con

Channels

Variable	Mapping	Channel	Add
ControlWord_D1		ABB Drives control word	
Speed_Ref_D3		ABB Drives REF1	
StatusWord_D3		ABB Drives status word	
Act_Speed_D3		ABB Drives ACT1	

FECA\_01\_and\_ACSM1\_motion

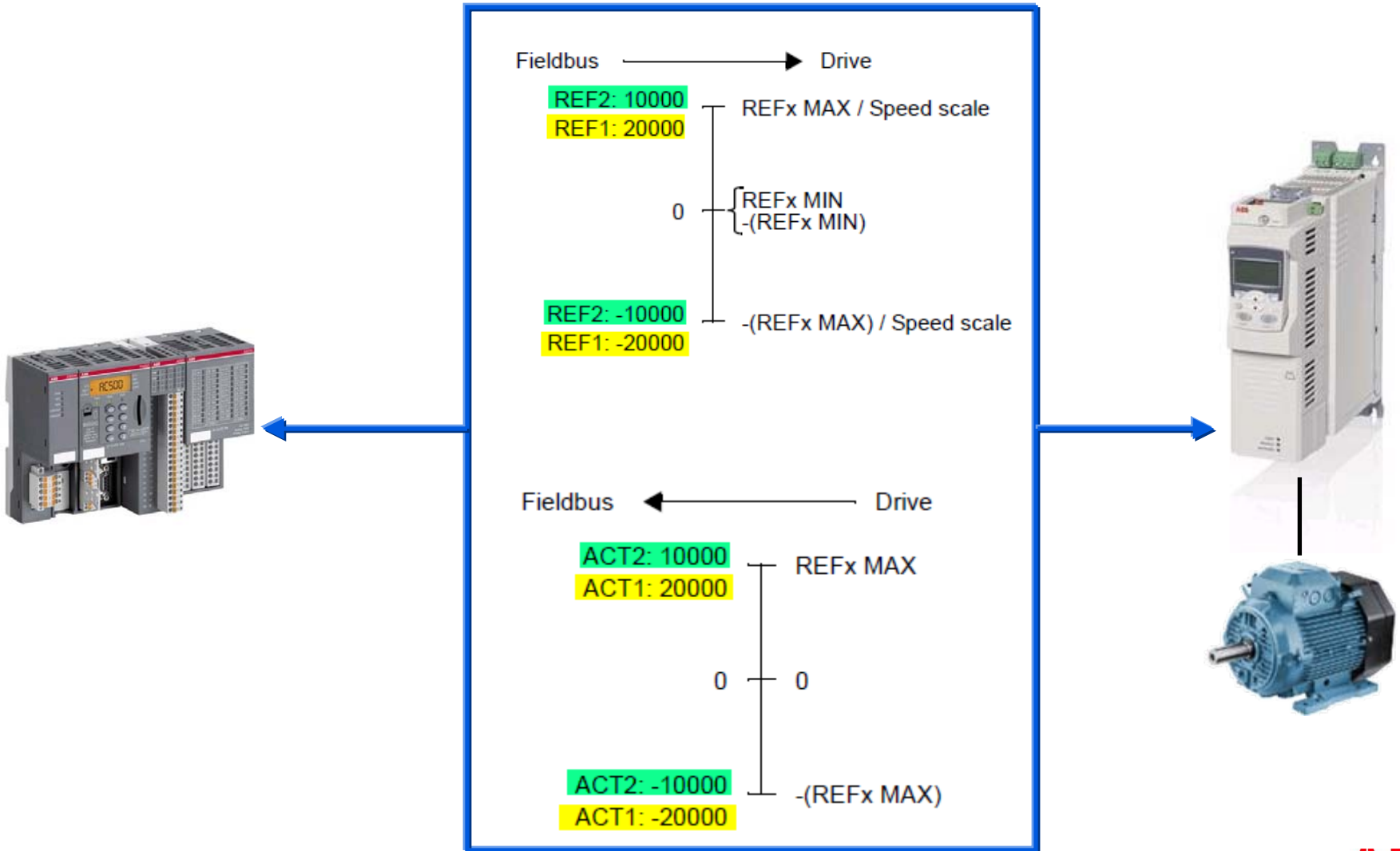
Expert Process Data | Process Data | Startup parameters | EtherCAT Con

Channels

Variable	Mapping	Channel	Add
ControlWord_D3		ABB Drives control word	
Speed_Ref_D3		ABB Drives REF1	
StatusWord_D3		ABB Drives status word	
Act_Speed_D3		ABB Drives ACT1	

# PS553-DRIVES: Fieldbus independent blocks

## ACS\_REF\_SCALING

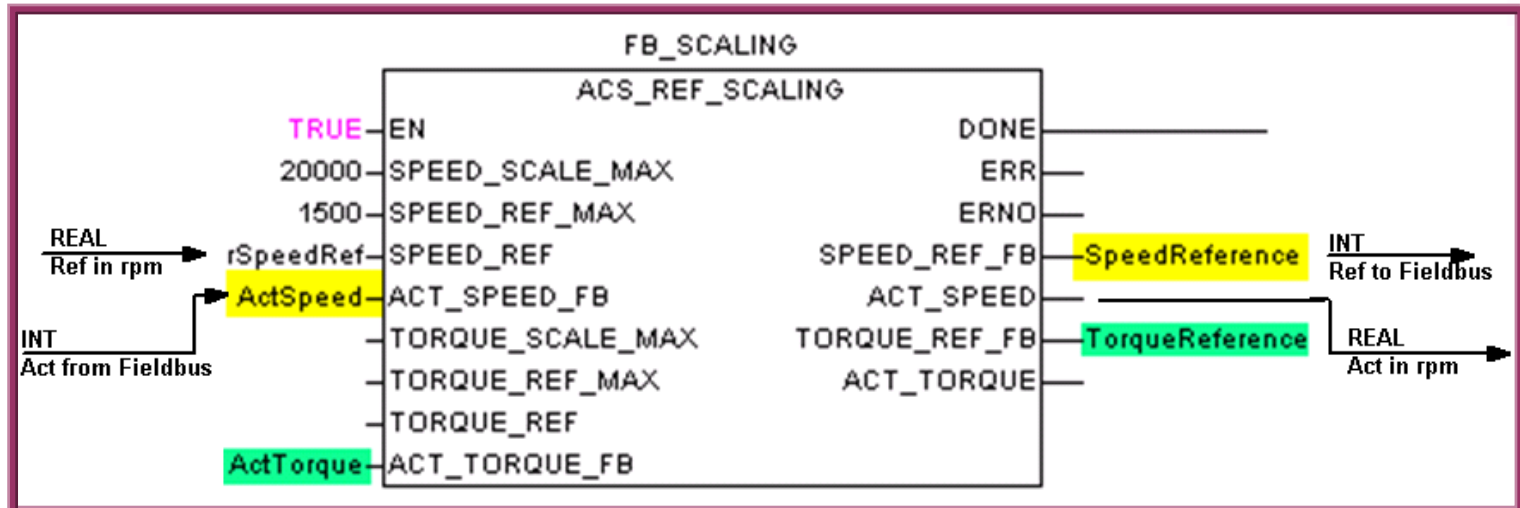
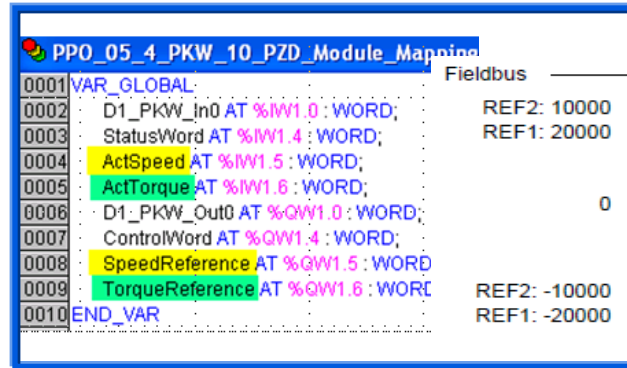


# PS553-DRIVES: Fieldbus independent blocks

## ACS\_REF\_SCALING

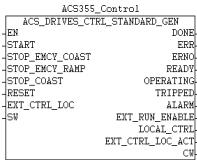


Scaling  
Real <=> FB



# PS553-DRIVES: AC500 Library Package Structure

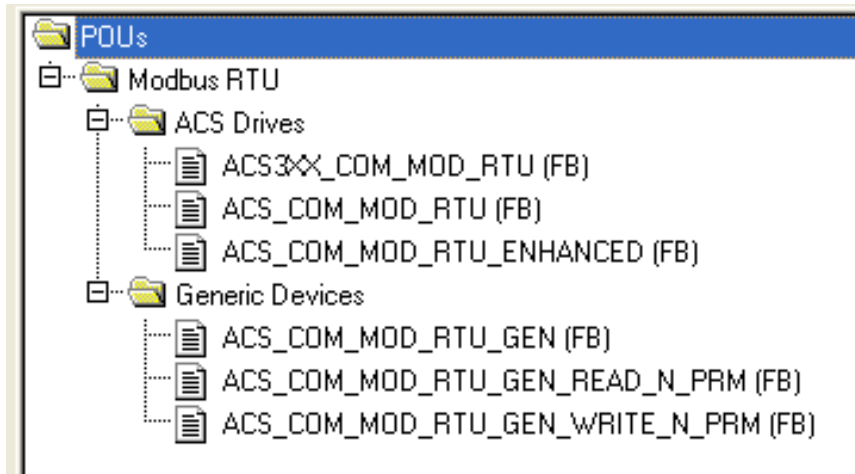
- Overview AC Drives Fieldbus Configuration
- Configuration of AC Drives for AC500 Fieldbus Control
  - Workflow, Configuration Tools, Settings
- PS553-DRIVES Library
  - Update Package, Library details
  - Fieldbus independent blocks
  - [Modbus RTU: Generic servers / ACSXXX](#)
  - Modbus TCP
  - Control Blocks
  - Help and Documentation
  - Visualizations, Examples
- Benefits



# PS553-DRIVES: Modbus RTU

## Library: ACSDrivesComModRTU\_AC500\_V20.lib

ACS355_Control	
ACS_DRIVES_CTRL_STANDARD_GEN	
-EN	DONE
-START	ERR
-STOP_EMCY_COAST	ERR
-STOP_EMCY_RAMP	READY
-STOP_COAST	OPERATING
-RESET	TRIPPED
-EXT_CTRL_LOC	ALARM
-SW	EXT_RUN_ENABLE
	LOCAL_CTRL
	EXT_CTRL_LOC_ACT
	CS



- Communication blocks for Modbus RTU for ACS drives
- Communication blocks for Modbus RTU for generic devices using same LineToken variable

# PS553-DRIVES: Modbus RTU

## Modbus RTU Configuration



ACS355\_PM554-ETH\_ModbusRTU.project - Control Builder Plus

File Edit View Project Tools Window Help

Devices

- ACS355\_PM554-ETH\_ModbusRTU
  - ACS500\_PM554\_ETH\_V2\_0 (ACS500 PM554-ETH)
  - ACS500
  - CPU\_parameters (CPU parameters)
  - OBIO (Onboard IO: 8DI+6DO)
  - IO\_Bus (I/O-Bus)
  - Interfaces (Interfaces)
    - COM1\_MODBUS (COM1 - Modbus)
    - COM2\_Online\_Access (COM2 - Online)
    - Ethernet (Ethernet)

COM1\_MODBUS

COM1 - Modbus Configuration | Modbus settings

Parameter	Type	Value	Default Value	Unit	Description
Enable login	Enumeration of BYTE	Disabled	Disabled		Check for CoDeSys login
RTS control	Enumeration of BYTE	Telegram	None		RTS control must be set to 'telegram' for RS
Telegram ending value	WORD(0..65535)	3	3		Set the telegram ending value in ms or char.
Baudrate	Enumeration of DWORD	19200	19200	bits/s	Set the baudrate in bits per seconds
Parity	Enumeration of BYTE	None	even		Set the parity bit type
Data bits	Enumeration of BYTE	8	8	bits/character	Set the character size
Stop bits	Enumeration of BYTE	1	1		Set the number of stop bits per character
Run on config fault	Enumeration of BYTE	No	No		Launch PLC program by configuration fault
Operation mode	Enumeration of BYTE	Master	None		Set the operating mode
Address	BYTE(0..255)	0	0		Set the address of the device

