

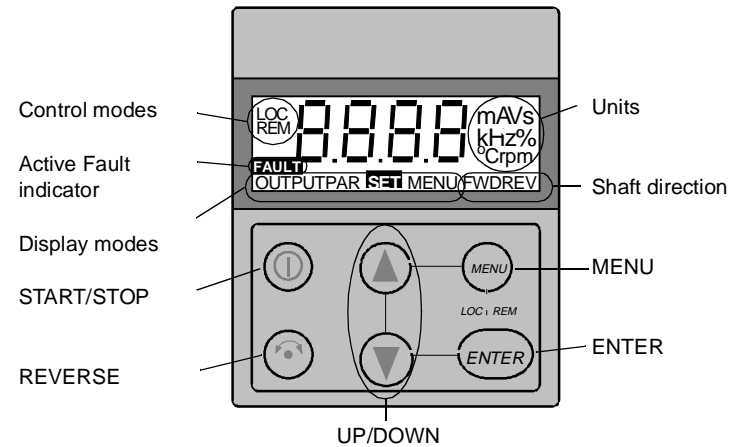


### Control Panel

This guide provides information on how to use the ACS 100-PAN control panel with an ACS 100 frequency converter. See also the ACS 100 User's Guide.

The control panel can be connected to and detached from the converter at any time. The panel can be used to copy parameters to other drives.

When the control panel is powered up, the LCD display illuminates for one second. Immediately afterwards, the position of the configuration switch, S1, is displayed for one second, e.g. **CF 0**, when S1 = 0.



### Control Modes

The very first time the drive is powered up, it is controlled from terminal X1 (remote control, **REM**). The ACS 100 is controlled from the control panel when the drive is in local control (**LOC**).

Switch to local control (**LOC**) by pressing and holding the MENU and ENTER buttons down simultaneously until first **Loc** or later **LCr** is displayed:

- If the buttons are released while **Loc** is displayed, the panel frequency reference is set to the current external reference and the drive is stopped.
- When **LCr** is displayed, the current run/stop status and the frequency reference are copied from the user I/O.

Start and stop the drive by pressing the START/STOP button.

Change the shaft direction by pressing the REVERSE button.

Switch back to remote control (**REM**) by pressing and holding the MENU and ENTER buttons down simultaneously until **rE** is displayed.

### Shaft Direction

<b>FWD / REV</b> Visible	<ul style="list-style-type: none"> <li>• Shaft direction is forward / reverse</li> <li>• Drive is running and at set point</li> </ul>
<b>FWD / REV</b> Blinking rapidly	Drive is accelerating / decelerating.
<b>FWD / REV</b> Blinking slowly	Drive is stopped.

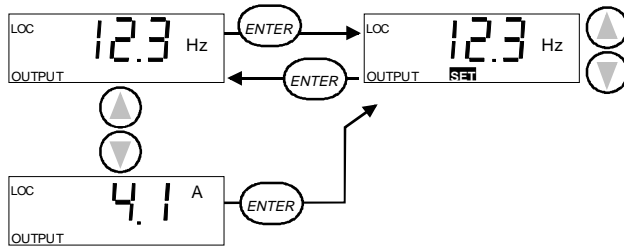


## Output Display

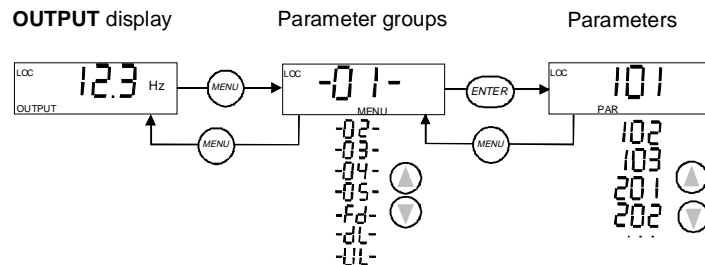
When the control panel is powered up, the panel displays the actual output frequency. Whenever the MENU button is pressed and held, the control panel resumes this **OUTPUT** display.

To toggle between output frequency and output current, press the UP or DOWN button.

To set the output frequency (**LOC**), press ENTER. Pressing the UP/DOWN buttons changes the output immediately. Press ENTER again to return to **OUTPUT** display.



