ПРИВОДЫ ПЕРЕМЕННОГО ТОКА НИЗКОВОЛЬТНЫЕ
Техническое описание на преобразователи ACS602, ACS603

Overview

This chapter explains how to program the ACS 600 parameters to prepare the drive for PROFIBUS communication.

For information on setting the ACS 600 parameters, read **General** below. For details, see the *ACS 600 Programming Manual.*

The sections **NPBA-01 Module Activation** and **PROFIBUS Connection Configuration** (page 5-3) describe how the communication between the ACS 600 and the NPBA-01 PROFIBUS Adapter Module is started.

Control Locations (starting page 5-4) deals with selecting the NPBA-01 module as the source of Start, Stop, Direction and Reference signals. For information on how to select the actual signal from the ACS 600 to be read through the PROFIBUS link, refer to **Analogue Outputs**, page 5-7. The selection of the NPBA-01 module as the source of the Run enable signal and fault reset is described in **System Control Inputs,** page 5-7. For information on how to define the operation of the drive upon a NPBA-01 Module fault condition, see **Fault Functions,** page 5-8.

General

The operation of the ACS 600 standard software can be changed by adjusting the drive operating instructions called Parameters. Parameter values can be modified with the CDP 311 Control Panel. For information on the use of the control panel, see the *ACS 600 Programming Manual*.

Before programming, the NPBA-01 PROFIBUS Adapter Module should be installed according to the instructions given in Chapters 3 and 4.

Table 5-1 (next page) presents the Parameters that should be set after the NPBA-01 PROFIBUS Adapter Module has been mechanically and electrically installed. The Parameters are discussed in more detail later in this chapter. The default values refer to the Factory macro, and may differ from the default values of other macros.

Note: The proper control of the ACS 600 by the PROFIBUS Control Word requires that the parameters are set according to the values in the Recommended Settings column.

Appendix F contains the listing for a type definition program, required by Siemens master stations to configure the system for communication with the NPBA-01 PROFIBUS Adapter Module.

Table 5-1 The ACS 600 parameters to be set on NPBA-01 installation.

Parameter	Alternative Settings	Default Setting	Recommended Setting
98.2 COMM.MODULE	YES; NO	NO	YES
51.1 MODULE TYPE		NPBA SW1.0	
51.2 PROFIBUS MODE	FMS; DP-PPO1; DP-PPO2; DP-PPO3; DP-PPO4; DP-PPO5	DP-PPO1	
51.3 STATION NUMBER	2 to 126	2	
51.4 BIT RATE SELECT	9.6KBIT; 19.2KBIT; 93.75KBIT; 187.5KBIT; 500KBIT; 1.5MBIT; AUTO	AUTO	
51.5 WRITE PPO DATA SET SEL	0 to 255	0	
51.6 READ PPO DATA SET SEL	0 to 255	0	
10.1 EXT1 STRT/STP/DIR	NOT SEL; DI1; ...; DI6,5; KEYPAD; COMM.MODULE	DI1,2	COMM.MODULE
10.2 EXT2 STRT/STP/DIR	NOT SEL; D1; ...; DI6,5; KEYPAD; COMM.MODULE	NOT SEL	COMM.MODULE
10.3 DIRECTION	FORWARD; REVERSE; REQUEST	FORWARD	REQUEST
11.2 EXT1/EXT2 SELECT	DI1; ...; DI6; EXT1; EXT2; COMM.MODULE	EXT1	COMM.MODULE
11.3 EXT REF1 SELECT	KEYPAD; AI1; ...; MAX(AI2,AI3); DI3U,4D(R); ...; DI5U,6D; COMM.MODULE	AI1	COMM.MODULE
11.6 EXT REF2 SELECT	KEYPAD; AI1; ...; MAX(AI2,AI3); DI3U,4D(R); ...; DI5U,6D; COMM.MODULE	KEYPAD	COMM.MODULE
12.1 CONST SPEED SEL	NOT SEL; D1 (SPEED1); DI2 (SPEED2); DI3 (SPEED3); DI4 (SPEED4); DI5 (SPEED5); DI6 (SPEED6); DI1,2; DI3,4; DI5,6; DI1,2,3; DI3,4,5; DI4,5,6; DI3,4,5,6	DI5,6	NOT SEL
15.1 ANALOGUE OUTPUT1	NOT USED; P SPEED; ...; CONTROL DEV	SPEED	
15.6 ANALOGUE OUTPUT2	NOT USED; P SPEED; ...; CONTROL DEV	CURRENT	
16.1 RUN ENABLE	YES; DI1; ...; DI6; COMM.MODULE	YES	COMM.MODULE
16.4 FAULT RESET SEL	NOT SEL; DI1; ...; DI6; COMM.MODULE	NOT SEL	COMM.MODULE
21.3 STOP FUNCTION	COAST; RAMP	COAST	RAMP
30.18 COMM FAULT FUNC	NO; FAULT; CONST SP 15; LAST SPEED	FAULT	
30.19 COMM FLT TIME-OUT	0.1 to 60 s	1.00	

NPBA-01 Module Activation

The NPBA-01 Adapter Module must be activated to establish the communication between the ACS 600 and the module.