Messages

Devices

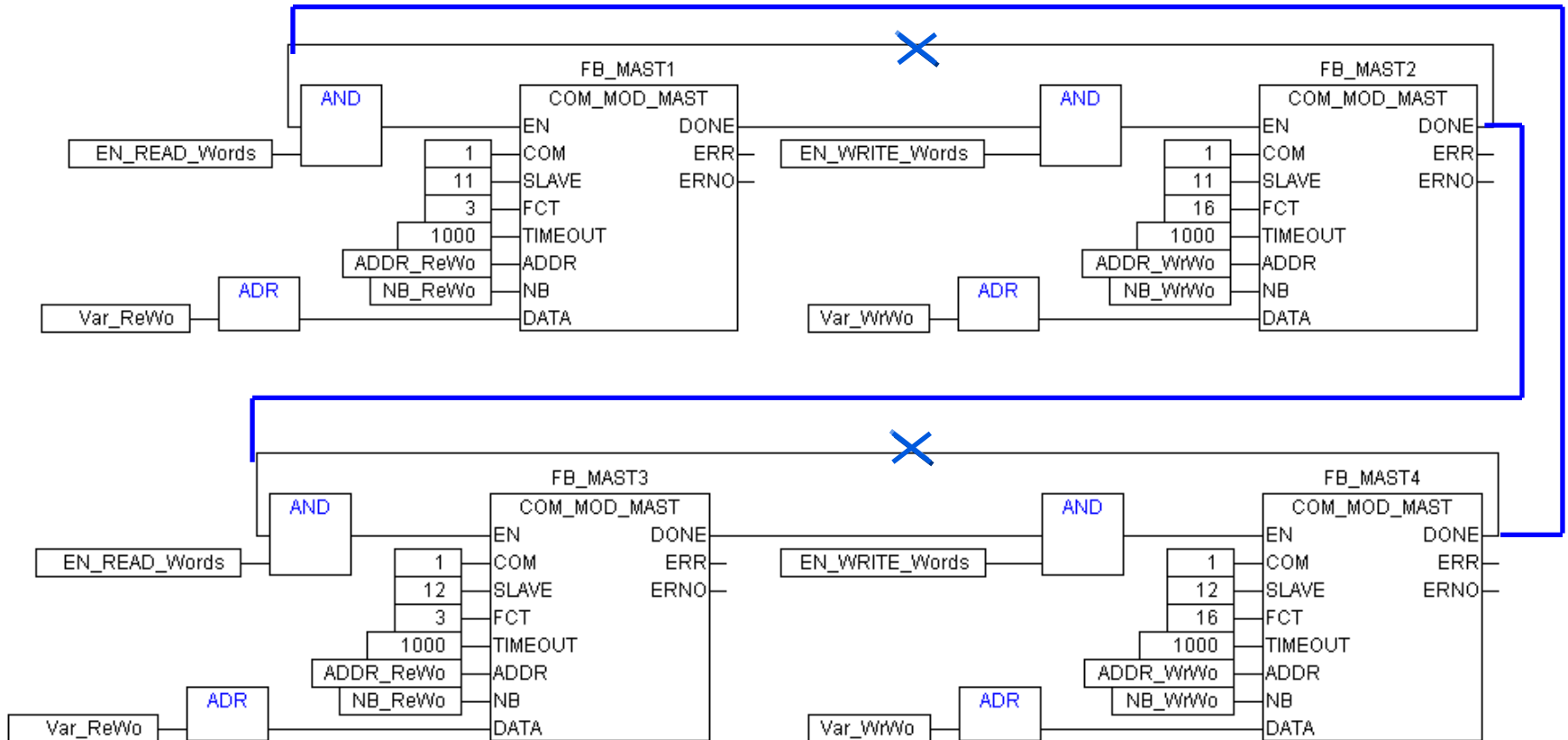
0 error(s) 0 warning(s) 7 message(s)



# PS553-DRIVES: Modbus RTU

## ACS\_COM\_MOD\_RTU\_GEN

Classic way using COM\_MOD\_MAST checking the end of the jobs to start the next one



# PS553-DRIVES: Modbus RTU

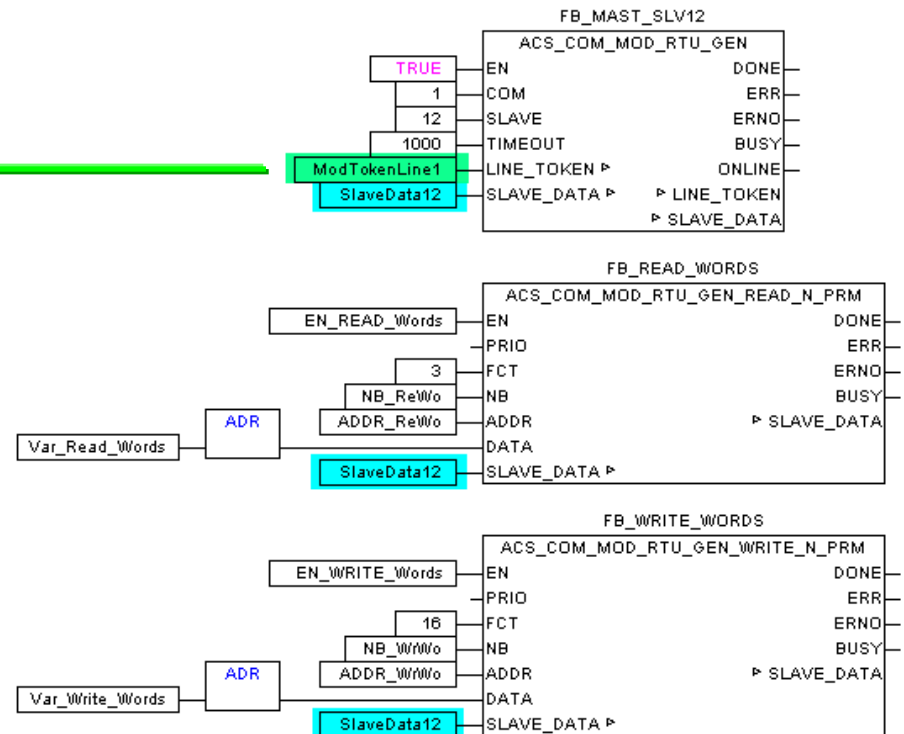
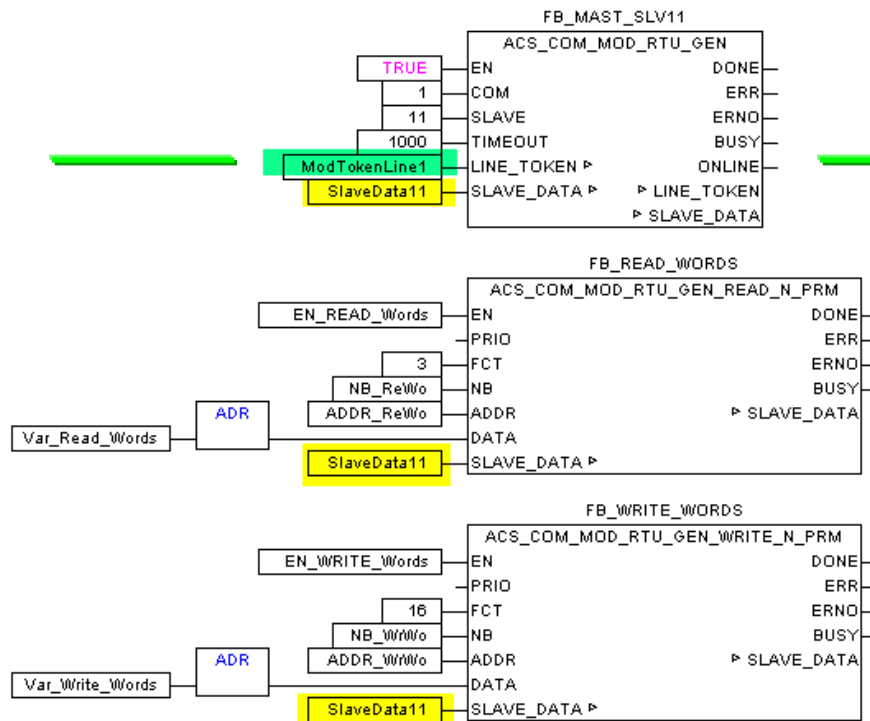
## ACS\_COM\_MOD\_RTU\_GEN

ACS\_COM\_MOD\_RTU\_GEN with Read and Write Blocks

ACS\_COM\_MOD\_RTU\_GEN\_READ\_N\_PRM

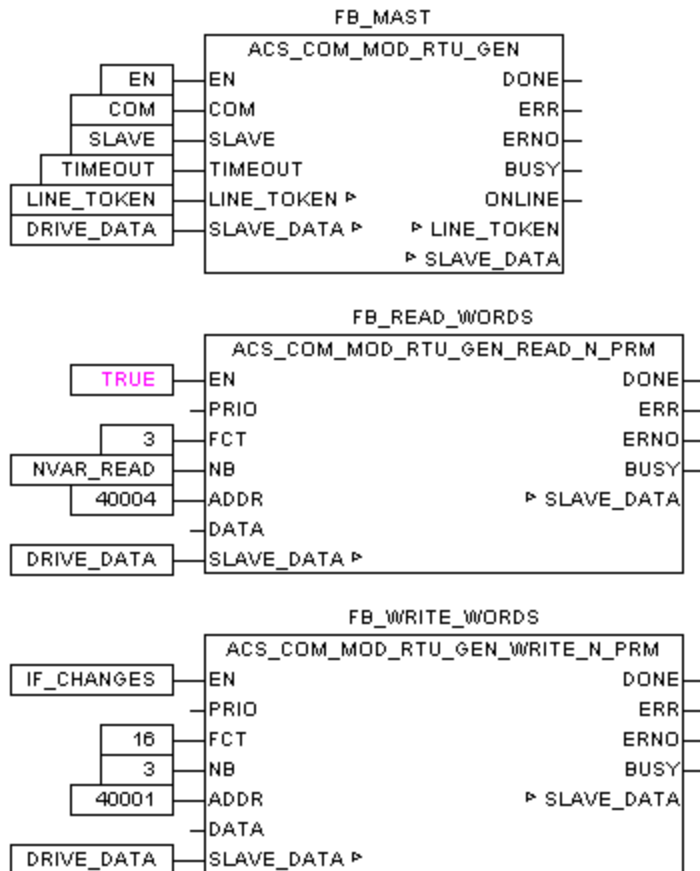
ACS\_COM\_MOD\_RTU\_GEN\_WRITE\_N\_PRM

Easy add new servers  
or new Read / Write Jobs

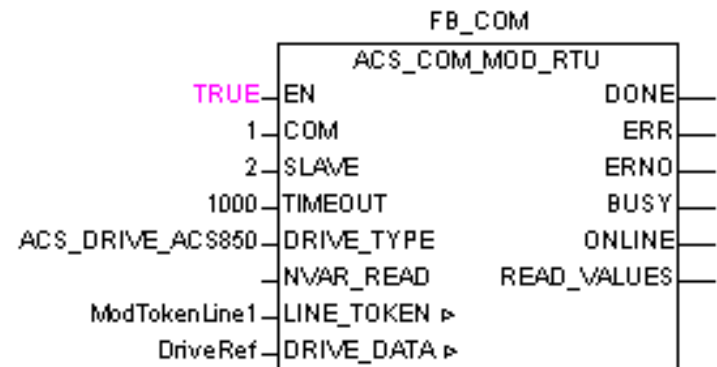


# PS553-DRIVES: Modbus RTU

## ACS\_COM\_MOD\_RTU



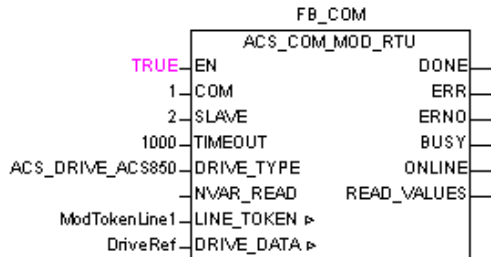
## Principle of ACS\_COM\_MOD\_RTU



# PS553-DRIVES: Modbus RTU

## ACS\_COM\_MOD\_RTU

For ABB Drives Profile (classic) !



