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Subject: **Hands-on exercise 800xA 3.1 SP1 – Mr Engineer – Connecting an ACS800 Drive to AC800M**

Table of contents

1	Introduction.....	2
2	Revision History	2
3	Goal	2
4	Related Documentation	2
5	Prepare the Drive.....	2
6	Drives Configuration	2
7	Connecting a Drive via Modulebus	3
7.1	Connect the Optical Cable	4
7.2	Configure the Drive to be connected to an M Controller	4
7.3	Configure the Drive to be controlled from an external device	5
7.4	Setup Control Logic.....	6
7.4.1	Configure the ACSStdDrive function block.....	6
7.5	Insert and configure the Drive in CB M	11
7.6	Configure the Drive	13
7.7	Test the Drive from Process Portal	13
7.8	Setup parameters.....	17
8	Connecting a Drive via PROFIBUS	19
9	Trouble Shooting.....	19
9.1	Local Operation	19

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1 Introduction

This document is **not a manual**. The objective is to give a quick guide on how to connect an ACS800 Drive an AC800M Controller. It is a step-by-step instruction for easy understanding. For full documentation on how to connect a drive, please read related documentation for System 800xA and ACS800 Drive.

If you have any comments or suggestions, please contact me via E-mail johan.Bjorklund@cn.abb.com or by phone +86 138 178 022 03.

2 Revision History

- Version 1 – First release — Only Modulebus Connection

3 Goal

The goal is to connect an ACS800 Drive to an AC800M Controller

4 Related Documentation

ACS800

Firmware Manual ACS800 Standard Application Program 7.x

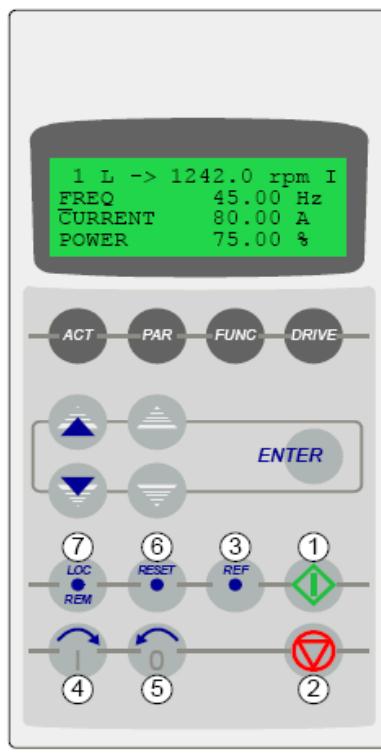
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5 Prepare the Drive

Install and connect the drive according to the manuals of the drive. Test-run the Drive and the Motor in Local Operation. Contact your local Drives Expert if you need help.

6 Drives Configuration

You can configure the drive by using the DrivePanel.



The LCD type display has 4 lines of 20 characters.
The language is selected at start-up (parameter 99.01).

The control panel has four operation modes:

- Actual Signal Display Mode (ACT key)
- Parameter Mode (PAR key)
- Function Mode (FUNC key)
- Drive Selection Mode (DRIVE key)

The use of single arrow keys, double arrow keys and ENTER depend on the operation mode of the panel.

The drive control keys are:

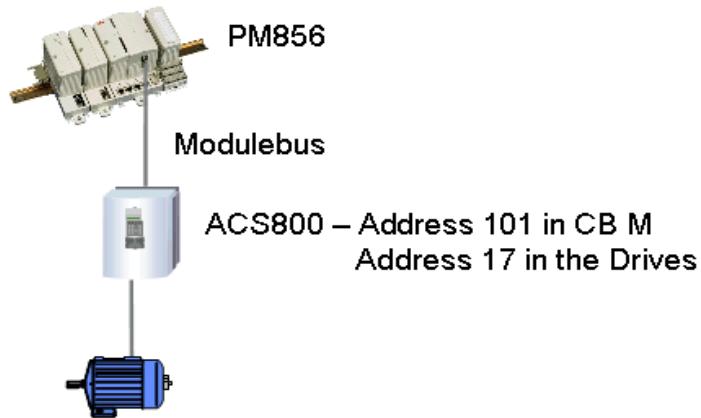
No.	Use
1	Start
2	Stop
3	Activate reference setting
4	Forward direction of rotation
5	Reverse direction of rotation
6	Fault reset
7	Change between Local / Remote (external) control

To setup Parameters, press PAR. The menu system is based on major and minor numbers.

Use the blue arrows to move between major numbers and the white arrows to move between minor numbers. For example, to configure 70.01, the address of the drive, navigate to the 70 by using the blue arrows and to 01 my using the white arrows. If you want to change a minor setting, press Enter and use the arrows to change the numbers.

7 Connecting a Drive via Modulebus

I will use the following configuration



7.1 Connect the Optical Cable

First you need to connect the optical cable to the M controller as well as to the drive

7.2 Configure the Drive to be connected to an M Controller

The next step is to setup the Drive to be connected via the Modulebus. Please see page 185 in the

ACS800

Firmware Manual ACS800 Standard Application Program 7.x

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Communication Set-up

The communication between the drive and the AF 100 interface is activated by setting parameter [98.02](#) to ADVANT.

Table 3 Communication set-up parameters for AF 100 connection.

