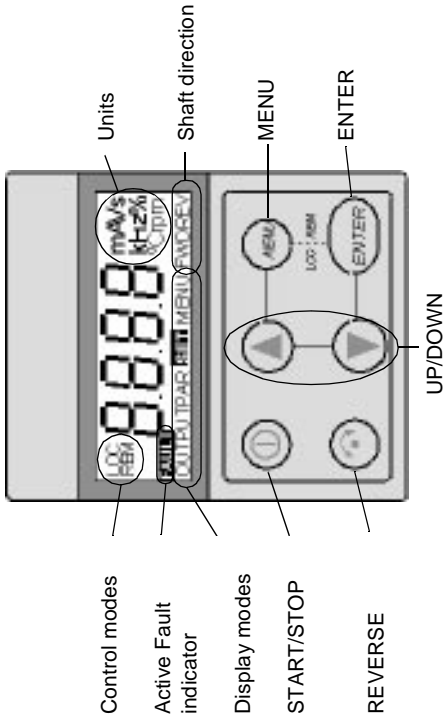


Control Panel

This guide provides information on how to use the ACS 100-PAN control panel with an ACS 100 drive. See also the ACS 100 User 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

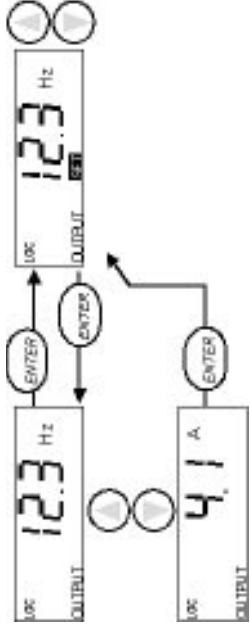
FWD / REV Visible	<ul style="list-style-type: none"> • Shaft direction is forward / reverse • Drive is running and at set point
FWD / REV Blinking rapidly	Drive is accelerating / decelerating.
FWD / REV Blinking slowly	Drive is stopped.

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.

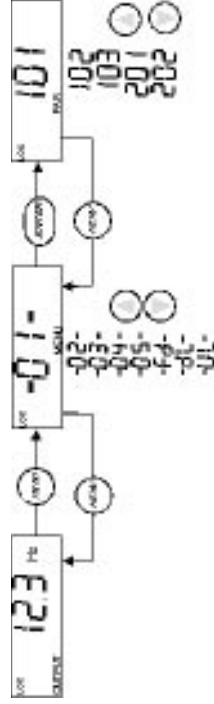


Menu Structure

OUTPUT display

Parameter groups

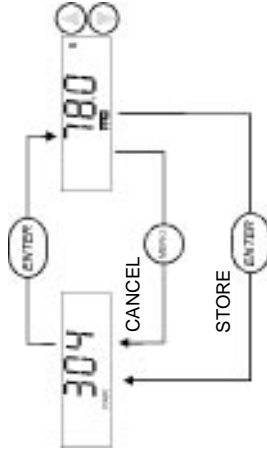
Parameters



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.

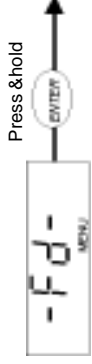
Note! To view the parameter default value press UP/DOWN buttons simultaneously.

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.

Diagnosics

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 (REM), while parameter 208 (Dir Lock) is active.
AL15 - AL16	Reserved. Contact supplier.
FL 1	Overcurrent: <ul style="list-style-type: none"> Possible mechanical problem. Acc and/or Dec times may be too small.
FL 2	DC overvoltage: <ul style="list-style-type: none"> Input voltage too high. Dec time may be too small.
FL 3	ACS 100 overtemperature: <ul style="list-style-type: none"> Ambient temperature too high. Severe overload.
FL 4 *	Fault current: output earth fault or short circuit
FL 5	Output overload.
FL 6	DC undervoltage.
FL 7	Analog input fault. (See parameter 501.)
FL 8	Motor overtemperature. (See parameter 502.)
FL 9	Panel disconnected from drive in local control. Note! If FL 9 is active when the power is turned off, the ACS 100 will start in remote control (REM) 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. 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.

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ACS 100 Parameter Table

Code	Name	Min.	Max.	Resolution	Default	User	S	N
Group 01								
ACTUAL VALUES AND STATUS								
101	f _{ref}	0 Hz	250 Hz	0.1 Hz	-			
102	Last Fault	-	-	-	-			
103	Version	0.0.0.0	9.9.9.F	-	-			
Group 02								
MOTOR VALUES AND LIMITS								
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 x I ₂	1.5 x I ₂	0.1 A	I ₂		✓	
204	Norm Speed	0 rpm	3600 rpm	1 rpm	1440 rpm		✓	
205	I _{max}	0.5 x I ₂	1.5 x I ₂	0.1 A	1.5 x 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		✓	
Group 03								
DRIVE CONTROL								
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			✓
Group 04:								
INPUT/OUTPUT								
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				
Group 05:								
SUPERVISION								
501	AI Fault	0	1	-	0			
502	f _{lim}	0 Hz	250 Hz	1 Hz	35 Hz			✓
503	Param Lock	0	2	-	1			

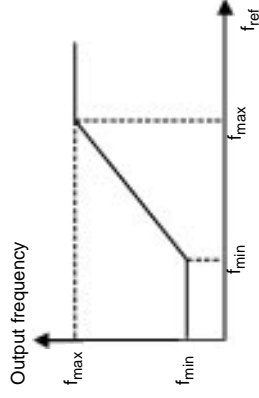
S = Value can be modified only when Configuration switch, S1 = 0.
N = Not changeable when start is active.