Drive\_Data

### ▪ Read cyclic:

- Status word,
- Actual Speed,
- Actual Value2

READ\_VALUES[1..24]

- Configured Values in Modbus Reg 40007 ... Modbus Reg 40030

Drive\_Data

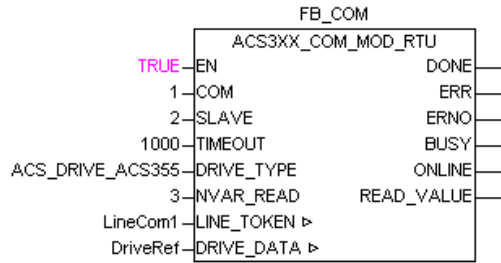
### ▪ Write after changes:

- Control word,
- Reference Speed,
- Ref Value2



# PS553-DRIVES: Modbus RTU

## ACS3XX\_COM\_MOD\_RTU



Drive\_Data

READ\_VALUES[1..9]

Drive\_Data

### ▪ Read cyclic:

- Status word,
- Actual Speed,
- Actual Value2
- Configured Values in Modbus Reg 40004 ... Modbus Reg 40012

### ▪ Write after changes:

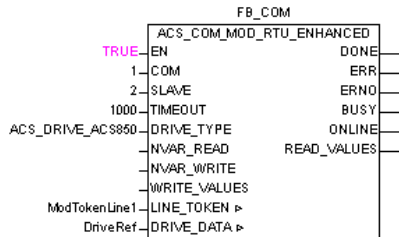
- Control word,
- Reference Speed,
- Ref Value2

Still used for compatibility reasons  
ACS\_COM\_MOD\_RTU  
could also be used



# PS553-DRIVES: Modbus RTU

## ACS\_COM\_MOD\_RTU\_ENHANCED



For ABB Drives Profile enhanced !

### ▪ Read cyclic:

Drive\_Data

- Status word, Actual Speed, Actual Value2

READ\_VALUES[1..24]

- Configured Values in Modbus Reg 400054 ... Modbus Reg 400065

### ▪ Write after changes:

Drive\_Data

- Control word, Reference Speed, Ref Value2

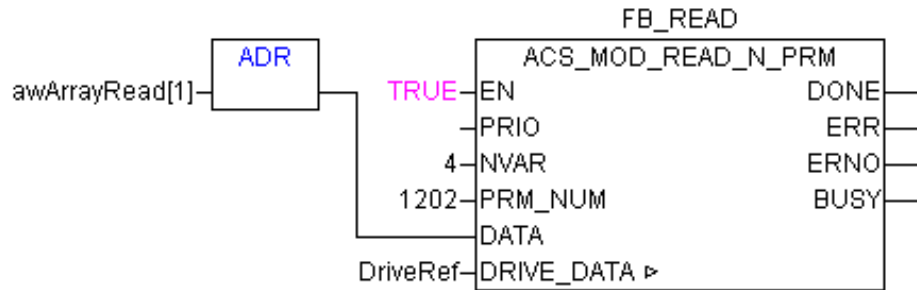
WRITE\_VALUES[1..12]

- Configured Values in Modbus Reg 400004 ... Modbus Reg 400015



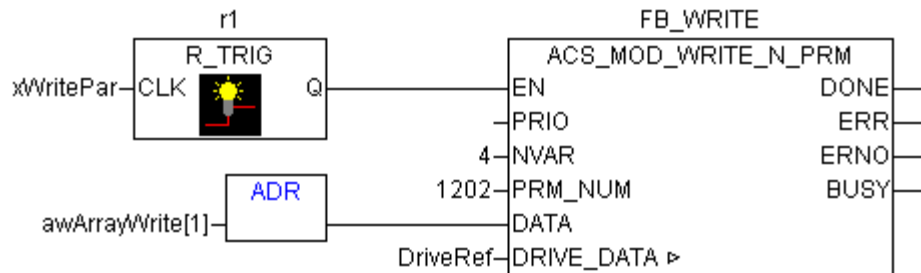
# PS553-DRIVES: Modbus RTU

## Additional Communication Function Blocks



### ACS\_MOD\_READ\_N\_PRM

- Read any Parameter / Actual Value from the drive
- Cyclic reading at steady TRUE on EN



### ACS\_MOD\_WRITE\_N\_PRM

- Write any Parameter to the drive
- One write job at rising edge on EN

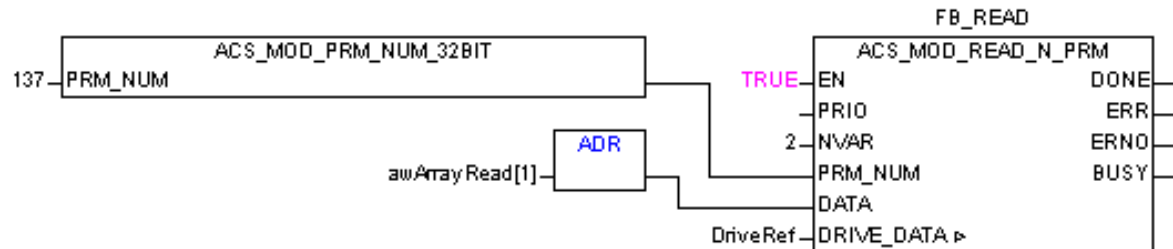
Connect **DRIVE\_DATA** variable to communication block e.g.  
**ACS\_COM\_MOD\_RTU**

# PS553-DRIVES: Modbus RTU

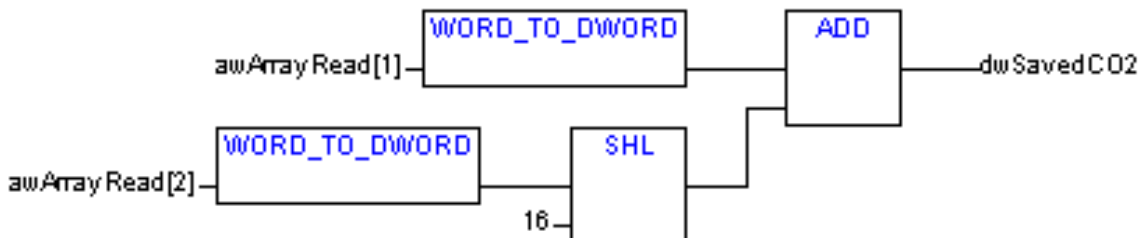
## Additional Communication Function Blocks

Read / Write 32 Bit long Parameters / Values from drive

- Use additional function to „ACS\_MOD\_PRM\_NUM\_32BIT“ to calculate modbus address of 32 Bit parameters



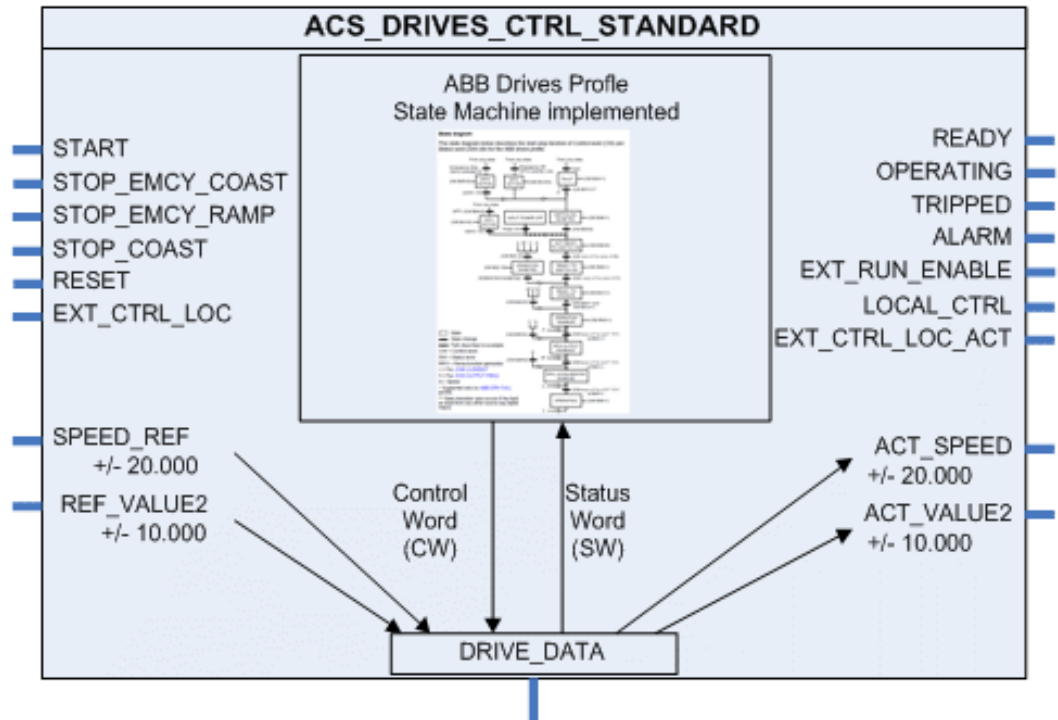
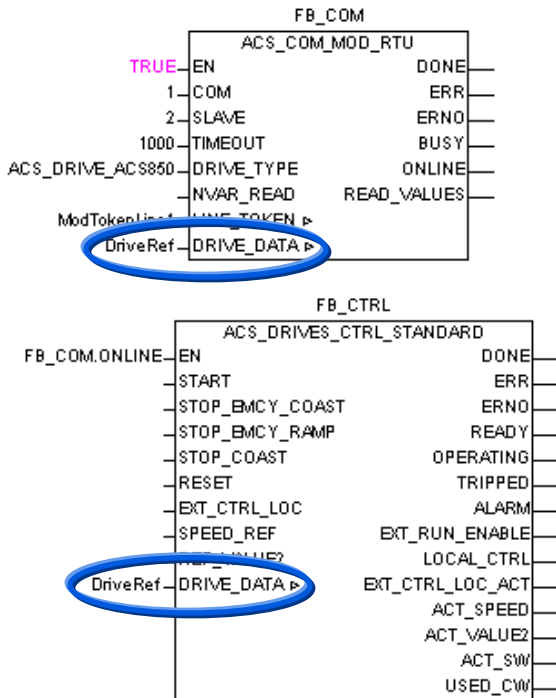
- Concatenate high word and low word according to configured order in drive





# PS553-DRIVES: Modbus RTU

## ACS\_DRIVES\_CTRL\_STANDARD

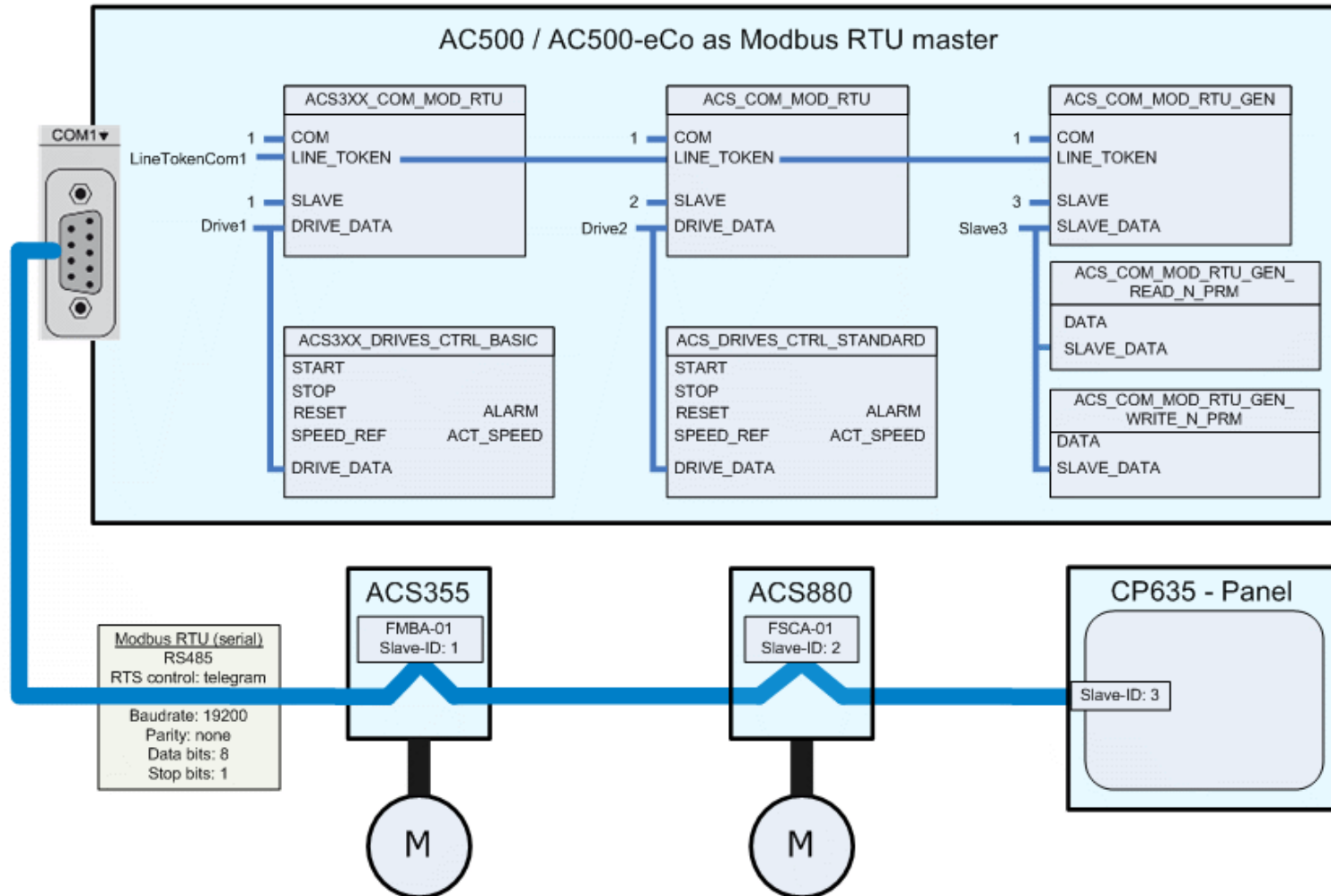


Connect DRIVE\_DATA  
variable to communication  
block e.g.  
ACS\_COM\_MOD\_RTU