Parameter	Alternative Settings	Setting for Control through CH0	Function/Information
COMMUNICATION INITIALISATION			
98.02	NO; FIELDBUS; ADVANT; STD MODBUS, CUSTOMISED	ADVANT	Initialises communication between drive (fibre optic channel CH0) and AF 100 interface. The transmission speed is 4 Mbit/s.
98.07	ABB DRIVES; GENERIC; CSA 2.8/3.0	ABB DRIVES	Selects the communication profile used by the drive. See section Communication profiles below.

After the communication activation parameters have been set, the AF 100 interface must be programmed according to its documentation, and the drive control parameters (shown in [Table 4](#)) checked and adjusted where necessary.

In an Optical ModuleBus connection, the channel 0 address (parameter [70.01](#)) is calculated from the value of the POSITION terminal in the appropriate database element (for the AC 80, DRISTD) as follows:

1. Multiply the hundreds of the value of POSITION by 16.
2. Add the tens and ones of the value of POSITION to the result.

For example, if the POSITION terminal of the DRISTD database element has the value of 110 (the tenth drive on the Optical ModuleBus ring), parameter 70.01 must be set to $16 \times 1 + 10 = 26$.

Set the following

- 98.02 Advant
- 98.07 ABB Drives
- 70.01 to 17
- 70.03 to 4 MBit

My address on the optical Modulebus is going to be 101, thus the address of 70.01 in the drive should be set to $1*16+0+1=17$.

7.3 Configure the Drive to be controlled from an external device

We also need to setup the drive to receive set points from an external source.

Set the following

- 10.01 to Comm.CW
- 10.03 to Request
- 11.02 to Comm.CW
- 11.03 to Comm.Ref

For more information see page 186 in the

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We also want to be able to set max speed and the negative max speed

- 20.01 to negative MAX SPEED
- 20.02 to MAX SPEED

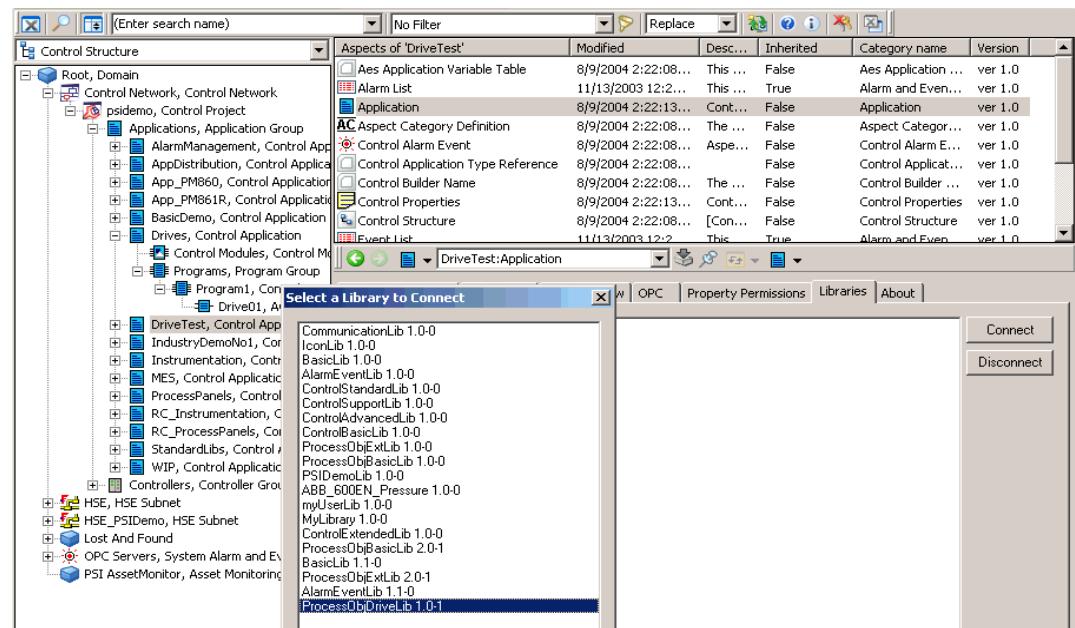
7.4 Setup Control Logic

Now when the Hardware is connected it is time to setup the software part.

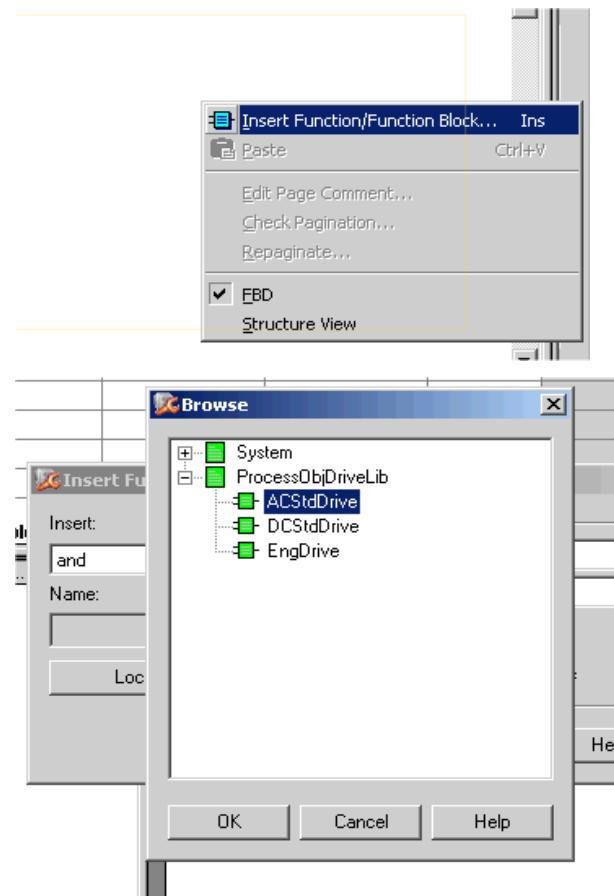
7.4.1 Configure the ACSStdDrive function block