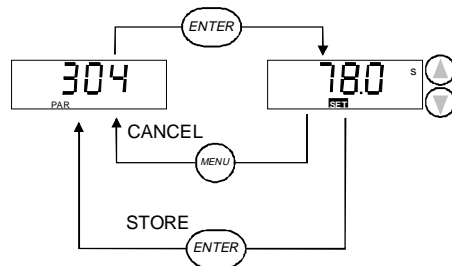
## Menu Structure



## Setting Parameter Value

Press ENTER to view the parameter value.

To set a new value, press and hold ENTER until **SET** is displayed.



**Note!** **SET** blinks, if the parameter value is altered. **SET** is not displayed, if the value cannot be altered.

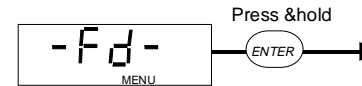
**Note!** To view the parameter default value press UP/DOWN buttons simultaneously.

## Menu Functions

Scroll the Parameter groups for the desired Menu Function. Press and hold ENTER until the display blinks to start the function.

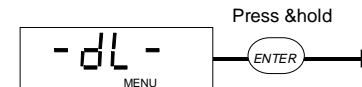
**Note!** Drive must be stopped and in local control. The configuration switch, S1, must be set to 0. Parameter 503 (Param Lock) must be set to 1.

### Restore factory defaults

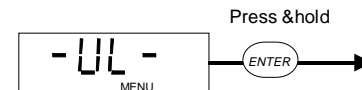


Parameter 503 (Param Lock) can also be set to 2.

### Copy parameters from panel to drive (download)



### Copy parameters from drive to panel (upload)



## Resetting the Drive

When the red LED of the ACS 100 is on or blinking, there is an active fault.

To reset a fault when the red LED is on, press the START/STOP button.

**Caution!** When in remote control, this may start the drive.

To reset a fault when the red LED is blinking, turn the power off.

**Caution!** Turning the power on again may start the drive immediately.

The relevant fault code (see Diagnostics) flashes in the panel display until the fault is reset or the display is "cleared".

You can "clear" the display without resetting the fault by pressing any button. The word **FAULT** will be visible in the display.

**Note!** If no other button is pressed within 15 seconds and the fault is still active, the fault code will be displayed again.

After a power failure, the drive will be in the same control mode (**LOC** or **REM**) as before the power failure.

## Diagnostics

The control panel displays the following alarm and fault codes.

Alarms AL1-6 arise from button operation. Green LED blinks for AL10-16, meaning that the ACS 100 cannot fully follow control commands.

Code	Description
CF 0 - CF 9	Position of configuration switch S1. Certain parameters can be modified only when S1 = 0.
AL 1	Parameter upload/download failed.
AL 2	Operation not allowed while start is active.
AL 3	Operation not allowed in remote or local control.
AL 4	REVERSE button disabled. Parameter 208 (Dir Lock) is active.
AL 5	Panel START button disabled. DI configuration is 3-wire and DI2 is open.
AL 6	Operation not allowed. Parameter 503 (Param Lock) is active.
AL10	Overcurrent controller active.
AL11	Overvoltage controller active.
AL12	Undervoltage controller active.
AL13	Reserved. Contact supplier.
AL14	Reverse command attempted in remote control ( <b>REM</b> ), while parameter 208 (Dir Lock) is active.
AL15 - AL16	Reserved. Contact supplier.
FL 1	Overcurrent: <ul style="list-style-type: none"> <li>Possible mechanical problem.</li> <li>Acc and/or Dec times may be too small.</li> </ul>
FL 2	DC overvoltage: <ul style="list-style-type: none"> <li>Input voltage too high.</li> <li>Dec time may be too small.</li> </ul>
FL 3	ACS 100 overtemperature: <ul style="list-style-type: none"> <li>Ambient temperature too high.</li> <li>Severe overload.</li> </ul>
FL 4 *	Fault current: output earth fault or short circuit
FL 5	Output overload.
FL 6	DC undervoltage.
FL 7	Analogue input fault. (See parameter 501.)
FL 8	Motor overtemperature. (See parameter 502.)
FL 9	Panel disconnected from drive in local control. <b>Note!</b> If FL 9 is active when the power is turned off, the ACS 100 will start in remote control ( <b>REM</b> ) when the power is turned back on.
FL10	Parameters inconsistent. Check that AI min ( $f_{min}$ ) is not greater than AI max ( $f_{max}$ ).
FL11 *	DC bus ripple too large. Check supply.
FL12	Reserved. Contact supplier.
FL13 - FL19 *	Hardware error. Contact supplier.
Full display blinking	Serial link failure. Bad connection between the control panel and the ACS 100.