# PS553-DRIVES: Modbus RTU

## Main structure for Modbus RTU

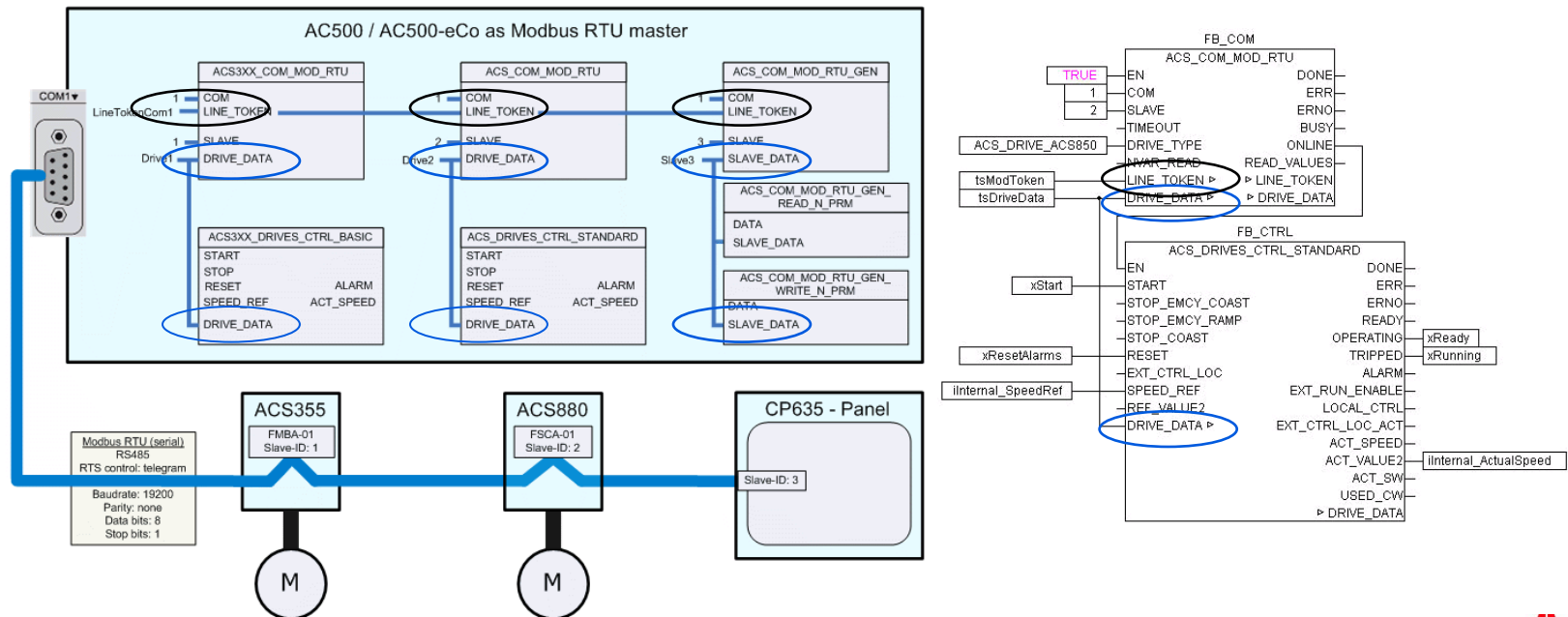


# PS553-DRIVES: Modbus RTU

## Modbus RTU Handling and Integration

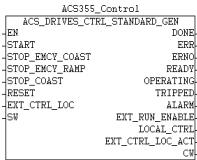


- LINE\_TOKEN variabel (Structure)
  - Connect all drives and generic devices on the same line
- DRIVE\_DATA variabel (Structure)
  - Read cyclic: Statusword, Actual Speed, ...
  - Write after changes: Controlword, Reference Speed, ...



# PS553-DRIVES: AC500 Library Package Structure

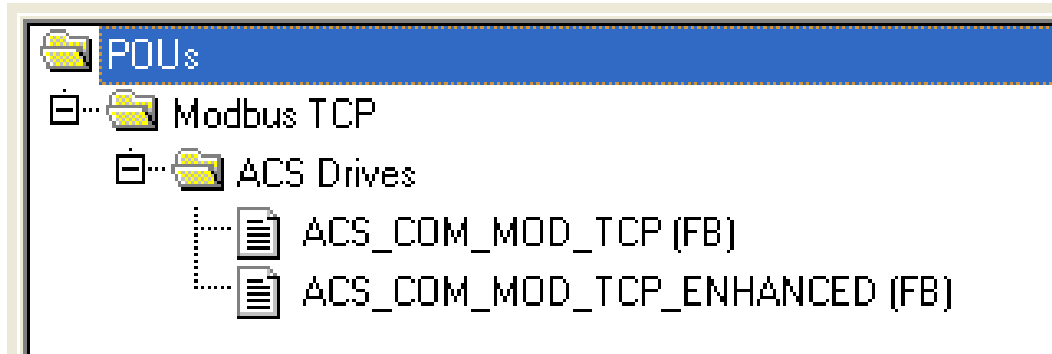
- Overview AC Drives Fieldbus Configuration
- Configuration of AC Drives for AC500 Fieldbus Control
  - Workflow, Configuration Tools, Settings
- PS553-DRIVES Library
  - Update Package, Library details
  - Fieldbus independent blocks
  - Modbus RTU: Generic servers / ACSXXX
  - [Modbus TCP](#)
  - Control Blocks
  - Help and Documentation
  - Visualizations, Examples
- Benefits



# PS553-DRIVES: Modbus TCP

## Library: ACSDrivesComModTCP\_AC500\_V22.lib

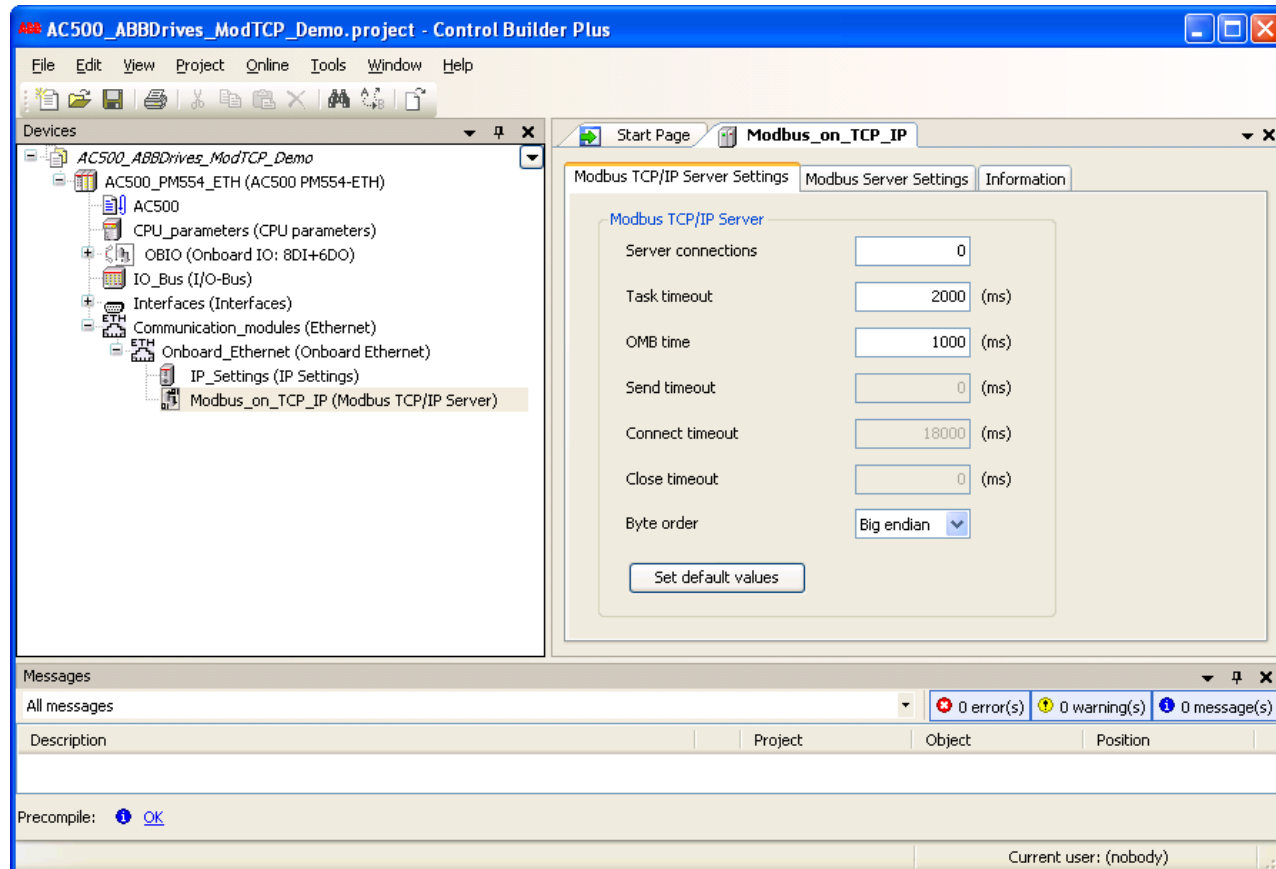
ACS355_Control	
ACS_DRIVES_CTRL_STANDARD_GEN	DONE
EN	ERR
START	ERR
STOP_EMCY_COAST	READY
STOP_EMCY_RAMP	OPERATING
STOP_COAST	TRIPPED
RESET	ALARM
EXT_CTRL_LOC	EXT_RUN_ENABLE
SW	LOCAL_CTRL
	EXT_CTRL_LOC_ACT
	CS



- Communication blocks for Modbus TCP for ACS drives

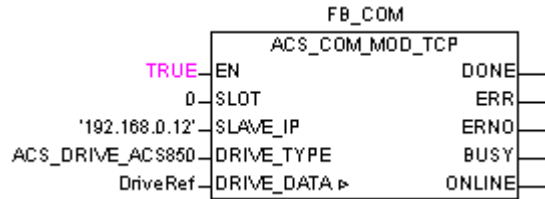
# PS553-DRIVES: Modbus TCP

## Modbus TCP Configuration



# PS553-DRIVES: Modbus TCP

## ACS\_COM\_MOD\_TCP



For ABB Drives Profile (classic) !