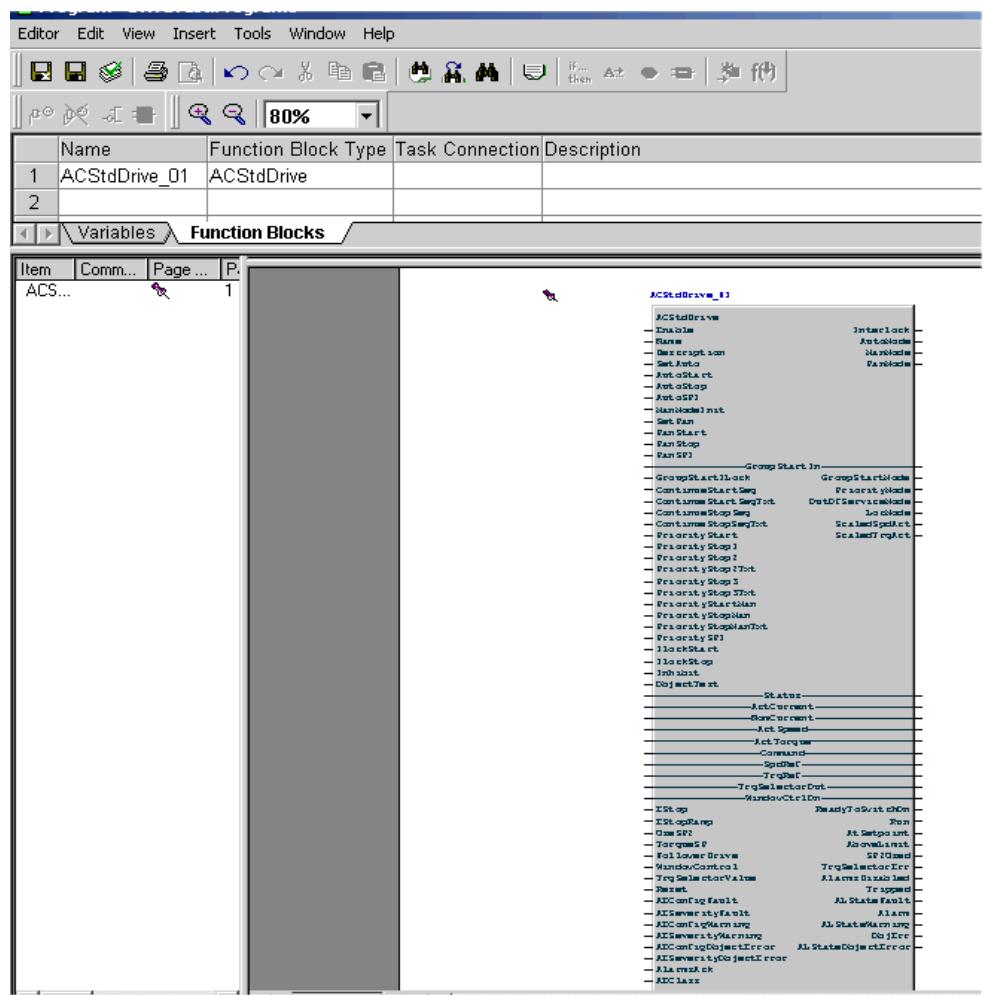
Open an existing program or create new one and insert the ACSStdDrive element. You find it in the ProcessObjectDriveLib. If you can not find it make sure you have connected the ProcessObjectDriveLib to the Program as well as the Application.

See below how to connect a library to an application



Select Insert Function Block





The next step is to connect some of the pins. The picture below shows the ones that I connected. You can of course select to connect more if needed.



	Name	Data Type	Attributes	Initial value
1	ACSSStdDrive01_GroupStart	BasicLib.GroupStartStepConnection	retain	
2	ACSSStdDrive01_Status	DintIO	retain	
3	ACSSStdDrive01_ActCurrent	DintIO	retain	
4	ACSSStdDrive01_NomCurrent	DintIO	retain	
5	ACSSStdDrive01_ActSpeed	DintIO	retain	
6	ACSSStdDrive01_ActTorque	DintIO	retain	
7	ACSSStdDrive01_Command	DintIO	retain	
8	ACSSStdDrive01_SpdRef	DintIO	retain	
9	ACSSStdDrive01_TrqRef	DintIO	retain	
10	ACSSStdDrive01_TrqSelectorOut	DintIO	retain	
11	ACSSStdDrive01_WindowCtrlOn	DintIO	retain	
12	ACSSStdDrive01_InteractionPar	ProcessObjDriveLib.ACStdDrivePar	retain	
13	ACSSStdDrive01_Enable	bool	retain	true
14	ACSSStdDrive01_Descr	string[40]	retain	'Demo Drive'
15	ACSSStdDrive01_Name	string[30]	retain	'ACSSStdDrive01'
16	Act2	dint	retain	
17	Act3	dint	retain	
18	Act4	dint	retain	
19	Act5	dint	retain	
20	Ref2	dint	retain	
21	Ref3	dint	retain	
22	Ref4	dint	retain	
23	Ref5	dint	retain	
24	UnitStatus	dint	retain	
25	AutoModeSetPoint	bool	retain	
26	ACSSStdDrive01_AutoModeSetpoint	real	retain	688
27	ACSSStdDrive01_PanSP1	real	retain	888