98.2 COMM.MODULE

The connection with the NPBA-01 PROFIBUS Adapter Module and the ACS 600 is activated with this parameter.

YES
The connection between the NPBA-01 and the ACS 600 is active.

NO
The connection between the NPBA-01 and the ACS 600 is inactive.

After the module is activated, the configuration parameters of the NPBA-01 are automatically copied from the adapter module to the configuration table of the ACS 600.

PROFIBUS Connection Configuration

Parameter Group 51 includes the parameters for module address and mode. The user needs to adjust the parameters only if the default values have to be changed.

Note: The new parameter settings take effect only after the module power supply is switched off and then on again.

Table 5-2 Parameter Group 51 COMMUNICATION MODULE.

Parameter	Alternative Settings	Default Setting
51.1 MODULE TYPE		NPBA SW1.0
51.2 PROFIBUS MODE	FMS; DP-PPO1; DP-PPO2; DP-PPO3; DP-PPO4; DP-PPO5	DP-PPO1
51.3 STATION NUMBER	2 to 126	2
51.4 BIT RATE SELECT	9.6KBIT; 19.2KBIT; 93.75KBIT; 187.5KBIT; 500KBIT; 1.5MBIT; AUTO	AUTO
51.5 WRITE PPO DATA SET SEL	0 to 255	0
51.6 READ PPO DATA SET SEL	0 to 255	0

51.1 MODULE TYPE	This parameter shows the module type as detected by the ACS 600. The value cannot be adjusted by the user.
51.2 PROFIBUS MODE	This parameter defines the operating mode of the PROFIBUS connection.

FMS
The NPBA-01 module uses the PROFIBUS-FMS protocol.

DP-PPO1, ..., DP-PPO5
The NPBA-01 module uses the PROFIBUS-DP protocol. This parameter also selects the PPO message type (see Chapter 6 for PPO message types).

51.3 STATION NUMBER	Each device on the PROFIBUS link must have a unique station number. This parameter is used to define a station number for the ACS 600 unit it is connected to. Allowable values are 2 to 126 inclusive.
51.4 BIT RATE SELECT	This parameter shows the transfer rate used in the PROFIBUS link. The default value is AUTO. With AUTO selected, the transfer rate is detected automatically.
51.5 WRITE PPO DATA SET SEL	This parameter defines the number of the data set the PPO message process information is written to. This data set is transmitted in PPO message parts PD1 to PD3 (see Table 6-2, page 6-7). This parameter is effective only when PPO Type 2, 4 or 5 is used.
51.6 READ PPO DATA SET SEL	This parameter defines the number of the data set the PPO message process information is read from. This data set is transmitted in PPO message parts PD1 to PD3 (see Table 6-2, page 6-7). This parameter is effective only when PPO Type 2, 4 or 5 is used.

Note: PPO Type 5 is available in PROFIBUS-DP mode only.

Control Locations	The ACS 600 drive can receive control information from multiple sources including digital inputs, analogue inputs, the CDP 311 Control Panel and a communication module (e.g. NPBA-01). The control signal sources for the drive are selected with the parameters in Parameter Group 10 START/STOP/DIR and in Parameter Group 11 REFERENCE SELECT. The parameters can be altered only with the drive stopped.
10.1 EXT1 STRT/STP/DIR	This parameter defines the source of the Start, Stop and Direction commands for External control location 1 (see Parameter 11.2).

NOT SEL
No source is selected for the Start, Stop and Direction commands.

D1, ..., D6,5
The drive receives the Start, Stop and Direction commands through the digital inputs. For details on the use of the digital inputs, see the *ACS 600 Programming Manual*.

COMM.MODULE *(Recommended Setting)*
The drive receives the Start, Stop and Direction commands through the communication (fieldbus adapter) module. The rotation direction of the motor is determined by the selected reference.

10.2 EXT2 STRT/STP/DIR This parameter defines the source of the for the Start, Stop and Direction commands for External control location 2 (see Parameter 11.2).

NOT SEL
No source is selected for the Start, Stop and Direction commands.

D1, ..., D6,5
The drive receives the Start, Stop and Direction commands through the digital inputs. For details on the use of the digital inputs, see the *ACS 600 Programming Manual*.

COMM.MODULE *(Recommended Setting)*
The drive receives the Start, Stop and Direction commands through the communication (fieldbus adapter) module. The rotation direction of the motor is determined by the selected reference.

10.3 DIRECTION **FORWARD, REVERSE**
The rotation direction of the motor is fixed to FORWARD or REVERSE.

REQUEST *(Recommended Setting)*
The rotation direction is defined with Parameter 10.1 EXT1 STR/STP/ DIR and Parameter 10.2 EXT2 STR/STP/DIR, or by keypad push-buttons. The selection is overridden if Parameter 11.3 EXT REF1 SELECT or Parameter 11.6 EXT REF2 SELECT is set to AI1/JOYST or AI2/JOYST or to COMM.MODULE.

11.2 EXT1/EXT2 SELECT This parameter defines the active External control location for the Start, Stop and Direction commands and for the reference. The parameter sets one of the digital inputs or the communication module to select between EXT1 and EXT2. Alternatively, the parameter fixes either EXT1 or EXT2 as the active External control location.