Drive\_Data

- Read cyclic:

- Status word,
- Actual Speed,
- Actual Value2

Drive\_Data

- Write after changes:

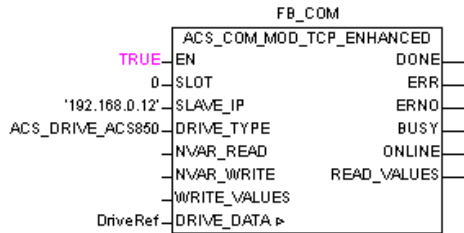
- Control word,
- Reference Speed,
- Ref Value2



# PS553-DRIVES: Modbus TCP

## ACS\_COM\_MOD\_TCP\_ENHANCED

For ABB Drives Profile enhanced !



Drive\_Data

### ▪ Read cyclic:

- Status word, Actual Speed, Actual Value2

READ\_VALUES[1..12]

- Configured Values in Modbus Reg 400054 ... Modbus Reg 400065

### ▪ Write after changes:

- Control word, Reference Speed, Ref Value2

Drive\_Data

WRITE\_VALUES[1..12]

- Configured Values in Modbus Reg 400004 ... Modbus Reg 400015





# PS553-DRIVES: Modbus TCP

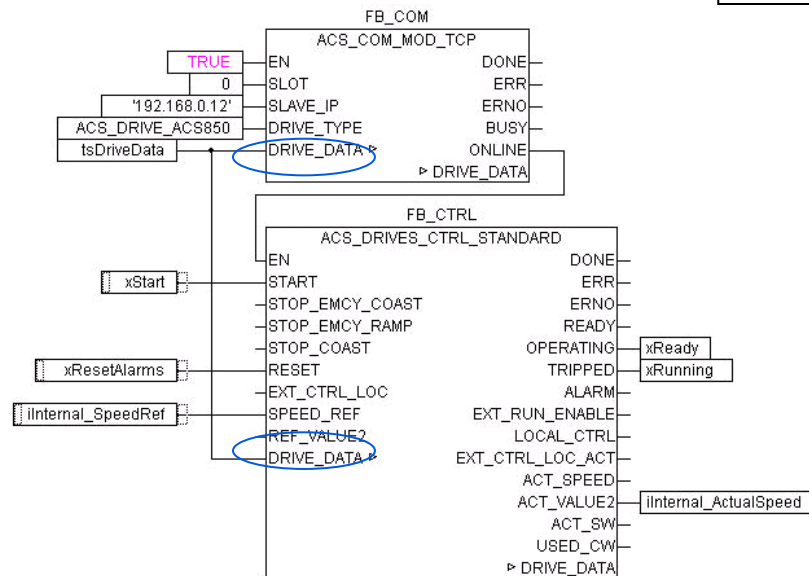
## Modbus TCP Handling and Integration



- DRIVE\_DATA variable (Structure)

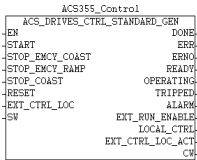
- Read cyclic: Statusword, + other e.g. Actual Speed
- Write after changes: Controlword, + other e.g. Reference Speed

- Number of used ACS\_COM\_MOD\_TCP\_x must not exceed number of possible TCP sockets for specific PLC type!
- Check has to be made by user



# PS553-DRIVES: AC500 Library Package Structure

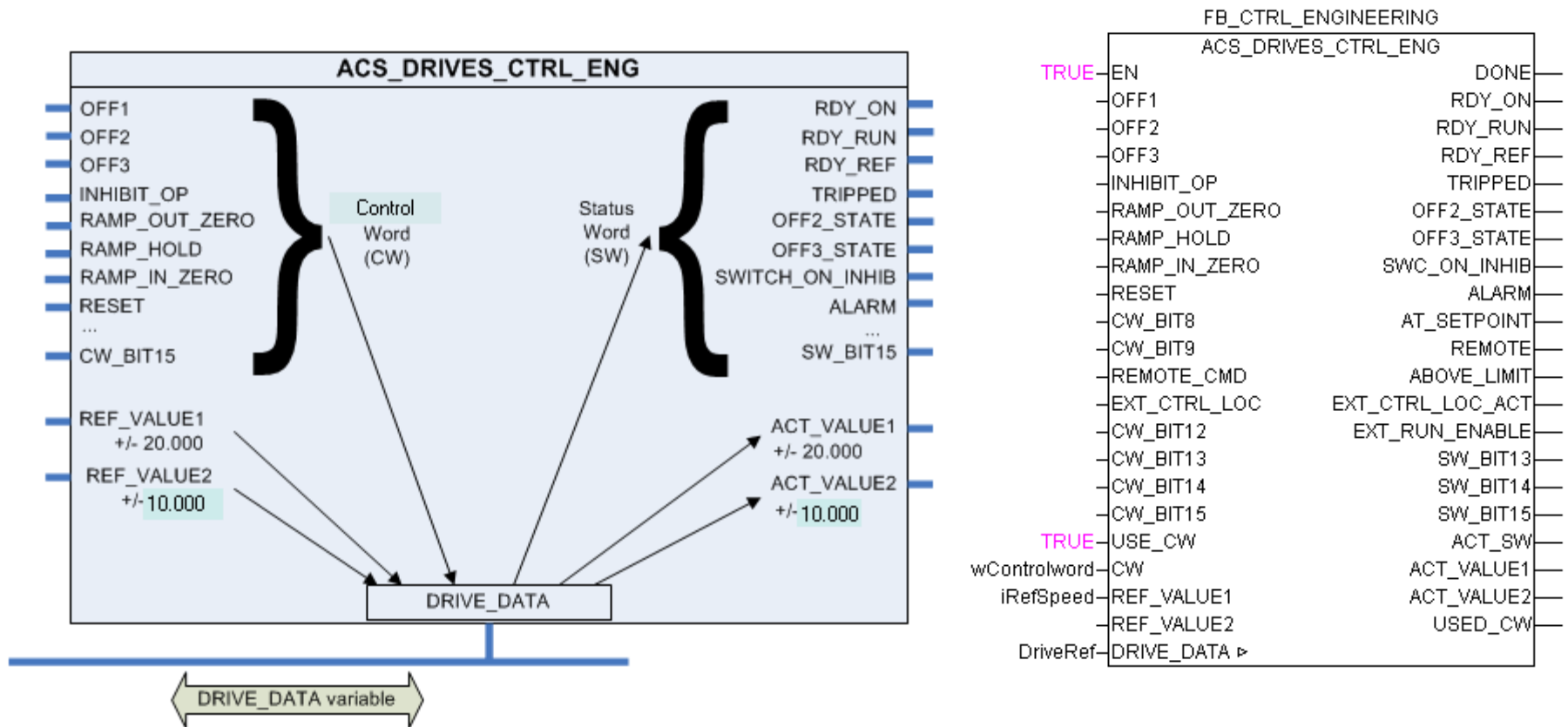
- Overview AC Drives Fieldbus Configuration
- Configuration of AC Drives for AC500 Fieldbus Control
  - Workflow, Configuration Tools, Settings
- PS553-DRIVES Library
  - Update Package, Library details
  - Fieldbus independent blocks
  - Modbus RTU: Generic servers / ACSXXX
  - Modbus TCP
  - **Control Blocks**
  - Help and Documentation
  - Visualizations, Examples
- Benefits



# PS553-DRIVES: Control Function Blocks

## ACS\_DRIVES\_CTRL\_ENG

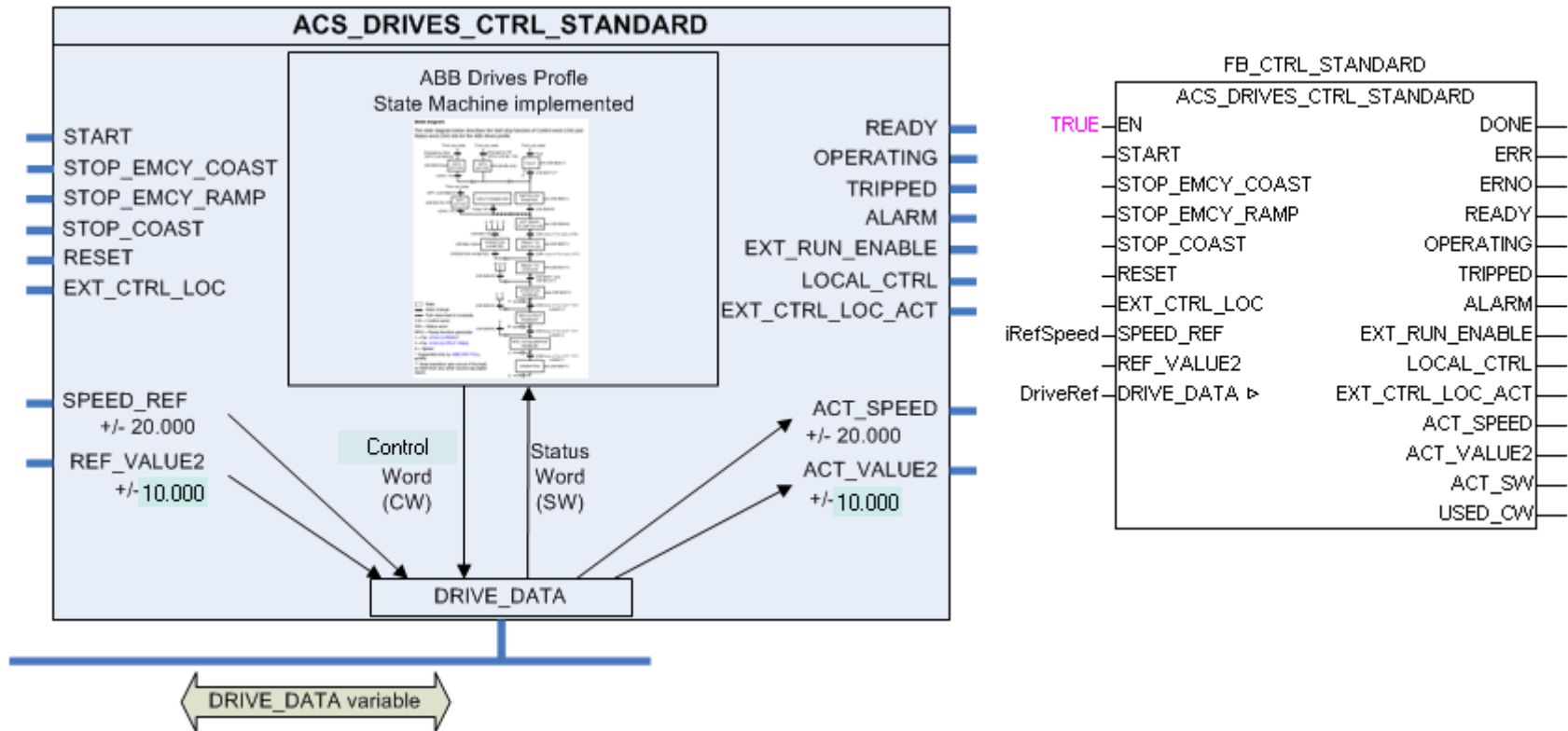
- Engineering Block
- Pack Controlword, Unpack Statusword for own setting of bits