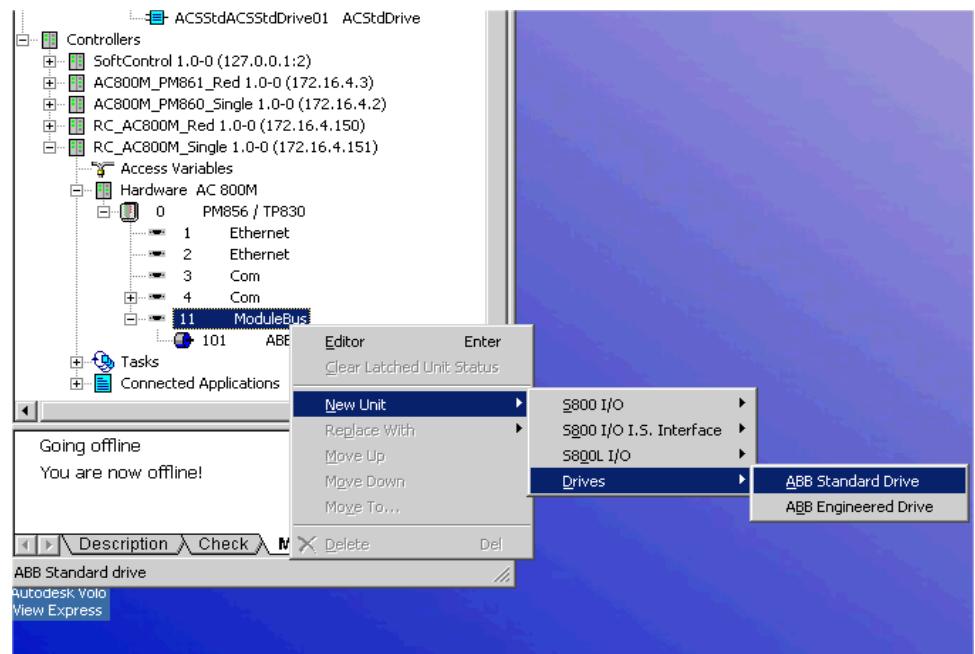
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Doc. no.
Rev. ind. 1
Date 040809

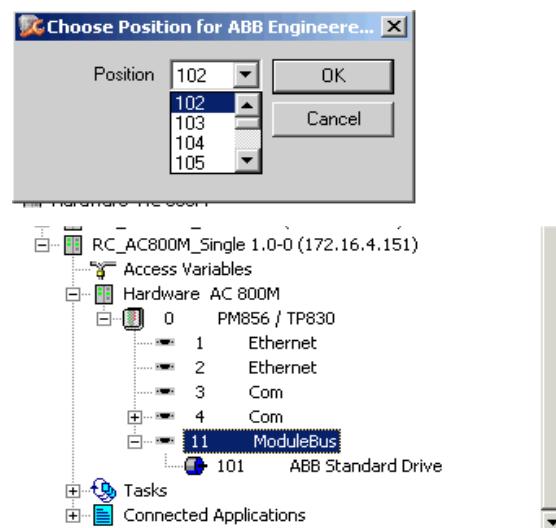
ACSStdACSStdDrive01

7.5 Insert and configure the Drive in CB M

Select the Controller you have connected the Drive to and right mouse click to insert the Drive



Select the position. The address of the first Drive on the Modulebus is 101.



Double click on the Drive to setup the parameter connection

Hardware - RC_AC800M_Single.0.11.101 ABB Standard Drive*				
Editor Edit View Insert Tools Window Help				
Channel	Name	Type	Variable	I/O Descri
IWD.11.101.1	Status	dint	Drives.Program1.ACSStdDrive01_Status	
IWD.11.101.2	Actual 1	dint	Drives.Program1.ACSStdDrive01_ActCurrent	
IWD.11.101.3	Actual 2	dint	Drives.Program1.ACSStdDrive01_NomCurrent	
IWD.11.101.4	Actual 3	dint	Drives.Program1.ACSStdDrive01_ActSpeed	
IWD.11.101.5	Actual 4	dint	Drives.Program1.ACSStdDrive01_ActTorque	
IWD.11.101.6	Actual 5	dint		
QWD.11.101.7	Command	dint	Drives.Program1.ACSStdDrive01_Command	
QWD.11.101.8	Ref 1	dint	Drives.Program1.ACSStdDrive01_SpdRef	
QWD.11.101.9	Ref 2	dint		
QWD.11.101.10	Ref 3	dint		
QWD.11.101.11	Ref 4	dint		
QWD.11.101.12	Ref 5	dint		
QWD.11.101.13	UnitStatus	dint		

You can read how this should be connected in the on-line help. Select the Drive and Press F1.