EXT1
External control location 1 is selected as the active External control location. Parameter 10.1 defines the source of the Start, Stop and Direction Commands. Parameter 11.3 defines the source of the reference.

EXT2
External control location 2 is selected as the active External control location. Parameter 10.2 defines the source of the Start, Stop and Direction Commands. Parameter 11.6 defines the source of the reference.

Overview

This chapter describes the functions and indications of the Status LEDs on the NPBA-01 PROFIBUS Adapter Module to help solving problems that may arise.

Status LEDs

There are three status LEDs on the NPBA-01 module, labelled *MASTER*, *MSG* and *DDCS*.

The normal power-up procedure is as follows:

- All LEDs are turned on for the duration of the RAM/ROM test. If the test is passed, all LEDs will be turned off.

- The *DDCS* LED will light as the DDCS link between the NPBA-01 and the ACS 600 is initialised. After initialisation, the *DDCS* LED will remain on.

- If Parameter 51.4 BIT RATE SELECT is set to AUTO, the *MASTER* LED will flash until the module has found the correct data transfer rate and established the PROFIBUS connection, after which the LED will remain on. If the transfer rate is set manually, the LED will light even if the rate is not correct.

- All LEDs are lit: PROFIBUS communication and DDCS communication OK.

If the *MASTER* LED flashes after the RAM/ROM test, the test has failed. Try resetting the module. If the error persists, contact an ABB service representative.

If the *DDCS* LED flashes or goes out during operation, there are errors on the DDCS link between the module and the ACS 600. All errors in the link are reported by the module to the PROFIBUS master (bit 15 of the Status Word is turned on.) If errors occur, check the fibre cables visually for dirt or flaws. Ensure that all connectors are properly inserted. If these measures do not rectify the problem, try new cables. If errors still occur, contact an ABB service representative.

As parameters are copied from the NPBA-01 to the ACS 600 during the activation of the module, you can generally observe the functioning of the link by checking the parameters in Parameter Group 51 COMMUNICATION MODULE.

If the *MSG* LED is off, there is either no data transferred on the bus or the bus communication has failed. The loss of bus communication also ceases the DDCS communication.

Appendix A – Parameter Listings

The tables in this Appendix list all the available ACS 600 Actual signals, PROFIBUS/ACS 600 Parameters and their alternative settings, and profile-specific Parameters.

Table A-1 ACS 600 Actual Signals available. (See also PROFIBUS Parameters 1 to 26.)

Analogue Output/ Actual Signal	Short name	Description	Scaling
PROCESS SPEED	P SPEED	Process speed	-20000 ≜ -100 % 20000 ≜ 100 % **of the value defined with Parameter 20.2 (DTC Control Mode) or Parameter 20.8 (SCALAR Control Mode)**
SPEED	SPEED	Motor speed	-20000 ≜ -100 % 20000 ≜ 100 %
FREQUENCY	FREQ	Inverter output frequency	-100 ≜ -1 Hz 100 ≜ 1 Hz
CURRENT	CURRENT	Motor current	0 ≜ 0 % 10000 ≜ 100 % **of motor nominal current**
TORQUE	TORQUE	Motor torque	-10000 ≜ -100 % 10000 ≜ 100 % **of motor nominal torque**
POWER	POWER	Motor power	0 ≜ 0 % 10000 ≜ 100 % **of motor nominal power**
DC BUS VOLTAGE V	DC BUS V	DC bus voltage of ACS 600	0 ≜ 0 % 10000 ≜ 100 % **of nominal DC bus voltage**
OUTPUT VOLTAGE	OUT VOLT	Calculated motor voltage	0 ≜ 0 % 10000 ≜ 100 % **of motor nominal voltage**
EXTERNAL REF 2	EXT REF2	External reference 2	0 ≜ 0 % 10000 ≜ 100 % **of motor max. speed / nominal torque / max. process reference (defined with Parameter 11.6)**
APPL BLOCK OUTPUT	APPL OUT	The reference given as an output from the application (PID controller output, etc.)	0 ≜ 0 % 10000 ≜ 100 %
ACTUAL VALUE 1	ACT VAL1	PID controller Actual value 1 Available only if the PID Macro is selected	0 ≜ 0 % 10000 ≜ 100 %
ACTUAL VALUE 2	ACT VAL2	PID controller Actual value 2 Available only if the PID Macro is selected	0 ≜ 0 % 10000 ≜ 100 %
CONTROL DEVIATION	CONT DEV	The difference between the reference given by the user and the actual reference the ACS 600 is following	0 ≜ 0 % 10000 ≜ 100 %

Table A-2 PROFIBUS/ACS 600 Parameters.