# PS553-DRIVES: Control Function Blocks

## ACS\_DRIVES\_CTRL\_STANDARD

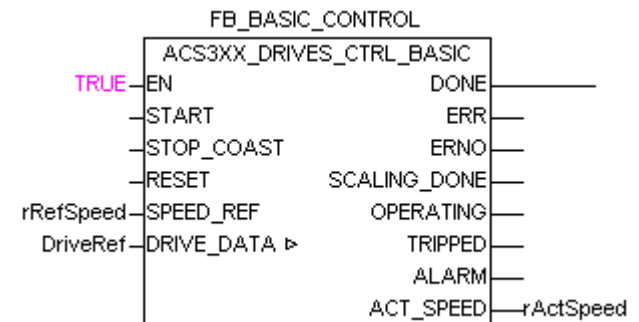
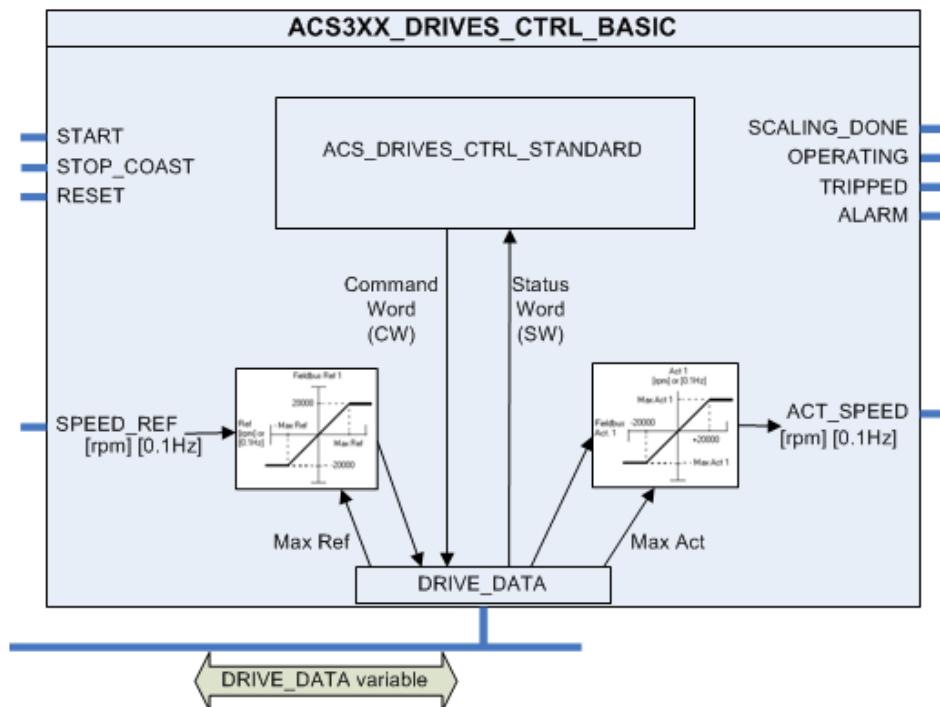
- Standard Control Block
- ABB Drives Profil Power-On Statemachine
- Reference and Actual values in fieldbus equivalent (+/- 20.000, +/- 10.000)



# PS553-DRIVES: Control Function Blocks

## ACS3XX\_DRIVES\_CTRL\_BASIC

- Special Block for ACS310, ACS350, ACS355, ACS550, ACH550
- includes Standard Control Block
- Reads scaling parameters from drive
- Reference and Actual values in rpm or 0.1Hz



# PS553-DRIVES

## Blocks for special Drives

Blocks which can be used only for special drives:

ACS3XX\_COM\_MOD\_RTU &  
ACS3XX\_DRIVES\_CTRL\_BASIC

**ACS310, ACS355, ACS550, ACH550**

ACS\_COM\_MOD\_RTU\_ENHANCED

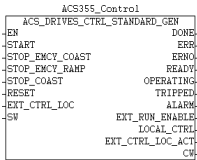
**drives using FSCA-01 (enhanced ABB profile)**

ACS\_COM\_MOD\_TCP\_ENHANCED

**drives using FENA-11 (enhanced ABB profile)**

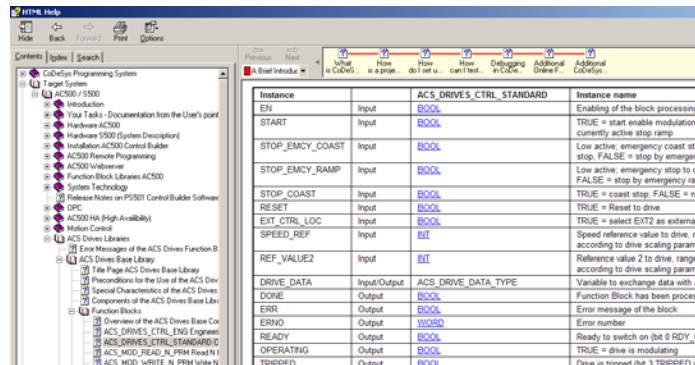
# PS553-DRIVES: AC500 Library Package Structure

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  - Visualizations, Examples
- Benefits



# PS553-DRIVES: Help and Documentation

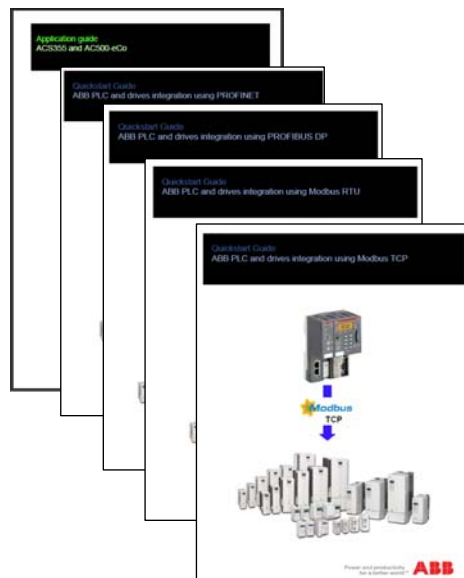
## Help and Documentation



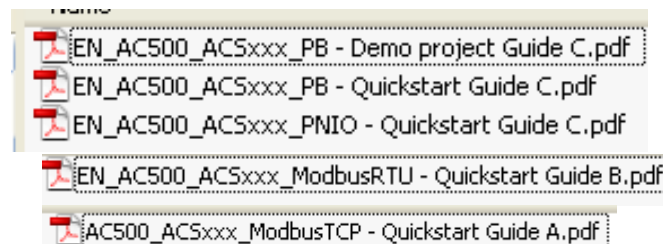
- Online help for Function Blocks form within CoDeSys

Help\Contents\Target System\AC500/S500\ACS Drives Libraries

- Application and Quickstart Guides in examples folders



PS553-DRIVES\Examples\PS553-DRIVES  
 \ACSxxx\_PM583\_PB\_PNIO\_Ctrl\_Std\_Gen\Documentation





# PS553-DRIVES: Help and Documentation Wizard to select needed blocks – Help file

- Online Help of CoDeSys  
AC500/S500 – ACSDrives Libraries – Configuration and Selection Guide

HTML Help

Hide Back Forward Home Print Options

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AC500 / S500

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- Hardware AC500
- Hardware S500 (System Description)
- Installation AC500 Control Builder Plus
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- Function Block Libraries AC500
- System Technology
- Release Notes on PS501 Control Build
- OPC
- AC500 HA (High Availability)
- Motion Control Library AC500
- ACS Drives Libraries**
  - Configuration and Selection Guide**
  - Error Messages of the ACS Drives F
  - ACS Drives Base Library
  - ACS Drives Communication via Mod
  - ACS Drives Communication via Mod
  - Glossary
- Information about AC500-S
- Solar Library
- Glossary
- Index

• scaling: [ACS\\_REF\\_SCALING](#) (optional)

### ACS550 or ACH550 with Modbus TCP

Used drive Communication Module: RETA-01

Question: How many values should be exchanged?

- only status word, actual speed, control word and speed reference:
  - communication profile in drive parameters: ABB Drives classic
  - communication Function Block in AC500 program: [ACS\\_COM\\_MOD\\_TCP](#)
  - control Function Block in AC500 program: [ACS3XX\\_DRIVES\\_CTRL\\_BASIC](#)
  - scaling: the scaling is included in the ACS3XX\_DRIVES\_CTRL\_BASIC Function Block
- status word, actual value1 (speed), actual value2 (torque), control word, reference1 (speed) and reference value2 (torque):
  - communication profile in drive parameters: ABB Drives classic
  - communication Function Block in AC500 program: [ACS\\_COM\\_MOD\\_TCP](#)
  - control Function Block in AC500 program: [ACS\\_DRIVES\\_CTRL\\_STANDARD](#)
  - scaling: [ACS\\_REF\\_SCALING](#) (optional)

### ACS800 with Modbus TCP

# PS553-DRIVES: Help and Documentation

## Wizard to select needed blocks – Excel file

Microsoft Excel - ACS Drives - AC500 overview fieldbus connectivity.xls									
Decision wizard to choose which kind of library / function blocks to be used in AC500 for a connection to ACS drives									
A	B	C	D	H	I	J	K	L	
1	on blocks to be used in AC500 for a connection to ACS drives								
2	? Application ?	? Connection PLC <-> Drives ?							
3	Package	Libraries	Comm Profile	Comm Block	Control Block for ABB Drives Profile	Scaling Block if needed	Remark		
4	Speed / Torque	Discrete / Analog	no library needed - discrete start/stop and analogue reference output						
5		Profibus / ProfiNet	ACSDrivesBase_AC500_V20.lib	ABB Drives	(for special communication blocks ask at <a href="mailto:plc.support@de.abb.com">plc.support@de.abb.com</a> )	ACS_DRIVES_CTRL_STANDARD_GEN	ACS_REF_SCALING		
6		CANopen / EtherCAT	ACSDrivesBase_AC500_V20.lib	ABB Drives	(transfer of control word, reference value, status word and actual value somehow via fieldbus (PZD, PDO, ...))	ACS_DRIVES_CTRL_STANDARD_GEN	ACS_REF_SCALING		
7		Modbus TCP	ACSDrivesBase_AC500_V20.lib, ACSDrivesComModTCP_AC500_V22.lib	ABB Drives (classic)	ACS_COM_MOD_TCP	ACS3XX_DRIVES_CTRL_BASIC (incl. scaling without EMCY or EXT1/2 just speed ctrl)			
8				ABB Drives (classic)	ACS_COM_MOD_TCP	ACS_DRIVES_CTRL_STANDARD	ACS_REF_SCALING	for specialists: ACS_DRIVES_CTRL_ENG	
9				ABB Drives enhanced	ACS_COM_MOD_TCP_ENHANCED	ACS_DRIVES_CTRL_STANDARD	ACS_REF_SCALING	for specialists: ACS_DRIVES_CTRL_ENG	
10				ABB Drives (classic)	ACS_COM_MOD_TCP	ACS3XX_DRIVES_CTRL_BASIC (incl. scaling without EMCY or EXT1/2 just speed ctrl)			
11				ABB Drives (classic)	ACS_COM_MOD_TCP	ACS_DRIVES_CTRL_STANDARD	ACS_REF_SCALING	for specialists: ACS_DRIVES_CTRL_ENG	
12				ABB Drives (classic)	ACS_COM_MOD_TCP	ACS_DRIVES_CTRL_STANDARD	ACS_REF_SCALING	for specialists: ACS_DRIVES_CTRL_ENG	
13				ABB Drives (classic)	ACS_COM_MOD_TCP	ACS_DRIVES_CTRL_STANDARD	ACS_REF_SCALING	for specialists: ACS_DRIVES_CTRL_ENG	
14				ABB Drives enhanced	ACS_COM_MOD_TCP_ENHANCED	ACS_DRIVES_CTRL_STANDARD	ACS_REF_SCALING	for specialists: ACS_DRIVES_CTRL_ENG	
15				ABB Drives enhanced	ACS_COM_MOD_TCP_ENHANCED	ACS_DRIVES_CTRL_STANDARD	ACS_REF_SCALING	for specialists: ACS_DRIVES_CTRL_ENG	
16				ABB Drives (classic)	ACS3XX_COM_MOD_RTU	ACS3XX_DRIVES_CTRL_BASIC (incl. scaling without EMCY or EXT1/2 just speed ctrl)			