The screenshot shows the Control Builder M Professional interface. On the left, the hardware configuration tree includes 'Libraries', 'Applications' (with several sub-applications like App_PM861R, BasicDemo, AppDistribution, AlarmManagement, ProcessPanel, MES, Instrumentation, WIP, App_PM860, RC_Instrumentation, RC_ProcessPanels, IndustryDemoNo1, Standardlibs, and Drives), 'Controllers' (with sub-options for SoftControl, AC800M, and RC_AC800M), and 'Access Variables'. A message at the bottom left says 'Going offline' and 'You are now offline!'. On the right, the 'ABB Standard Drives' help page is open, providing information on how drives communicate with AC 800M, supported connection methods (DriveBus, RPBA-01, NPBA-12, ModuleBus), and firmware requirements (CI830). It also details settings for the 'Settings Tab' (Channel No., DDS channels 1-2) and 'Connections Tab' (Status word for drive).

The settings here depend on the settings in the Drive. Thus if you want to use these settings you need to setup your drive accordingly.

7.6 Configure the Drive

You have now connected the drive in Control Builder, before it will work correctly you need to configure the Drive as well and make the following settings

- 92.02 - 1.04
- 92.03 - 99.06
- 92.04 - 1.02
- 92.05 - 1.05

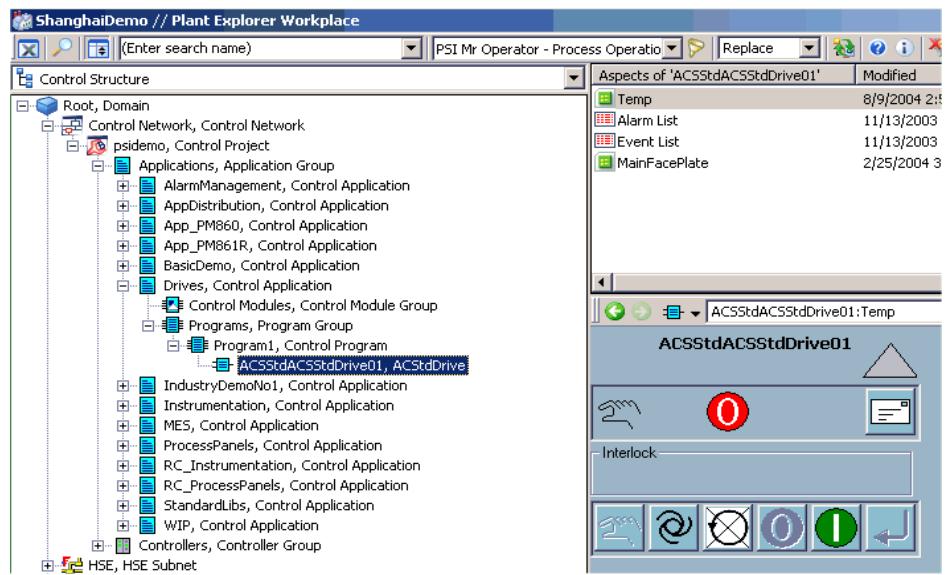
These settings set the outputs of the drive to match the one that we have configured in Control Builder.

You can read in the on-line help of the ACSDrive how to configure the Drive.

Function Block Type - ProcessObjDriveLib.ACStdDrive [Read-only]						
	Name	Data Type	Attributes	Direction	Initial Value	Description
33	PriorityStopMan	string	retain	in	'Priority Sto	Text for PriorityStopMan.
34	PrioritySP1	real	retain	in	100.0	Reference in Priority Mode, when Priority Start is active.
35	OutOfServiceMode	bool	retain	out		Drive in Out of Service mode.
36	LocMode	bool	retain	out		Drive in Local Mode (SW bit 9).
37	IlockStart	bool	retain	in		Interlock manual change from Stop to Start.
38	IlockStop	bool	retain	in		Interlock manual change from start to stop.
39	Inhibit	bool	retain	in		Inhibition of all Ilock and Priority signals.
40	ObjectTest	bool	retain	in		Set to test object.
41	ScaledSpdAct	real		out		Scaled actual Speed output in engineering units.
42	ScaledTrqAct	real		out		Scaled actual Torque output in engineering units.
43	Status	DintIO		in_out		IN Main status word. Connect to Drive.
44	ActCurrent	DintIO		in_out		IN Actual value Current. Connect to Drive data 104.
45	NomCurrent	DintIO		in_out		IN Nominal Value Current. Connect to Drive data 99.06.
46	ActSpeed	DintIO		in_out		IN Actual Speed. Connect to Drive data 1.02.
47	ActTorque	DintIO		in_out		IN Actual Torque. Connect to Drive data 1.05.
48	Command	DintIO		in_out		OUT Main control word. Connect to Drive.
49	SpdRef	DintIO		in_out		OUT Speed Reference value. Connect to Drive.
50	TrqRef	DintIO		in_out		OUT Torque Reference value for Follower. Connect to Drive data 2.09.
51	TrqSelectorOut	DintIO		in_out		OUT Torque Selector for Follower. Connect to Drive data 60.02.
52	WindowCtrlOn	DintIO		in_out		OUT Set Window Control. Connect to Drive data 60.03.
53	EStop	bool	retain	in		Emergency stop. Inverse of 'Off2' signal in Drive Command Word.
54	EStopRamp	bool	retain	in		Emergency stop. Inverse of 'Off3' signal in Drive Command Word.
55	UseSP2	bool	retain	in		Set if Bit 11 of control word needs to change to EXT 2 (FB uses EXT1
56	ReadyToSwitchC	bool	retain	out		Ready to Switch On (SW Bit 0).
57	Run	bool		out		Operation enabled (SW bit 2). Drive is running.