PROFIBUS Par. No. (Add 4000 in FMS Mode)	Name	Short name	Description	Scaling
1	PROCESS SPEED	P SPEED	Process speed	-100 ≙ -100 % 100 ≙ 100 % **of the value defined with Parameter 20.2 (DTC Control Mode) or Parameter 20.8 (SCALAR Control Mode)**
2	SPEED	EED	Motor speed	-20000 ≙ -100 % 20000 ≙ 100 %
3	FREQUENCY	REQ	Inverter output frequency	-100 ≙ -1 Hz 100 ≙ 1 Hz
4	CURRENT	CURRENT	Motor current	10 ≙ 1 A
5	TORQUE	ORQUE	Motor torque	-10000 ≙ -100 % 10000 ≙ 100 % **of motor nominal torque**
6	POWER	POWER	Motor power	0 ≙ 0 % 10000 ≙ 100 % **of motor nominal power**
7	DC BUS VOLTAGE V	DC BUS V	DC bus voltage of ACS 600	1 ≙ 1 V
8	MAINS VOLTAGE	MAINS V	Calculated supply voltage	1 ≙ 1 V
9	OUTPUT VOLTAGE	OUT VOLT	Calculated motor voltage	1 ≙ 1 V
10	ACS 600 TEMP	ACS TEMP	Temperature of the heatsink	1 ≙ 1 °C
11	EXTERNAL REF 1	EXT REF1	External reference 1	1 ≙ 1 rpm
12	EXTERNAL REF 2	EXT REF2	External reference 2	0 ≙ 0 % 10000 ≙ 100 % **of motor max. speed / nominal torque / max. process reference (depending on the ACS 600 macro selected)**
13	CTRL LOCATION	CTRL LOC	Active control location	**1** = EXT2; **2** = LOCAL; **3** = EXT1
14	OP HOUR COUNTER	OP HOURS	Elapsed time counter	1 ≙ 1 h
15	KILOWATT HOURS	KW HOURS	kWh meter	1 ≙ 1 kWh
16	APPL BLOCK OUTPUT	APPL OUT	The reference given as an output from the application (PID controller output, etc.)	0 ≙ 0 % 10000 ≙ 100 %
17	DI6-1 STATUS	DI6-1	Status of digital inputs	
18	AI1 (V)	AI1 (V)	Value of Analogue input 1	1 ≙ 0.01 V
19	AI2 (mA)	AI2 (mA)	Value of Analogue input 2	1 ≙ 1 mA
20	AI3 (mA)	AI3 (mA)	Value of Analogue input 3	1 ≙ 1 mA
21	RO3-1 STATUS	RO3-1	Status of relay outputs	
22	AO1 (mA)	AO1 (mA)	Value of Analogue output 1	1 ≙ 1 mA
23	AO2 (mA)	AO2 (mA)	Value of Analogue output 2	1 ≙ 1 mA

PROFIBUS Par. No. (Add 4000 in FMS Mode)	Name	Short name	Description	Scaling
24	ACTUAL VALUE 1	ACT VAL1	PID controller Actual value 1 Available only if the PID Macro is selected	0 △ 0 % 10000 △ 100 %
25	ACTUAL VALUE 2	ACT VAL2	PID controller Actual value 2 Available only if the PID Macro is selected	0 △ 0 % 10000 △ 100 %
26	CONTROL DEVIATION	CONT DEV	The difference between the reference given by the user and the actual reference the ACS 600 is following	-10000 △ -100 % 10000 △ 100 %

PROFIBUS Par. No. (Add 4000 in FMS Mode)	ACS 600 Parameter	Alternative Settings	Scaling
	10 START/STOP/DIR		
101	10.1 EXT1 STRT/STP/DIR	**1** = NOT SEL; **2** = DI1; **3** = DI1,2; **4** = DI1P,2P; **5** = DI1P,2P,3; **6** = DI1P,2P,3P; **7** = DI6; **8** = DI6,5; **9** = KEYPAD; **10** = COMM.MODULE	
102	10.2 EXT2 STRT/STP/DIR		
103	10.3 DIRECTION	**1** = FORWARD; **2** = REVERSE; **3** = REQUEST	
	11 REFERENCE SELECT		
126	11.1 KEYPAD REF SEL	**1** = REF1(rpm); **2** = REF2(%)	
127	11.2 EXT1/EXT2 SELECT	**1** = EXT1; **2** = EXT2; **3 ... 8** = DI1 ... DI6; **9** = COMM.MODULE	
128	11.3 EXT REF1 SELECT	**1** = KEYPAD; **2 ... 4** = AI1 ...AI3; **5** = AI1/JOYST; **6** = AI2/JOYST; **7** = AI1+AI3; **8** = AI2+AI3; **9** = AI1-AI3; **10** = AI2-AI3; **11** = AI1*AI3; **12** = AI2*AI3; **13** = MIN(AI1,AI3); **14** = MIN(AI2,AI3); **15** = MAX(AI1,AI3); **16** = MAX(AI2,AI3); **17** = DI3U,4D(R); **18** = DI3U,4D; **19** = DI5U,6D; **20** = COMM.MODULE	
129	11.4 EXT REF1 MINIMUM	0 ... 18000 rpm	1 △ 1 rpm
130	11.5 EXT REF1 MAXIMUM		
131	11.6 EXT REF2 SELECT	**1** = KEYPAD; **2 ... 4** = AI1 ...AI3; **5** = AI1/JOYST; **6** = AI2/JOYST; **7** = AI1+AI3; **8** = AI2+AI3; **9** = AI1-AI3; **10** = AI2-AI3; **11** = AI1*AI3; **12** = AI2*AI3; **13** = MIN(AI1,AI3); **14** = MIN(AI2,AI3); **15** = MAX(AI1,AI3); **16** = MAX(AI2,AI3); **17** = DI3U,4D(R); **18** = DI3U,4D; **19** = DI5U,6D; **20** = COMM.MODULE	
132	11.7 EXT REF2 MINIMUM	0 % ... 100 %	0 △ 0 % 10000 △ 100 %
133	11.8 EXT REF2 MAXIMUM	0 % ... 500 %	0 △ 0 % 5000 △ 500 %