**Note!** Faults (\*) with red blinking LED are reset by turning the power off and on. Other faults are reset by pressing the START/STOP button.

## Safety



**Warning!** Altering the parameter settings or device configurations will affect the function and performance of the ACS 100. Check that these changes do not cause any risk to persons or property.



**Warning!** The ACS 100 will start up automatically after an input voltage interruption, if the external run command is on.

**Note!** For additional information regarding safety issues, see the ACS 100 User's Guide.

ABB Industry Oy  
P.O. Box 184  
00381 Helsinki  
FINLAND  
Telephone +358-10-222 000  
Telefax +358-10-222 2681

3AFY 61342435 R0125 REV B  
EN

Effective: 1.6.1997

© 1997 ABB Industry Oy

Subject to change without prior notice.

## ACS 100 Parameter Table

Code	Name	Min.	Max.	Resolution	Default	User	S	N
<b>Group 01</b>								
<b>ACTUAL VALUES AND STATUS</b>								
101	$f_{ref}$	0 Hz	250 Hz	0.1 Hz	-			
102	Last Fault	-	-	-	-			
103	Version	0.0.0.0	9.9.9.F	-	-			
<b>Group 02</b>								
<b>MOTOR VALUES AND LIMITS</b>								
201	$U_{nom}$	200 V	240 V	200, 208, 220, 230, 240 V	230 V			✓
202	$f_{nom}$	50 Hz	250 Hz	1 Hz	50 Hz		✓	✓
203	$I_{nom}$	$0.5 \times I_2$	$1.5 \times I_2$	0.1 A	$I_2$			✓
204	Norm Speed	0 rpm	3600 rpm	1 rpm	1440 rpm			✓
205	$I_{max}$	$0.5 \times I_2$	$1.5 \times I_2$	0.1 A	$1.5 \times I_2$			
206	$f_{max}$	0 Hz	250 Hz	1 Hz	50 Hz		✓	✓
207	$f_{min}$	0 Hz	250 Hz	1 Hz	0 Hz			✓
208	Dir Lock	1	2	-	1			✓
209	Motor Noise	0	1	-	0			✓
<b>Group 03</b>								
<b>DRIVE CONTROL</b>								
301	Stop	1	2	-	1			✓
302	Ramp	0	3	-	0			✓
303	Acc	0 s	1800 s	0.1 s; 1.0 s	5.0 s		✓	✓
304	Dec	0 s	1800 s	0.1 s; 1.0 s	5.0 s		✓	✓
305	U/f Ratio	1	2	-	1			✓
306	IR Comp	0 V	30 V	1 V	10 V			
307	DC Inj Time	0 s	250 s	0.1 s; 1.0 s	0.0 s			
308	$UC_{max}$ Control	0	1	-	1			✓
<b>Group 04:</b>								
<b>INPUT/ OUTPUT</b>								
401	AI min	0 %	100 %	1 %	0 %			✓
402	AI max	0 %	100 %	1 %	100 %			✓
403	Ref min	0 Hz	250 Hz	1 Hz	0 Hz			✓
404	Ref max	0 Hz	250 Hz	1 Hz	50 Hz		✓	✓
405	DI Config	1	3	-	1		✓	✓
406	Const speed	0 Hz	250 Hz	0.1 Hz; 1 Hz	5 Hz			
<b>Group 05:</b>								
<b>SUPERVISION</b>								
501	AI Fault	0	1	-	0			
502	$f_{lim}$	0 Hz	250 Hz	1 Hz	35 Hz		✓	
503	Param Lock	0	2	-	1			

S = Value can be modified only when Configuration switch, S1 = 0.

N = Not changeable when start is active.

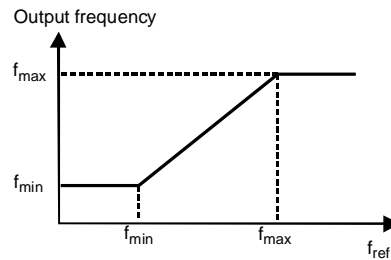
## Group 01: Actual Values and Status

Code	Description
101	$f_{ref}$ Reference frequency. <b>Note!</b> This parameter can only be viewed. To modify the reference frequency, go to <b>OUTPUT</b> display and press ENTER.
102	<b>Last Fault</b> Fault memory. 0 = no fault in memory. Clear the fault memory by pressing the UP/DOWN buttons simultaneously in parameter <b>SET</b> mode.
103	<b>Version</b> Software version number.