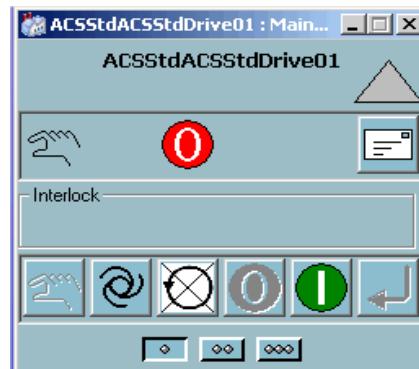
7.7 Test the Drive from Process Portal

Download to the controller and open the Faceplate in Process Portal.

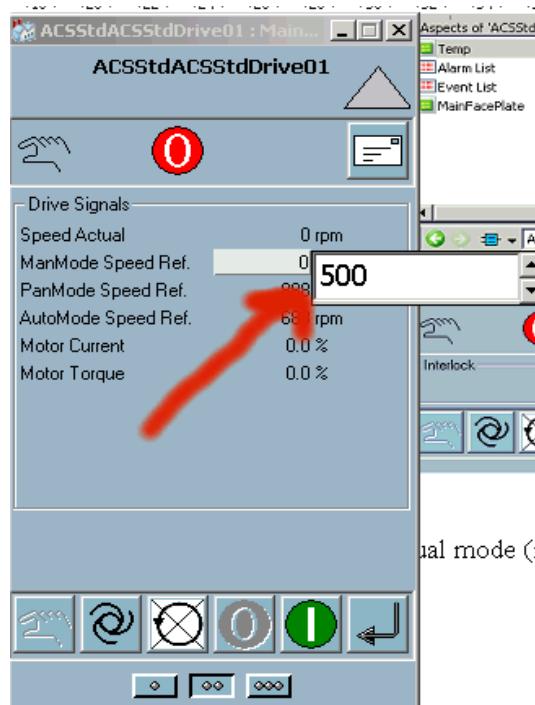


Double click to open it in its own window.

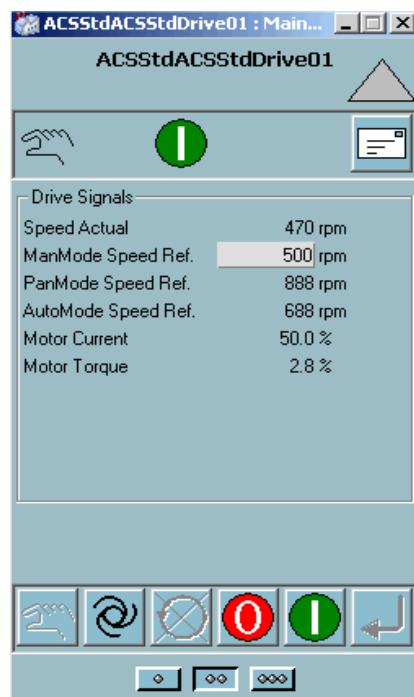
This is the Reduced Faceplate. The drive is in manual mode (indicated with the hand) and it is stopped.



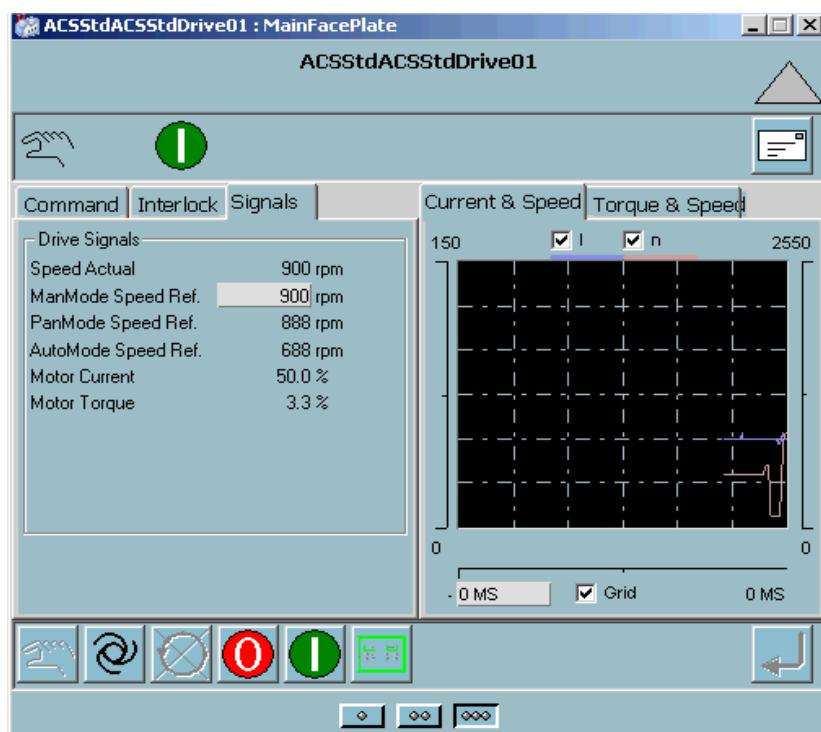
Open the Faceplate view by pressing the Middle button and type in a reference speed and press Enter.