PROFIBUS Par. No. (Add 4000 in FMS Mode)	ACS 600 Parameter	Alternative Settings	Scaling
	12 CONSTANT SPEEDS		
151	12.1 CONST SPEED SEL	**1** = NOT SEL; **2** = DI1 (SPEED1); **3** = DI2 (SPEED2); **4** = DI3 (SPEED3); **5** = DI4 (SPEED4); **6** = DI5 (SPEED5); **7** = DI6 (SPEED6); **8** = DI1,2; **9** = DI3,4; **10** = DI5, 6; **11** = DI1,2,3; **12** = DI3,4,5; **13** = DI4,5,6; **14** = DI3,4,5,6	
152	12.2 CONST SPEED 1	0 ... 18000 rpm	1 ≙ 1 rpm
153	12.3 CONST SPEED 2		
154	12.4 CONST SPEED 3		
155	12.5 CONST SPEED 4		
156	12.6 CONST SPEED 5		
157	12.7 CONST SPEED 6		
158	12.8 CONST SPEED 7		
159	12.9 CONST SPEED 8		
160	12.10 CONST SPEED 9		
161	12.11 CONST SPEED 10		
162	12.12 CONST SPEED 11		
163	12.13 CONST SPEED 12		
164	12.14 CONST SPEED 13		
165	12.15 CONST SPEED 14		
166	12.16 CONST SPEED 15		
	13 ANALOGUE INPUTS		
176	13.1 MINIMUM AI1	**1** = 0 mA; **2** = 2 V; **3** = TUNED VALUE; **4** = TUNE	
177	13.2 MAXIMUM AI1	**1** = 10 V; **2** = TUNED VALUE; **3** = TUNE	
178	13.3 SCALE AI1	0 ... 100 %	0 ≙ 0 % 10000 ≙ 100 %
179	13.4 FILTER AI1	0 s ... 10 s	0 ≙ 0 s 1000 ≙ 10 s
180	13.5 INVERT AI1	**0** = NO; **Hex FFFF** = YES	
181	13.6 MINIMUM AI2	**1** = 0 mA; **2** = 4 mA; **3** = TUNED VALUE; **4** = TUNE	
182	13.7 MAXIMUM AI2	**1** = 20 mA; **2** = TUNED VALUE; **3** = TUNE	
183	13.8 SCALE AI2	0 ... 100 %	0 ≙ 0 % 10000 ≙ 100 %
184	13.9 FILTER AI2	0 s ... 10 s	0 ≙ 0 s 1000 ≙ 10 s
185	13.10 INVERT AI2	**0** = NO; **Hex FFFF** = YES	
186	13.11 MINIMUM AI3	**1** = 0 mA; **2** = 4 mA; **3** = TUNED VALUE; **4** = TUNE	
187	13.12 MAXIMUM AI3	**1** = 20 mA; **2** = TUNED VALUE; **3** = TUNE	
188	13.13 SCALE AI3	0 ... 100 %	0 ≙ 0 % 10000 ≙ 100 %
189	13.14 FILTER AI3	0 s ... 10 s	0 ≙ 0 s 1000 ≙ 10 s
190	13.15 INVERT AI3	**0** = NO; **Hex FFFF** = YES	