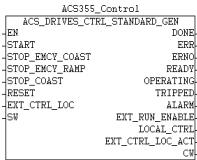
# PS553-DRIVES: Help and Documentation

## Overview of Modbus data exchange with one block

Microsoft Excel - ACS Drives - AC500 overview fieldbus connectivity.xls												
File Edit View Insert Format Tools Data Window Help Adobe PDF												
F6 3												
	A	B	C	F	G	H	I	J	K	L	M	N
	Modbus XXX	ABB Profile		ACS350 (3) ACS355 (4)		ACS550 (6) ACH550 (7)		ACS800		ACS850		ACS800
1												
2	Drivetype			3, 4		6		1		9		8
3	1. Job			write	read	write	read	write	read	write	read	write
4	RTU embedded	classic	Module	FMBA-01		direct		-		direct		direct
5			Functionblock	ACS3xx_COM_MOD_RTU		ACS3xx_COM_MOD_RTU				ACS_COM_MOD_RTU		ACS_COM
6			Number of Values	3	1 + 8	3	1 + 8			3	3 + 24	3
7			Mod-Register - 40000	1 .. 3	4 .. 12	1 .. 3	4 .. 12			1..3	4..30	1..3
8			Mapping Par		53.10 .. 53.17		53.10 .. 53.17				58.35 .. 58.58	
9		enhanced	Module	-		-				direct		direct
10			Functionblock							ACS_COM_MOD_RTU_ENHANCED		ACS_COM_MOD_F
11			Number of Values							3 + 12	3 + 12	3 + 12
12			Mod-Register - 40000							1..15	51..65	1..15
13			Mapping Par							58.35 .. 58.46	58.47 .. 58.58	58.35 .. 58.46
14	RTU	classic	Module	work with FSCA not released		-		RMBA-01		FSCA-01		FSCA
15			Functionblock					ACS_COM_MOD_RTU		ACS_COM_MOD_RTU		ACS_COM
16			Number of Values					3	3	3	3	3
17			Mod-Register - 40000					1..3	4..6	1..3	4..6	1..3
18			Mapping Par									
19		enhanced	Module	work with FSCA not released		-				FSCA-01		FSCA
20			Functionblock							ACS_COM_MOD_RTU_ENHANCED		ACS_COM_MOD_F
21			Number of Values							3 + 12	3 + 12	3 + 12
22			Mod-Register - 40000							1..15	51..65	1..15
23			Mapping Par							53.01 .. 53.12	52.01 .. 52.12	53.01 .. 53.12
24												
25	TCP	classic	Module	FENA-01		RETA-01 RETA-02		RETA-01 RETA-02		FENA-11		FENA
26			Functionblock	ACS_COM_MOD_TCP		ACS_COM_MOD_TCP		ACS_COM_MOD_TCP		ACS_COM_MOD_TCP		ACS_COM
27			Number of Values	3	3	3	3	3	3	3	3	3
28			Mod-Register - 40000	1..3	4..6	1..3	4..6	1..3	4..6	1..3	4..6	1..3
29			Mapping Par									
30		enhanced	Module	FENA-01		RETA-01 RETA-02		RETA-01 RETA-02		FENA-11		FENA
31			Functionblock	ACS_COM_MOD_TCP_ENHANCED		? Special for ACS550 sec. Job		? Special for ACS800 sec. Job		ACS_COM_MOD_TCP_ENHANCED		ACS_COM_MOD
32			Number of Values	3 + 10	3 + 10	+4	+4	+4	+4	3 + 12	3 + 12	3 + 12
33			Mod-Register - 40000	1..13	51..63	5119..5122	5123..5126	5119..5122	5123..5126	1..15	51..65	1..15
34			Mapping Par									

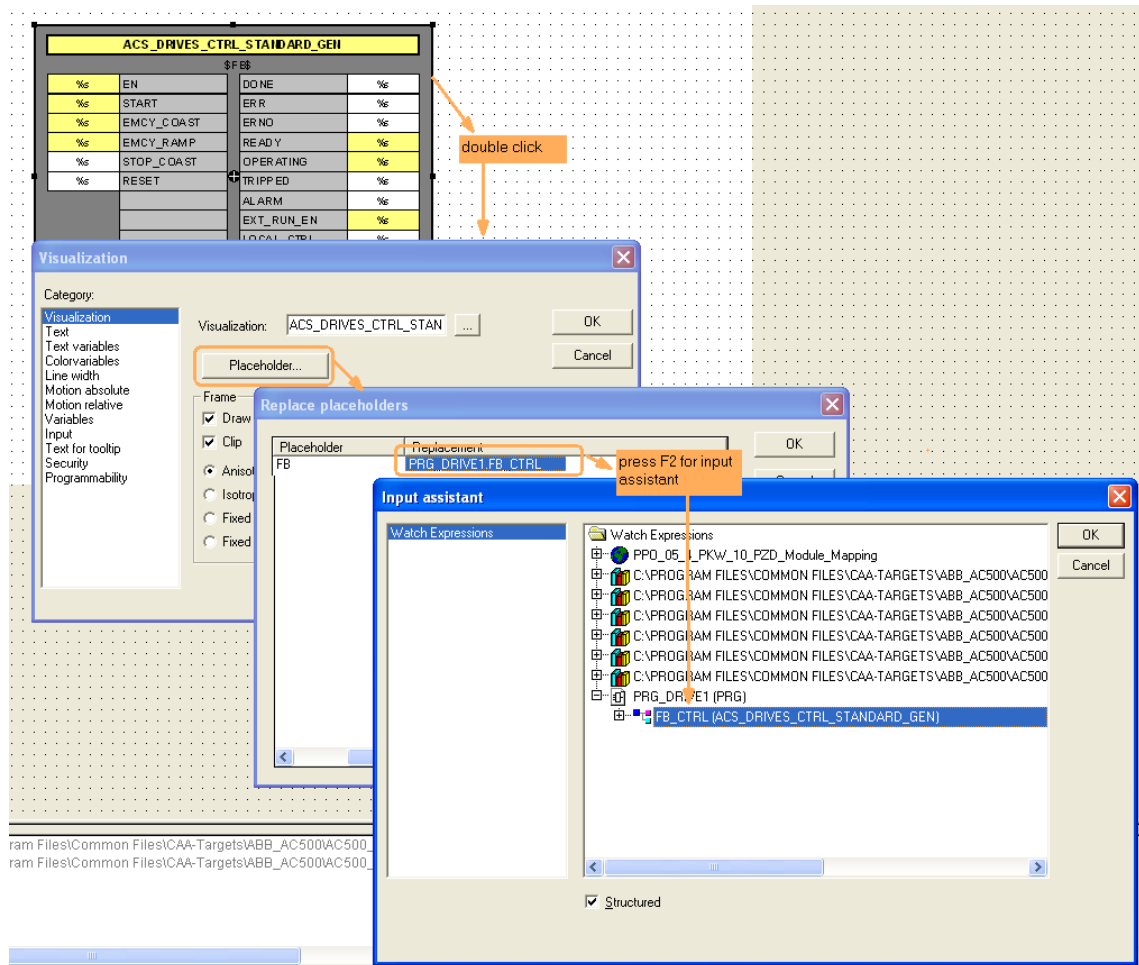
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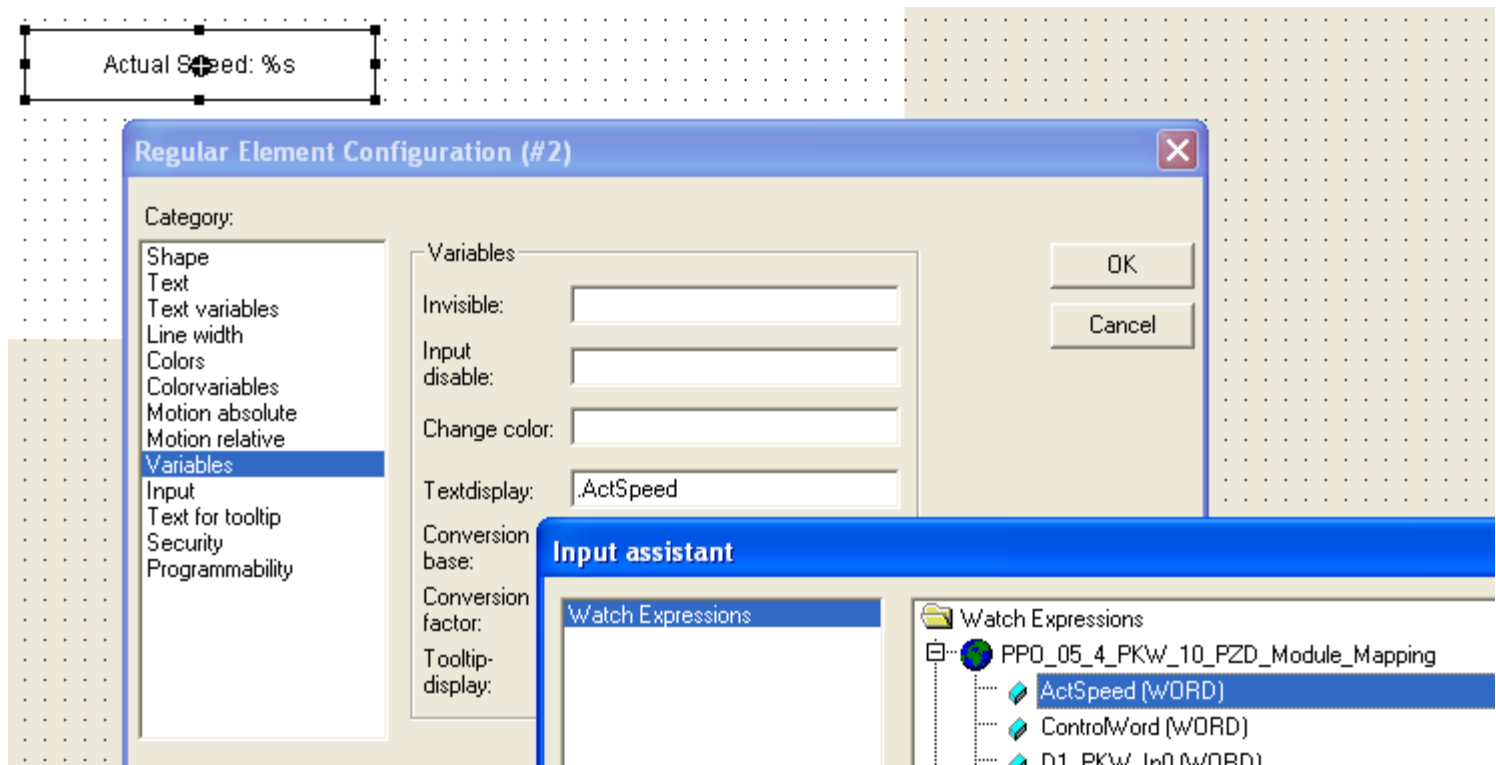
# PS553-DRIVES: Visualizations

## Visualization for all Blocks Available



# PS553-DRIVES: Visualizations

## General Creation of a Visualization Element



# PS553-DRIVES: Examples

## Example Classic Control

PRG\_DRIVE1 (PRG-FBD)

0001 FB\_CTRL

0002

0003

0004

0005

0006

0001

FB\_CTRL

ACS\_DRIVES\_CTRL\_STANDARD\_GEN

-EN	DONE
-START	ERR
-STOP_EMCY_COAST	ERNO
-STOP_EMCY_RAMP	READY
-STOP_COAST	OPERATING
-RESET	TRIPPED
-EXT_CTRL_LOC	ALARM
StatusWord=5943-SW	EXT_RUN_ENABLE
	LOCAL_CTRL
	EXT_CTRL_LOC_ACT
	CW

ControlWord=1279

0002

PLC\_VISU

ACS\_DRIVES\_CTRL\_STANDARD\_GEN

PRG\_DRIVE1.FB\_CTRL

TRUE	EN	DONE	TRUE
TRUE	START	ERR	FALSE
TRUE	EMCY_COAST	ERNO	0
TRUE	EMCY_RAMP	READY	TRUE
FALSE	STOP_COAST	OPERATING	TRUE
TRUE	RESET	TRIPPED	FALSE
		ALARM	FALSE
		EXT_RUN_EN	TRUE
		LOCAL_CTRL	FALSE
FALSE	EXT_CTRL_LOC	EXT_CTRL_LOC	FALSE
5943	SW	CW	1279
MESSAGE		Operation	

Speed Reference: 15000

Actual Speed: 15037

# PS553-DRIVES: Examples

## Example Classic Control with Scaling Function

**PRG\_DRIVE1 (PRG-FBD)**

0001 **FB\_CTRL**

0002 **FB\_SCALING**

0003

0004

0005

0006

0001

**FB\_CTRL**

**ACS\_DRIVES\_CTRL\_STANDARD\_GEN**

EN
START
STOP\_EMCY\_COAST
STOP\_EMCY\_RAMP
STOP\_COAST
RESET
EXT\_CTRL\_LOC
StatusWord=5943 SW

DONE
ERR
ERNO
READY
OPERATING
TRIPPED
ALARM
EXT\_RUN\_ENABLE
LOCAL\_CTRL
EXT\_CTRL\_LOC\_ACT
CW—ControlWord=1151

0002

**FB\_SCALING**

**ACS\_SCALING**

EN
SPEED\_SCALE\_MAX
1500 SPEED\_MAX
SPEED\_REF
ActSpeed=10015 ACT\_SPEED\_SCALED
TORQUE\_SCALE\_MAX
TORQUE\_MAX
TORQUE\_REF
ActTorque=1303 ACT\_TORQUE\_SCALED

DONE
ERR
ERNO
SPEED\_REF\_SCALED
TORQUE\_REF\_SCALED
ACT\_TORQUE
SpeedReference=10000
TorqueReference=1000