Group 01: Actual Values and Status

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

Group 02: Motor Values and Limits

Code	Description
201	<p>U_{nom}: Nominal motor voltage from motor rating plate. U_{nom} sets the maximum output voltage supplied to motor by ACS 100. f_{nom} sets the frequency at which output voltage is equal to the U_{nom}. The ACS 100 cannot supply the motor with a voltage greater than the mains voltage. See figure 3.</p>
202	<p>f_{nom}: Nominal motor frequency from motor rating plate (field weakening point). See Figure 3.</p>
203	<p>I_{nom}: 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_{lim}). See Figure 5.</p>
204	<p>Nom Speed Nominal motor speed from motor rating plate.</p>
205	<p>I_{max} Maximum output current the ACS 100 will supply to motor</p>
206	<p>f_{max} Maximum frequency the ACS 100 will supply to motor.</p>
207	<p>f_{min} Minimum frequency the ACS 100 will supply to motor. Note! Keep f_{min} < f_{max}.</p>
208	<p>Dir Lock Direction lock Reverse can be disabled. 1 = FWD / REV 2 = FWD only</p>
209	<p>Motor Noise Motor noise control 0= standard noise control (switching frequency 4 kHz) 1= low noise (switching frequency 8 kHz) Note! When low noise setting is used, the maximum loadability of the ACS 100 is I₂ at 30 °C ambient temperature or 0.9 x I₂ at 40 °C ambient. (See User's Guide.)</p>



Group 03: Drive Control

Code	Description
301	<p>Stop Stop mode 1 = Coast 2 = Ramp See also parameter 307 (DC Inj. Time).</p>
302	<p>Ramp Ramp shape 0 = Linear 1 = Fast S curve 2 = Medium S curve 3 = Slow S curve</p>
303	<p>Acc Acceleration time from zero to maximum frequency (0 - f_{max}).</p>
304	<p>Dec Deceleration time from maximum frequency to zero (f_{max} - 0).</p>
305	<p>U/f Ratio 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.</p>
306	<p>IR Comp Amount of IR compensation, i.e. extra voltage applied to motor on frequency range 0 - f_{nom} · frequency range 0 - f_{nom} · IR comp/V Note! IR compensation should be kept as low as possible.</p>
307	<p>DC Inj Time 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.</p>
308	<p>UC_{max} 0 = No overvoltage control 1 = Overvoltage control enabled</p>

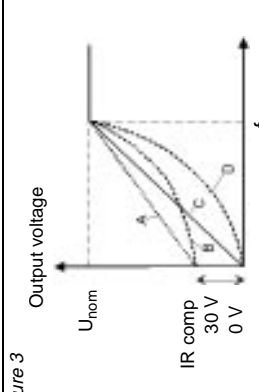
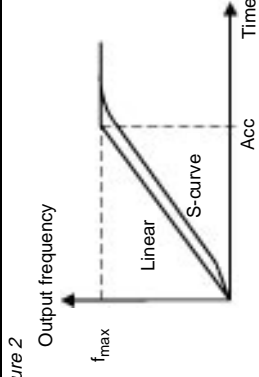


Table 1 Typical IR compensation voltages.

P _N / 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	<p>AI min Analog input scaling. 0 % equals 0 mA (or 0 V) and 100 % equals 20 mA (or 10 V) at input.</p>
402	<p>AI max Analog input scaling. 0 % equals 0 mA (or 0 V) and 100 % equals 20 mA (or 10 V) at input. Note! Keep AI min < AI max</p>
403	<p>Ref min Reference value for analog input scaling.</p>
404	<p>Ref max Reference value for analog input scaling.</p>
405	<p>DI Config Digital input configuration. 1 = ABB Standard 2 = 3-wire 3 = Alternate Note! After modifications, turn the power off and then on again to validate changes.</p>
406	<p>Const speed Constant speed. Can be actuated from digital input. See Table 2.</p>

Figure 4a

Figure 4b

Table 2 DI configurations.

ABB Standard	Function	
	activated	deactivated
DI 1	start	stop
DI 2	reverse	forward
DI 3	parameter 406 (Const speed) is f _{ref}	analog input is f _{ref}
3-Wire	Function	
DI 1	Momentary activation with DI2 activated: start	
DI 2	Momentary deactivation: stop	
DI 3	When activated: reverse direction When deactivated: forward 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}	analog input is f _{ref}

Note! When Alternate is selected, the drive stops, if DI1 and DI2 are activated at the same time.

Group 05: Supervision

Code	Description
501	<p>AI Fault Analog input supervision. 0 = not in use 1 = If analog input is below the level given by parameter 401 (AI min), the drive stops.</p>
502	<p>f_{lim} Frequency limit for thermal protection. Together with parameter 203 (f_{nom}) determines the continuous safe operation area for the motor. 0 Hz = Thermal protection disabled.</p> <p style="text-align: center;">Figure 5</p>
503	<p>Param Lock 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.</p>