PROFIBUS Par. No. (Add 4000 in FMS Mode)	ACS 600 Parameter	Alternative Settings	Scaling
	14 RELAY OUTPUTS		
201	14.1 RELAY RO1 OUTPUT	**1** = NOT USED; **2** = READY; **3** = RUNNING; **4** = FAULT; **5** = FAULT(-1); **6** = FAULT(RST); **7** = STALL WARN; **8** = STALL FLT; **9** = MOT TEMP WRN; **10** = MOT TEMP FLT; **11** = ACS TEMP WRN; **12** = ACS TEMP FLT; **13** = FAULT/WARN; **14** = WARNING; **15** = REVERSED; **16** = EXT CTRL; **17** = REF 2 SEL; **18** = CONST SPEED; **19** = DC OVERVOLT; **20** = DC UNDERVOL; **21** = SPEED 1 LIM; **22** = SPEED 2 LIM; **23** = CURRENT LIM; **24** = REF 1 LIM; **25** = REF 2 LIM; **26** = TORQUE 1 LIM; **27** = TORQUE 2 LIM; **28** = STARTED; **29** = LOSS OF REF; **30** = AT SPEED; **31** = ACT 1 LIM; **32** = ACT 2 LIM	
202	14.2 RELAY RO2 OUTPUT		
203	14.3 RELAY RO3 OUTPUT		
	15 ANALOGUE OUTPUTS		
226	15.1 ANALOGUE OUTPUT1	**1** = NOT USED; **2** = P SPEED; **3** = SPEED; **4** = FREQUENCY; **5** = CURRENT; **6** = TORQUE; **7** = POWER; **8** = DC BUS VOLT; **9** = OUTPUT VOLT; **10** = APPL OUTPUT; **11** = REFERENCE; **12** = CONTROL DEV; **13** = ACTUAL 1; **14** = ACTUAL 2	
227	15.2 INVERT AO1	**0** = NO; **Hex FFFF** = YES	
228	15.3 MINIMUM AO1	**1** = 0 mA; **2** = 4 mA	
229	15.4 FILTER AO1	0 s ... 10 s	0 △ 0 s 1000 △ 10 s
230	15.5 SCALE AO1	10 % ... 1000 %	100 △ 10 % 10000 △ 1000 %
231	15.6 ANALOGUE OUTPUT2	**1** = NOT USED; **2** = P SPEED; **3** = SPEED; **4** = FREQUENCY; **5** = CURRENT; **6** = TORQUE; **7** = POWER; **8** = DC BUS VOLT; **9** = OUTPUT VOLT; **10** = APPL OUTPUT; **11** = REFERENCE; **12** = CONTROL DEV; **13** = ACTUAL 1; **14** = ACTUAL 2	
232	15.7 INVERT AO2	**0** = NO; **Hex FFFF** = YES	
233	15.8 MINIMUM AO2	**1** = 0 mA; **2** = 4 mA	
234	15.9 FILTER AO2	0 s ... 10 s	0 △ 0 s 1000 △ 10 s
235	15.10 SCALE AO2	10 % ... 1000 %	100 △ 10 % 10000 △ 1000 %
	16 SYSTEM CTR INPUTS		
251	16.1 RUN ENABLE	**1** = YES; **2 ... 7** = DI1 ... DI6; **8** = COMM.MODULE	
252	16.2 PARAMETER LOCK	**0** = OPEN; **Hex FFFF** = LOCKED	
253	16.3 PASS CODE	0 ... 8 388 607	
254	16.4 FAULT RESET SEL	**1** = NOT SEL; **2 ... 7** = DI1 ... DI6; **8** = COMM.MODULE	
255	16.5 USER MACRO IO CHG	**1** = NOT SEL; **2 ... 7** = DI1 ... DI6	
	20 LIMITS		
351	20.1 MINIMUM SPEED	-18000/(number of pole pairs) rpm ... 18000/(number of pole pairs) rpm	1 △ 1 rpm
352	20.2 MAXIMUM SPEED		
353	20.3 MAXIMUM CURRENT	0 % I_{hd} ... 200 % I_{hd}	0 △ 0 % 20000 △ 200 %
354	20.4 MAXIMUM TORQUE	0 % ... 300 %	1 △ 1 %
355	20.5 OVERVOLTAGE CTRL	**0** = OFF; **Hex FFFF** = ON	
356	20.6 UNDERVOLTAGE CTRL		
357	20.7 MINIMUM FREQ	- 300 Hz ... 300 Hz (effective only when the SCALAR control mode is selected)	-30000 △ -300 Hz 30000 △ 300 Hz
358	20.8 MAXIMUM FREQ		

PROFIBUS Par. No. (Add 4000 in FMS Mode)	ACS 600 Parameter	Alternative Settings	Scaling
	21 START/STOP		
376	21.1 START FUNCTION	**1** = AUTO; **2** = DC MAGN; **3** = CNST DC MAGN	
377	21.2 CONST MAGN TIME	30 ms ... 10000 ms	1 △ 1 ms
378	21.3 STOP FUNCTION	**1** = COAST; **2** = RAMP	
379	21.4 DC HOLD	**0** = OFF; **Hex FFFF** = ON	
380	21.5 DC HOLD SPEED	0 rpm ... 3000 rpm	1 △ 1 rpm
381	21.6 DC HOLD CURR	0 % ... 100 %	1 △ 1 %
	22 ACCEL/DECEL		
401	22.1 ACC/DEC 1/2 SEL	**1** = ACC/DEC 1; **2** = ACC/DEC 2; **3 ... 8** = DI1 ... DI6	
402	22.2 ACCELER TIME 1	0 s ... 1800 s	0 △ 0 s 18000 △ 1800 s
403	22.3 DECELER TIME 1		
404	22.4 ACCELER TIME 2		
405	22.5 DECELER TIME 2		
406	22.6 ACC/DEC RAMP SHPE	**1** = LINEAR; **2** = S1; **3** = S2; **4** = S3	
	23 SPEED CTRL		
426	23.1 GAIN	0.0 ... 100	0 △ 0 10000 △ 100
427	23.2 INTEGRATION TIME	0 s ... 320 s	0 △ 0 s 3200 △ 320 s
428	23.3 DERIVATION TIME	0 s ... 10 s	0 △ 0 s 10000 △ 10 s
429	23.4 ACC COMPENSATION	0.00 s ... 100.00 s	0 △ 0 s 1000 △ 100 s
430	23.5 SLIP GAIN	0.0 % ... 400.0 %	1 △ 1 %
431	23.6 AUTOTUNE RUN ?	**0** = NO; **Hex FFFF** = YES	
	24 TORQUE CTRL	(EFFECTIVE ONLY WHEN THE TORQUE CONTROL MACRO IS SELECTED)	
451	24.1 TORQ RAMP UP	0.00 s ... 10.00 s	0 △ 0 s 100 △ 10 s
452	24.2 TORQ RAMP DOWN	0.00 s ... 10.00 s	
	25 CRITICAL SPEEDS		
476	25.1 CRIT SPEED SELECT	**0** = OFF; **Hex FFFF** = ON	
477	25.2 CRIT SPEED 1 LOW	0 rpm ... 18000 rpm	1 △ 1 rpm
478	25.3 CRIT SPEED 1 HIGH		
479	25.4 CRIT SPEED 2 LOW		
480	25.5 CRIT SPEED 2 HIGH		
481	25.6 CRIT SPEED 3 LOW		
482	25.7 CRIT SPEED 3 HIGH		
483	25.8 CRIT SPEED 4 LOW		
484	25.9 CRIT SPEED 4 HIGH		
485	25.10 CRIT SPEED 5 LOW		
486	25.11 CRIT SPEED 5 HIGH		