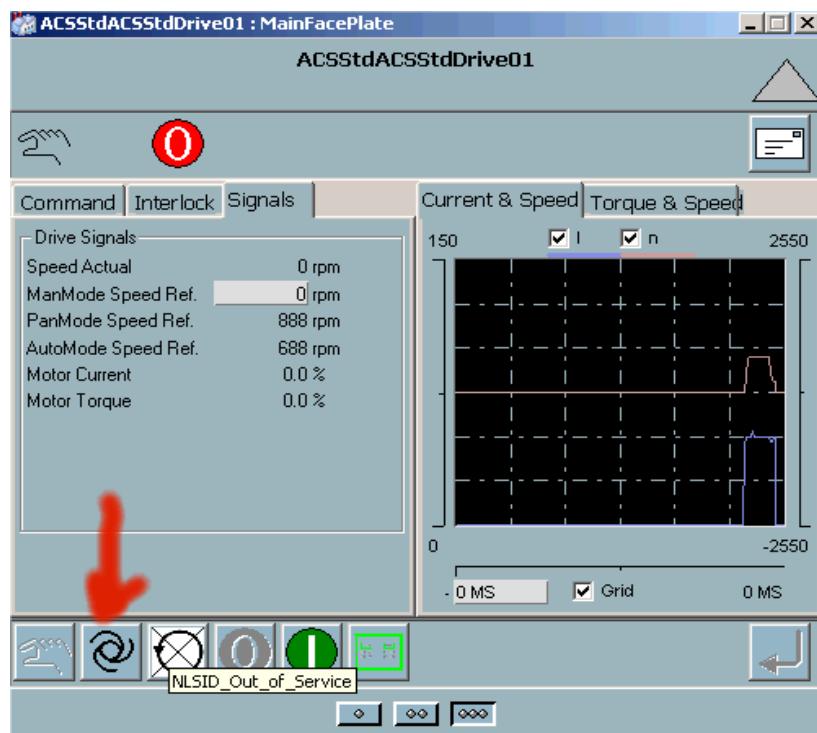
Click start and the Drive will start



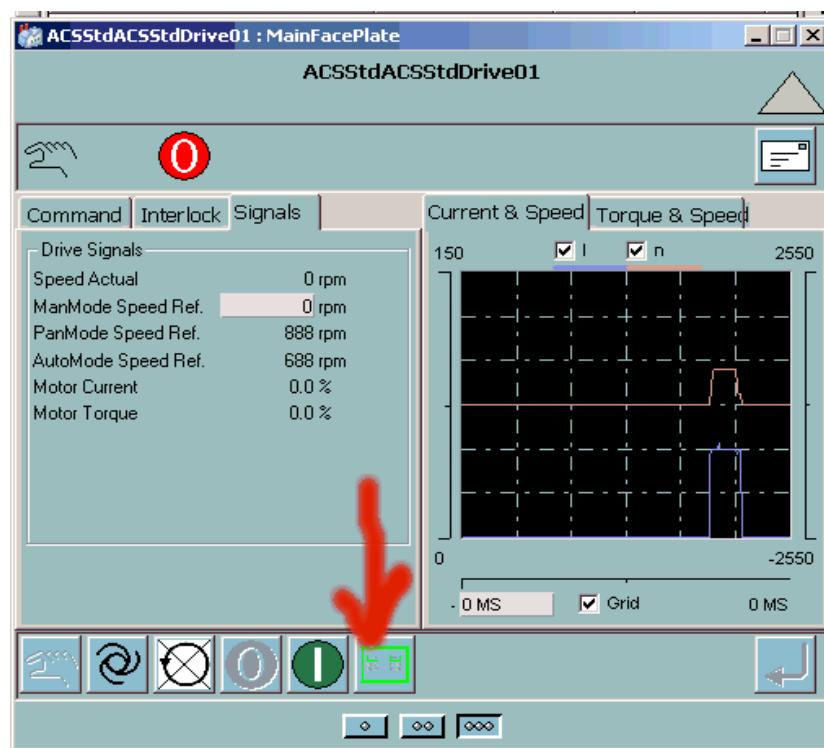
You can also view the Extended Faceplate



You can set the Drive to be in AutoMode by clicking the AutoMode icon.