## Group 02: Motor Values and Limits

Code	Description
201	<b>U<sub>nom</sub></b> Nominal motor voltage from motor rating plate. U <sub>nom</sub> sets the maximum output voltage supplied to motor by ACS 100. f <sub>nom</sub> sets the frequency at which output voltage is equal to the U <sub>nom</sub> . The ACS 100 cannot supply the motor with a voltage greater than the mains voltage. See figure 3.
202	<b>f<sub>nom</sub></b> Nominal motor frequency from motor rating plate (field weakening point). See Figure 3.
203	<b>I<sub>nom</sub></b> Nominal motor current from the motor rating plate. Note! This parameter is used only when motor thermal protection function is used. Refer to parameter 502 (f <sub>lim</sub> ). See Figure 5.
204	<b>Nom Speed</b> Nominal motor speed from motor rating plate.
205	<b>I<sub>max</sub></b> Maximum output current the ACS 100 will supply to motor
206	<b>f<sub>max</sub></b> Maximum frequency the ACS 100 will supply to motor.
207	<b>f<sub>min</sub></b> Minimum frequency the ACS 100 will supply to motor.  <b>Note!</b> Keep f <sub>min</sub> < f <sub>max</sub> .
208	<b>Dir Lock</b> Direction lock Reverse can be disabled. 1 = FWD / REV 2 = FWD only
209	<b>Motor Noise</b> Motor noise control 0= standard noise control (switching frequency 4 kHz) 1= low noise (switching frequency 8 kHz) <b>Note!</b> When low noise setting is used, the maximum loadability of the ACS 100 is I <sub>2</sub> at 30 °C ambient temperature or 0.9 x I <sub>2</sub> at 40 °C ambient. (See User's Guide.)

Figure 1 Usage of f<sub>min</sub> and f<sub>max</sub> to limit output frequency.



## Group 03: Drive Control

Code	Description
301	<b>Stop</b> Stop mode 1 = Coast 2 = Ramp See also parameter 307 (DC Inj. Time).
302	<b>Ramp</b> Ramp shape 0 = Linear 1 = Fast S curve 2 = Medium S curve 3 = Slow S curve
303	<b>Acc</b> Acceleration time from zero to maximum frequency (0 - f <sub>max</sub> ).
304	<b>Dec</b> Deceleration time from maximum frequency to zero (f <sub>max</sub> - 0).
305	<b>U/f Ratio</b> U/f below weakening point. 1 = Linear (curves A and C) 2 = Square (curves B and D) Linear is preferred for constant torque applications and Square for centrifugal pump and fan applications.
306	<b>IR Comp</b> Amount of IR compensation, i.e. extra voltage applied to motor on frequency range 0 - f <sub>nom</sub> . <b>Note!</b> IR compensation should be kept as low as possible.
307	<b>DC Inj Time</b> DC injection time after modulation has stopped. If stop mode is Coast, ACS 100 uses DC Braking. If stop mode is Ramp, ACS 100 uses DC Hold after ramp.
308	<b>UC<sub>max</sub></b> 0 = No overvoltage control 1 = Overvoltage control enabled

Figure 2

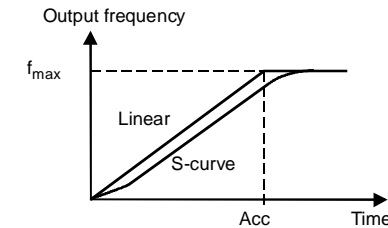


Figure 3

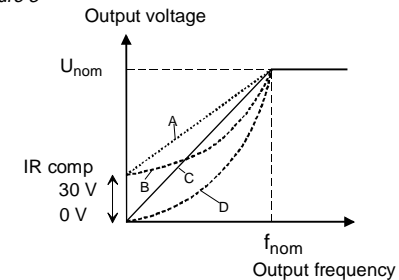


Table 1 Typical IR compensation voltages.