PROFIBUS Par. No. (Add 4000 in FMS Mode)	ACS 600 Parameter	Alternative Settings	Scaling
	26 MOTOR CONTROL		
501	26.1 FLUX OPTIMIZATION	**0** = NO; **Hex FFFF** = YES	
502	26.2 FLUX BRAKING		
503	26.3 IR COMPENSATION	0 % ... 30 % (effective only when the SCALAR motor control mode is selected)	1 △ 1 %
	30 FAULT FUNCTIONS		
601	30.1 AI<MIN FUNCTION	**1** = FAULT; **2** = NO; **3** = CONST SP 15; **4** = LAST SPEED	
602	30.2 PANEL LOSS	**1** = FAULT; **2** = CONST SP 15; **3** = LAST SPEED	
603	30.3 EXTERNAL FAULT	**1** = NOT SEL; **2 ... 7** = DI1 ... DI6	
604	30.4 MOTOR THERM PROT	**1** = FAULT; **2** = WARNING; **3** = NO	
605	30.5 MOT THERM P MODE	**1** = DTC; **2** = USER MODE; **3** = THERMISTOR	
606	30.6 MOTOR THERM TIME	256 s ... 10 000 s	1 △ 1 s
607	30.7 MOTOR LOAD CURVE	50 % ... 150 %	1 △ 1 %
608	30.8 ZERO SPEED LOAD	25 % ... 150 %	
609	30.9 BREAK POINT	1 Hz ... 300 Hz	100 △ 1 Hz 30000 △ 300 Hz
610	30.10 STALL FUNCTION	**1** = FAULT; **2** = WARNING; **3** = NO	
611	30.11 STALL FREQ HI	0.5 Hz ... 50 Hz	50 △ 0.5 Hz 5000 △ 50 Hz
612	30.12 STALL TIME	10 s ... 400 s	1 △ 1 s
613	30.13 UNDERLOAD FUNC	**1** = NO; **2** = WARNING; **3** = FAULT	
614	30.14 UNDERLOAD TIME	0 s ... 600 s	1 △ 1 s
615	30.15 UNDERLOAD CURVE	**1**; **2**; **3**; **4**; **5**	
616	30.16 MOTOR PHASE LOSS	**0** = NO; **Hex FFFF** = FAULT	
617	30.17 EARTH FAULT		
618	30.18 COMM FAULT FUNC	**1** = FAULT; **2** = NO; **3** = CONST SP 15; **4** = LAST SPEED	
619	30.19 COMM FAULT TIMEOUT	0.1 s ... 60 s	10 △ 0.1 s 6000 △ 60 s
	31 AUTOMATIC RESET		
626	31.1 NUMBER OF TRIALS	**1**; **2**; **3**; **4**; **5**	
627	31.2 TRIAL TIME	1.0 s ... 180.0 s	100 △ 1 s 18000 △ 180 s
628	31.3 DELAY TIME	0.0 s ... 60.0 s	100 △ 1 s 6000 △ 60 s
629	31.4 OVERCURRENT	**0** = NO; **Hex FFFF** = YES	
630	31.5 OVERVOLTAGE		
631	31.6 UNDERVOLTAGE		
632	31.7 AI SIGNAL<MIN		