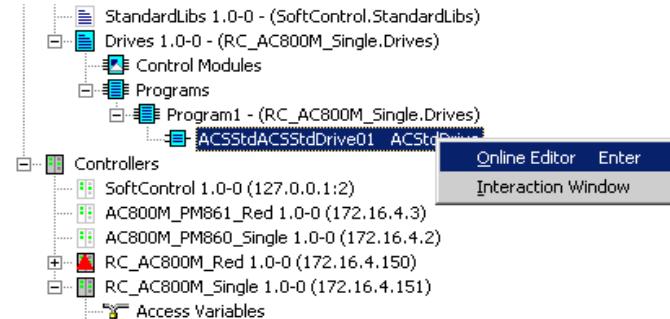


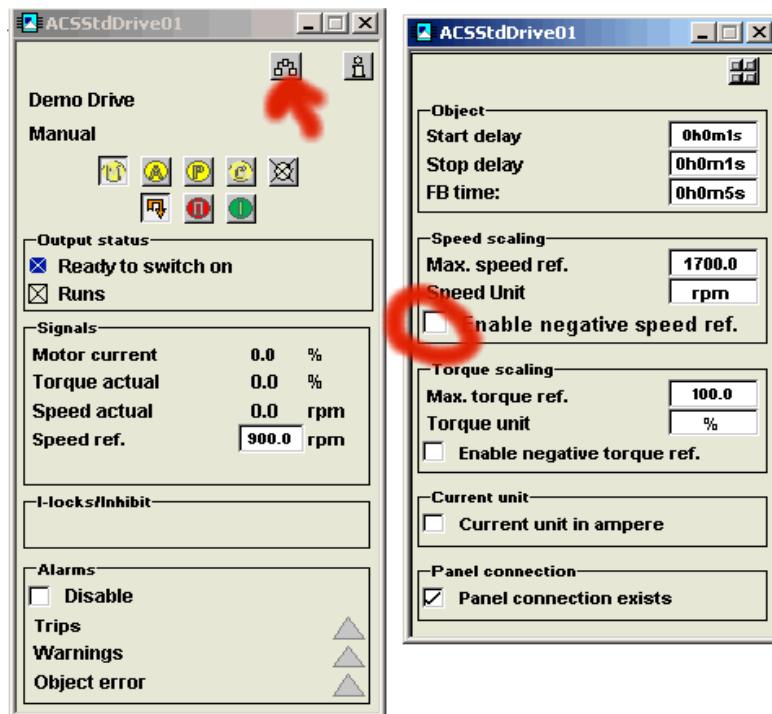
and as well into the Panel Mode



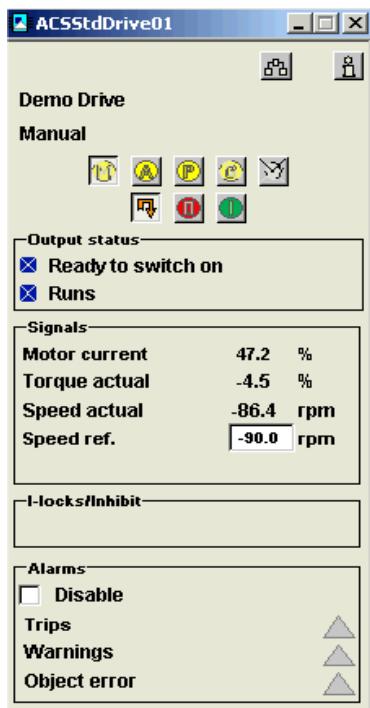
7.8 Setup parameters

You can set some additional parameters in the CB M in the on-line mode.





Click on the arrow to open the settings Windows. Select to Enable negative speed reference to be able to switch the direction of the Drive. You can also control the Drive from CB M.



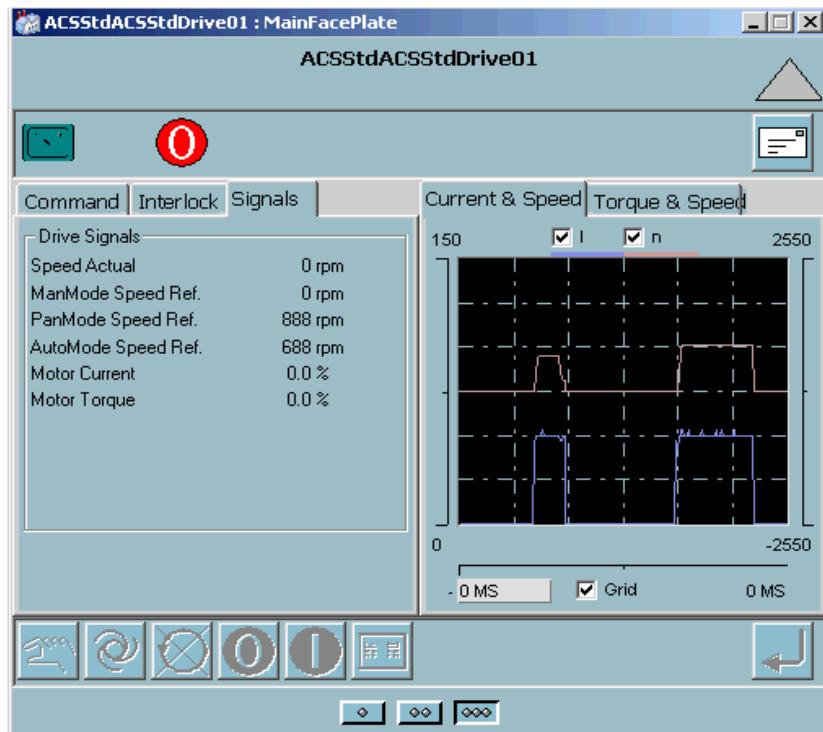
8 Connecting a Drive via PROFIBUS

To be added later

9 Trouble Shooting

9.1 Local Operation

If your Faceplate looks like this



then the Drive is in local operation. Go to the Drive, if you see that the L is in the Window, press Rem/Loc to switch to remote operation