P <sub>N</sub> / kW	0.37	0.55	0.75	1.1	1.5	2.2
IR comp/ V	25	21	18	16	14	13

## Group 04: Input/Output

Code	Description																																																
401	<b>AI min</b> Analogue input scaling. 0 % equals 0 mA (or 0 V) and 100 % equals 20 mA (or 10 V) at input.	<i>Figure 4a</i> 																																															
402	<b>AI max</b> Analogue input scaling. 0 % equals 0 mA (or 0 V) and 100 % equals 20 mA (or 10 V) at input. <b>Note!</b> Keep AI min < AI max																																																
403	<b>Ref min</b> Reference value for analogue input scaling.	<i>Figure 4b</i> 																																															
404	<b>Ref max</b> Reference value for analogue input scaling.																																																
405	<b>DI Config</b> Digital input configuration. 1 = ABB Standard 2 = 3-wire 3 = Alternate <b>Note!</b> After modifications, turn the power off and then on again to validate changes.	<i>Table 2 DI configurations.</i> <table border="1"> <thead> <tr> <th rowspan="2">ABB Standard</th> <th colspan="2">Function</th> </tr> <tr> <th>activated</th> <th>deactivated</th> </tr> </thead> <tbody> <tr> <td>DI 1</td> <td>start</td> <td>stop</td> </tr> <tr> <td>DI 2</td> <td>reverse</td> <td>forward</td> </tr> <tr> <td>DI 3</td> <td>parameter 406 (Const speed) is <math>f_{ref}</math></td> <td>analogue input is <math>f_{ref}</math></td> </tr> <tr> <th colspan="3">3-Wire</th> </tr> <tr> <th colspan="3">Function</th> </tr> <tr> <td>DI 1</td> <td colspan="2">Momentary activation with DI2 activated: <b>start</b></td> </tr> <tr> <td>DI 2</td> <td colspan="2">Momentary deactivation: <b>stop</b></td> </tr> <tr> <td>DI 3</td> <td colspan="2">When activated: <b>reverse</b> direction When deactivated: <b>forward</b> direction</td> </tr> <tr> <th colspan="3">Alternate</th> </tr> <tr> <th colspan="3">Function</th> </tr> <tr> <th></th> <th>activated</th> <th>deactivated</th> </tr> <tr> <td>DI 1</td> <td>forward</td> <td>stop, if DI2 is also deactivated</td> </tr> <tr> <td>DI 2</td> <td>reverse</td> <td>stop, if DI1 is also deactivated</td> </tr> <tr> <td>DI 3</td> <td>parameter 406 (Const speed) is <math>f_{ref}</math></td> <td>analogue input is <math>f_{ref}</math></td> </tr> </tbody> </table> <p><b>Note!</b> When Alternate is selected, the drive stops, if DI1 and DI2 are activated at the same time.</p>	ABB Standard	Function		activated	deactivated	DI 1	start	stop	DI 2	reverse	forward	DI 3	parameter 406 (Const speed) is $f_{ref}$	analogue input is $f_{ref}$	3-Wire			Function			DI 1	Momentary activation with DI2 activated: <b>start</b>		DI 2	Momentary deactivation: <b>stop</b>		DI 3	When activated: <b>reverse</b> direction When deactivated: <b>forward</b> direction		Alternate			Function				activated	deactivated	DI 1	forward	stop, if DI2 is also deactivated	DI 2	reverse	stop, if DI1 is also deactivated	DI 3	parameter 406 (Const speed) is $f_{ref}$	analogue input is $f_{ref}$
ABB Standard	Function																																																
	activated	deactivated																																															
DI 1	start	stop																																															
DI 2	reverse	forward																																															
DI 3	parameter 406 (Const speed) is $f_{ref}$	analogue input is $f_{ref}$																																															
3-Wire																																																	
Function																																																	
DI 1	Momentary activation with DI2 activated: <b>start</b>																																																
DI 2	Momentary deactivation: <b>stop</b>																																																
DI 3	When activated: <b>reverse</b> direction When deactivated: <b>forward</b> direction																																																
Alternate																																																	
Function																																																	
	activated	deactivated																																															
DI 1	forward	stop, if DI2 is also deactivated																																															
DI 2	reverse	stop, if DI1 is also deactivated																																															
DI 3	parameter 406 (Const speed) is $f_{ref}$	analogue input is $f_{ref}$																																															
406	<b>Const speed</b> Constant speed. Can be actuated from digital input. See Table 2.																																																

## Group 05: Supervision

Code	Description	
501	<b>AI Fault</b> Analogue input supervision. 0 = not in use 1 = If analogue input is below the level given by parameter 401 (AI min), the drive stops.	
502	<b><math>f_{lim}</math></b> Frequency limit for thermal protection. Together with parameter 203 ( $I_{nom}$ ) determines the continuous safe operation area for the motor.  0 Hz = Thermal protection disabled.	<i>Figure 5</i> 
503	<b>Param Lock</b> Parameter lock. 0 = STAR/STOP and REVERSE buttons and parameter modification disabled. Parameter value viewing is allowed. 1 = Not locked. 2 = Modified values not stored in permanent memory.	