**ACS\_DRIVES\_CTRL\_STANDARD\_GEN**

**PRG\_DRIVE1.FB\_CTRL**

TRUE
TRUE
TRUE
TRUE
FALSE
FALSE

EN
START
EMCY\_COAST
EMCY\_RAMP
STOP\_COAST
RESET
EXT\_CTRL\_LOC
5943 SW

DONE
ERR
ERNO
READY
OPERATING
TRIPPED
ALARM
EXT\_RUN\_EN
LOCAL\_CTRL
EXT\_CTRL\_LOC
CW

TRUE
FALSE
0
TRUE
TRUE
FALSE
FALSE
TRUE
FALSE
1151

MESSAGE
Operation

**ACS\_SCALING**

**PRG\_DRIVE1.FB\_SCALING**

TRUE
20000
1500
750.00
10015

EN
SPEED\_SCALE\_MAX
SPEED\_MAX
SPEED\_REF
ACT\_SPEED\_SCALED

DONE
ERR
ERNO
SPEED\_REF\_SCALED
ACT\_SPEED

TRUE
FALSE
0
10000
751.13

10000
100
10.00
1303

TORQUE\_SCALE\_MAX
TORQUE\_MAX
TORQUE\_REF
ACT\_TORQUE\_SCALED

TORQUE\_REF\_SCALED
ACT\_TORQUE

1000
13.03

© ABB  
Month DD, YYYY | Slide 77

**ABB**



# PS553-DRIVES: Examples

## Example project Modbus RTU ACS355

CoDeSys - ACS355\_PM554\_ModbusRTU.pro\*

File Edit Project Insert Extras Online Window Help

Resources

- Global Variables
- Variable Configuration (VAR\_CONFIG)
- library lccsf.lib 13.4.06 14:51:28: global v
- library PS553-DRIVES\ACSDrivesBase\_A
- library PS553-DRIVES\ACSDrivesComMod
- library SysLibMem.lib 14.4.10 09:51:32: gl
- library SysLib\sysLibPLCConfig.lib 14.4.1
- library SysLibTime.lib 14.4.10 09:51:32: gl
- library SysTaskInfo.lib 14.4.10 09:51:32: gl
- library Util.lib 18.5.10 14:14:28: global vari
- Tools
- IP config <R>
- Notepad <R>
- Alarm configuration
- Library Manager
- Log
- PLC - Browser
- PLC Configuration
- Sampling Trace
- Target Settings
- Task configuration
- Watch- and Recipe Manager
- Workspace

PRG\_Drive1 (PRG-FBD)

```

0001 FB_COM
0002 DriveRef
0003 FB_BASIC_CONTROL
0004 rRefSpeed = 191
0005 rActSpeed = 0
0006 xOnlineOK = TRUE
0007 awACT_PARAMETERS
0008
0009
0001 modbus RTU communication function block

          FB_COM
          ACS3XX_COM_MOD_RTU
TRUE--EN-- DONE
1--COM-- ERR
2--SLAVE-- ERNO
1000--TIMEOUT-- BUSY
ACS_DRIVE_ACS355--DRIVE_TYPE-- ONLINE--xOnlineOK
3--NVAR_READ-- READ_VALUE--awACT_PARAMETERS
LineCom1--LINE_TOKEN >
DriveRef--DRIVE_DATA >

0002 control function block, including scaling and initial reset

          FB_BASIC_CONTROL
          ACS3XX_DRIVES_CTRL_BASIC
xOnlineOK--EN-- DONE
DI_START--START-- ERR
DI_COAST_STOP--STOP_COAST-- ERNO
DI_RESET--RESET-- SCALING_DONE
rRefSpeed=191--SPEED_REF-- OPERATING
DriveRef--DRIVE_DATA >-- TRIPPED
--ALARM
    
```

PLC\_VISU

ACS3XX\_DRIVES\_CTRL\_BASIC

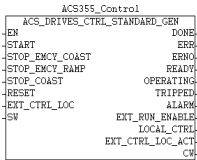
PRG_Drive1.FB_BASIC_CONTROL			
TRUE	EN	DONE	TRUE
FALSE	START	ERR	FALSE
FALSE	STOP_COAST	ERNO	0
FALSE	RESET	SCALING_DONE	TRUE
		OPERATING	FALSE
		TRIPPED	FALSE
		ALARM	FALSE
191.00	SPEED_REF	ACT_SPEED	0.00

ACS3XX\_COM\_MOD\_RTU

PRG_Drive1.FB_COM			
TRUE	EN	DONE	TRUE
1	COM	ERR	FALSE
1000	TIMEOUT	ERNO	0
2	SLAVE	BUSY	FALSE
4	DRIVE_TYPE	ONLINE	TRUE
		WriteErrCnt	0
		LastWriteErrno	0
		ReadErrCnt	0
		LastReadErrno	0
3	NVAR_READ	SW	4657
		ActValue1	0
		ActValue2	19
		ActValue3	0
		ActValue4	0
		ActValue5	0
		ActValue6	0
		ActValue7	0
		ActValue8	0

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# PS553-DRIVES: AC500 Library - Market

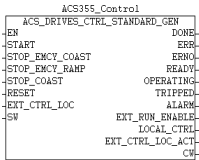
## Trend: Solution selling

ACS355_Control	
ACS_DRIVES_CTRL_STANDARD_GEN	DONE
EN	ERR
START	ERRO
STOP_EMCY_COAST	READY
STOP_EMCY_RAMP	OPERATING
STOP_COAST	TRIPPED
RESET	ALARM
EXT_CTRL_LOC	EXT_RUN_ENABLE
SW	LOCAL_CTRL
	EXT_CTRL_LOC_ACT
	CS

- Applications: Industrial Speed control applications
  - Pumping, blending, dosing in food & beverage or chemical; fan and compressors / compressors and fans in HVAC
  - Material handling: in production machines
  - Conveying: In assembly or packing lines
  - Packaging: bag forming filling, sealing, wrapping machines
- Main Segments:
  - Water & Waste Water
  - Building Automation
  - Food & beverage
  - Assembly line OEMs
  - Packaging machines OEM

# PS553-DRIVES: AC500 Library

## Advantage of AC500 Drives library



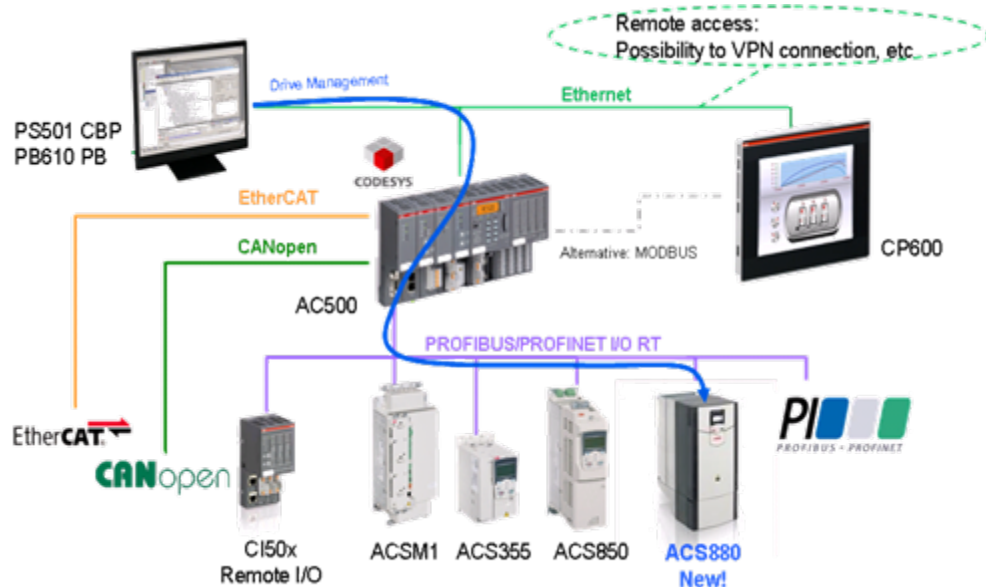
- Multiple drives can be connected to one PLC in a simple way via different networks
- One function block for many different drives and busses ensures similar handling
- Modbus RTU: additional support blocks for easy integration
  - Lower in cost, Standard Modbus interface available in CPU and some Drives
- Simple to use

# PS553-DRIVES: AC500 Library

## Benefit of the Solution



- System approach with ABB components
  - e.g. Drives Manager integration for Profibus and Profinet in CBP
  - Lower risk of implementation: Pretested blocks, example application
  - Save time: Up and running quickly.
  - Many different ABB Drives and networks usable in same simple way
- 
- The diagram illustrates a system architecture for ABB drives. A computer (PS501 CBP, PB610 PB) is connected to a drive (AC500) via EtherCAT, CANopen, and Drive Management. The drive is also connected to a CODESYS PLC and an Ethernet network. The drive is labeled 'Alternative'.

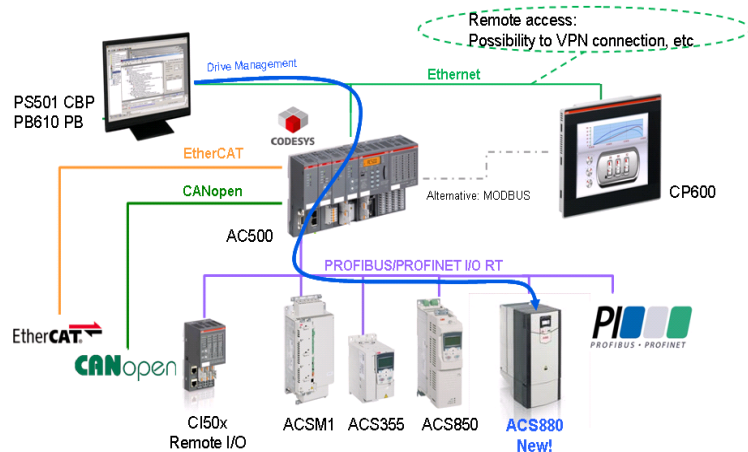


# PS553-DRIVES: AC500 Library

## Benefit of the AC500 platform



- One programming tool
- CPU w. onboard Ethernet f. integration to different networks
- Webserver for web visualization
- Scalability of the PLC: One single PLC platform with scaleable performance for all application types

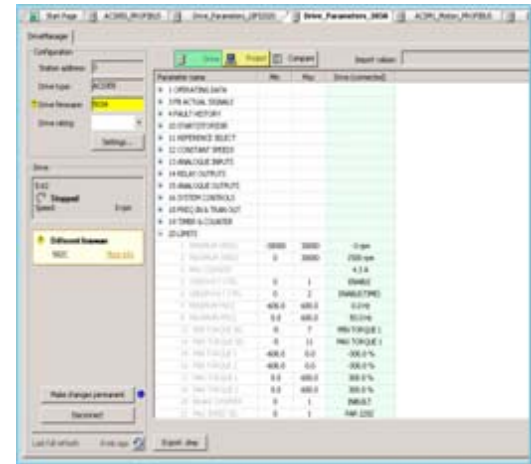
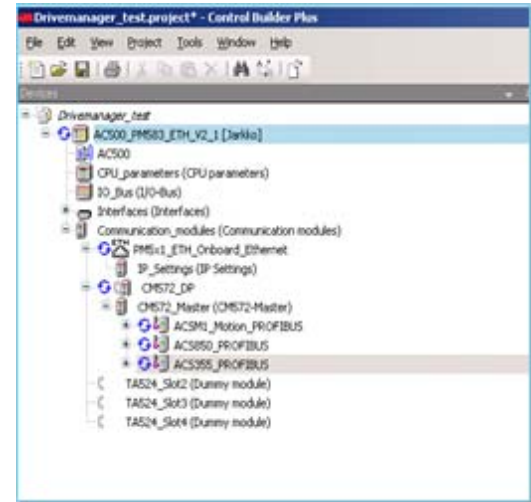


# PS553-DRIVES: AC500 Library

## Benefit of the AC500 platform



- One engineering tool based on the CODESYS environment
- One access point
  - One project archive
  - Drive interface libraries
- Well adapted user interface
- Complies with the IEC 61131-3 programming standard



# PS553-DRIVES: “Move a Motor in Minutes” (M³)

## Simple integration of major networks and ABB drives



- Modbus for General communications
- Profibus for plant communications
- CANopen for Machine communications
- Profinet for industrial networking
- EtherCAT for Motion networking



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