PROFIBUS Par. No. (Add 4000 in FMS Mode)	ACS 600 Parameter	Alternative Settings	Scaling
	32 SUPERVISION		
651	32.1 SPEED1 FUNCTION	**1** = NO; **2** = LOW LIMIT; **3** = HIGH LIMIT	
652	32.2 SPEED1 LIMIT	-18000 rpm ... 18000 rpm	1 ≙ 1 rpm
653	32.3 SPEED2 FUNCTION	**1** = NO; **2** = LOW LIMIT; **3** = HIGH LIMIT	
654	32.4 SPEED2 LIMIT	-18000 rpm ... 18000 rpm	1 ≙ 1 rpm
655	32.5 CURRENT FUNCTION	**1** = NO; **2** = LOW LIMIT; **3** = HIGH LIMIT	
656	32.6 CURRENT LIMIT	0 ... 1000 A	1 ≙ 1 A
657	32.7 TORQUE 1 FUNCTION	**1** = NO; **2** = LOW LIMIT; **3** = HIGH LIMIT	
658	32.8 TORQUE 1 LIMIT	0 % ... 400 %	1 ≙ 1 %
659	32.9 TORQUE 2 FUNCTION	**1** = NO; **2** = LOW LIMIT; **3** = HIGH LIMIT	
660	32.10 TORQUE 2 LIMIT	0 % ... 400 %	1 ≙ 1 %
661	32.11 REF1 FUNCTION	**1** = NO; **2** = LOW LIMIT; **3** = HIGH LIMIT	
662	32.12 REF1 LIMIT	0 rpm ... 18000 rpm	1 ≙ 1 rpm
663	32.13 REF2 FUNCTION	**1** = NO; **2** = LOW LIMIT; **3** = HIGH LIMIT	
664	32.14 REF2 LIMIT	0 % ... 500 %	1 ≙ 1 %
665	32.15 ACT1 FUNCTION	**1** = NO; **2** = LOW LIMIT; **3** = HIGH LIMIT	
666	32.16 ACT1 LIMIT	0 % ... 200 %	0 ≙ 0 % 20000 ≙ 200 %
667	32.17 ACT2 FUNCTION	**1** = NO; **2** = LOW LIMIT; **3** = HIGH LIMIT	
668	32.18 ACT2 LIMIT	0 % ... 200 %	0 ≙ 0 % 20000 ≙ 200 %
	33 INFORMATION		
676	33.1 DTC SW VERSION	(Version of the ACS 600 software)	
677	33.2 APPL SW VERSION	(Version of the ACS 600 software)	
678	33.3 TEST DATE	(Date Tested)	
679	33.4 SERIAL NUMBER	(Serial number of the ACS 600)	
	34 PROCESS SPEED	(EFFECTIVE ONLY WITH APPLICATION SOFTWARE VERSION ≥ 2.5)	
701	34.1 SCALE	1 ... 30000	1 ≙ 1
702	34.2 UNIT	**1** = NO; **2** = rpm; **3** = %; **4** = m/s	

Appendix C – Technical Data

Slave Link

Compatible Devices: All ACS 600 Fieldbus Adapter modules, ACS 600 Frequency Converters

Size of the Link: 2 stations

Topology: Point-to-point

Serial Communication Type: Synchronous, full Duplex

Transmission Rate: 4 Mbit/s

Protocol: Distributed Drives Communication System (DDCS)

Cable: Fibre optic cable

- Construction: Plastic core, diameter 1 mm, sheathed with plastic jacket
- Attenuation: 0.31 dB/m
- Maximum Length between Stations: 10 m
- Specifications:

Parameter	Minimum	Maximum	Unit
Storage Temperature	-55	+85	°C
Installation Temperature	-20	+70	°C
Short Term Tensile Force		50	N
Short Term Bend Radius	25		mm
Long Term Bend Radius	35		mm
Long Term Tensile Load		1	N
Flexing		1000	cycles

Connectors: Blue - receiver; grey - transmitter

Fieldbus Link   **Compatible Devices:** All devices compatible with the PROFIBUS-DP and PROFIBUS-FMS protocols

Size of the Link: 127 stations with repeaters (32 stations per segment)

Topology: Linear bus

Serial Communication Type: Asynchronous, half Duplex

Transmission Rate: 9.6, 19.2, 93.75, 187.5, 300 or 1500 kbit/s

Protocol: PROFIBUS-DP or PROFIBUS-FMS

Cable: Shielded, twisted pair RS485 cable

- Termination: built in the NPBA-01 Module
- Specifications:

Parameter	Line A PROFIBUS-DP	Line B DIN 19245 Part 1	Unit
Impedance	135 to 165 (3 to 20 MHz)	100 to 130 (f > 100 kHz)	Ω
Capacitance	< 30	< 60	pF/m
Resistance	< 110	–	Ω/km
Wire gauge	> 0.6	> 0.53	mm
Conductor area	> 0.34	> 0.22	mm^2

- Maximum Bus Length (m):

	Transmission rate (kbit/s)			
	$\leq$ 93.75	187.5	500	1500
Line A	1200	1000	400	200
Line B	1200	600	200	–

NPBA-01

Enclosure: Plastic, dimensions 45 × 75 × 105 mm, Class IP 20

Mounting: Onto a standard mounting rail

Settings: Parameter Group 51 (set with the CDP 311 Control Panel)

Connectors:

- Light transmitter (grey) and receiver (blue) for ACS 600 connection

- One Combicon MVSTBW 2,5/8-ST-5,08 (8-pole, cross-section 2.5 mm^2 max.) screw terminal block for the fieldbus and power supply:

	X2	Description
1	D(P)	D(P) = Data Positive (Conductor 1 in twisted pair)
2	D(N)	D(N) = Data Negative (Conductor 2 in twisted pair)
3	DG	DG = Data Ground
4	SHF	Filtered Shield (Earthed via an RC filter)
5	SH	Shield (Earthed)
6	0V	Power supply for the module (3 W). From the NIOC card of the
7	+24 V	ACS 600 (Terminal: X23.1 = +24 V, X23.2 = Earth/0 V) or from another stable 24 V d.c. supply.
8	PE	Earth

General:

- All materials are UL/CSA approved

- Fast transient burst immunity: According to standard IEC 801-4: 4 kV 5/50 ns

- Noise emissions: According to standard EN 55022 B

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