

ABB industrial drives

Start-up guide ACQ810-04 drive modules



3AUA0000055159 Rev A / EN

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List of related manuals

Drive hardware manuals and guides

Code (English)

ACQ810-04 drive modules (1.1...45 kW, 1...60 hp) hardware manual	3AUA0000055160 ¹⁾
ACQ810-04 drive modules (55...160 kW, 75...200 hp) hardware manual	3AUA0000055161 ¹⁾
ACQ810-04 drive modules (200...500 kW, 250...600 hp) hardware manual	3AUA0000055155 ¹⁾

Drive firmware manuals and guides

ACQ810-04 drive modules start-up guide	3AUA0000055159 ²⁾
ACQ810 standard pump control program firmware manual	3AUA0000055144 ¹⁾

Option manuals and guides

ACS-CP-U control panel IP54 mounting platform kit (+J410) installation guide	3AUA0000049072 ²⁾
Manuals and quick guides for I/O extension modules, fieldbus adapters, etc.	²⁾

¹⁾ Delivered in PDF format on a manuals CD with the drive module.

²⁾ Delivered as a printed copy with the drive or optional equipment.

All manuals are available in PDF format on the Internet. See section [Document library on the Internet](#) on the inside of the back cover.

Start-up guide – ACQ810-04

About this guide

This guide contains the very basic information about the start-up of the ACQ810-04 drive modules using Factory macro. Complete documentation can be found in appropriate *Hardware manual* and *Firmware manual*, see list of manuals inside front cover.

Safety instructions



WARNING! All electrical installation and maintenance work on the drive should be carried out by qualified electricians only.

Never work on the drive, the motor cable or the motor when input power is applied to the drive. Always ensure by measuring that no voltage is actually present.

Introduction

■ Single pump macro (Factory default)

Application macros are pre-defined parameter settings that can be used as a basis for user applications. This guide deals with single pump macro. Information on other macros is available in the *Firmware manual*.

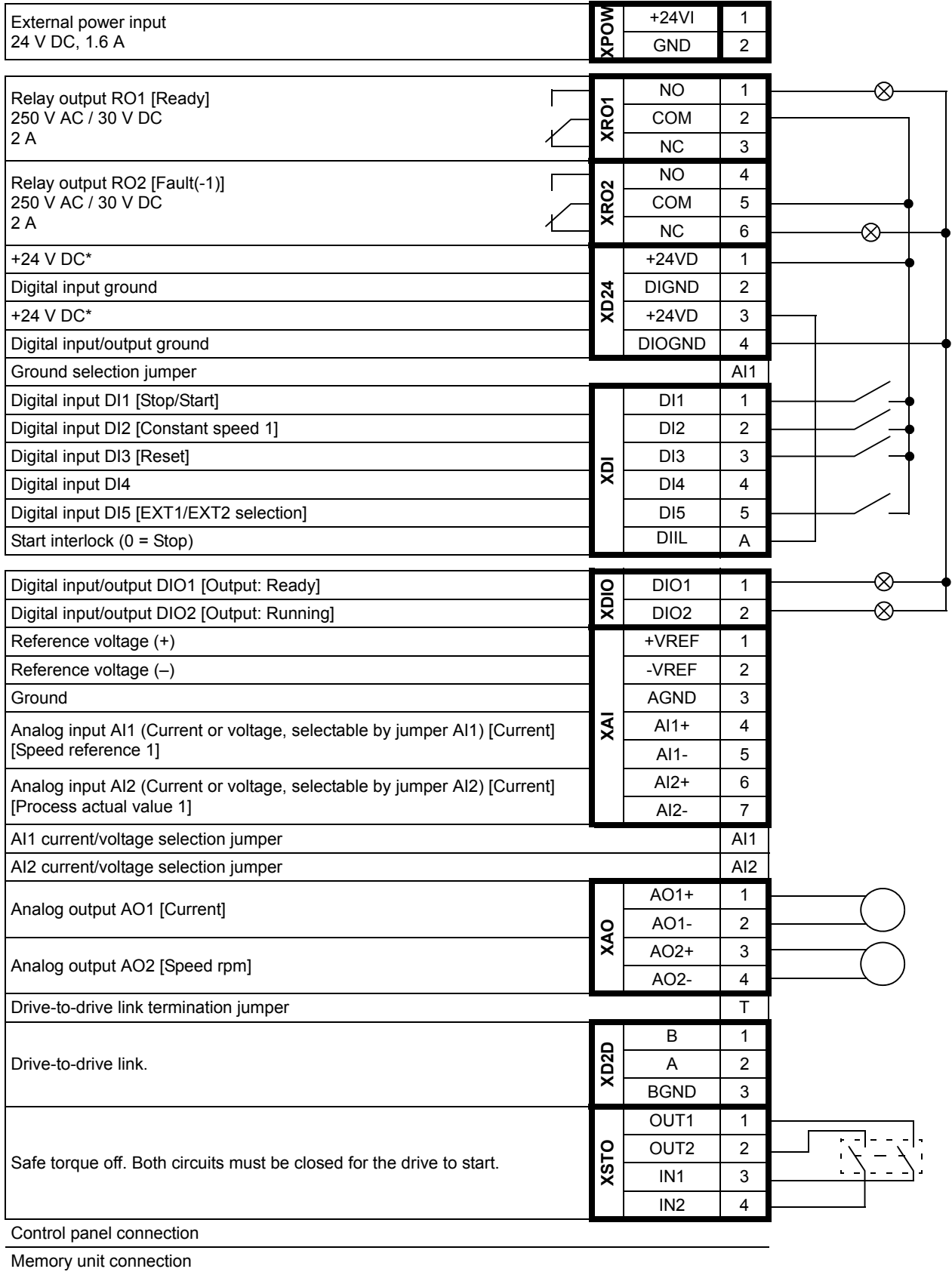
Single pump macro is used in applications where drive controls a single pump system. The system can contain e.g. one ACQ810-04 drive, one pump and one sensor. Sensor measures typically water flow or pressure, and it is located in the output of the pump.

By default, the process reference (setpoint) is set to 40%, but it can also be changed to e.g. analog input AI1. Process actual value or feedback signal should be connected to analog input AI2. Start command is given through the digital input DI1.

Sleep function is also activated to optimize the energy efficiency of the installation. By default, the drive is stopped if the motor speed is below 20% of the motor nominal for longer than 60 seconds.

Connecting the control cables

■ Default I/O connection diagram



Notes:

[Default setting with ACQ810 standard pump control program (Factory macro). See the *Firmware manual* for other macros.]

*Total maximum current: 200 mA

The wiring shown is for demonstrative purposes only. For further information of the usage of the connectors and jumpers, see appropriate *Hardware manual*.

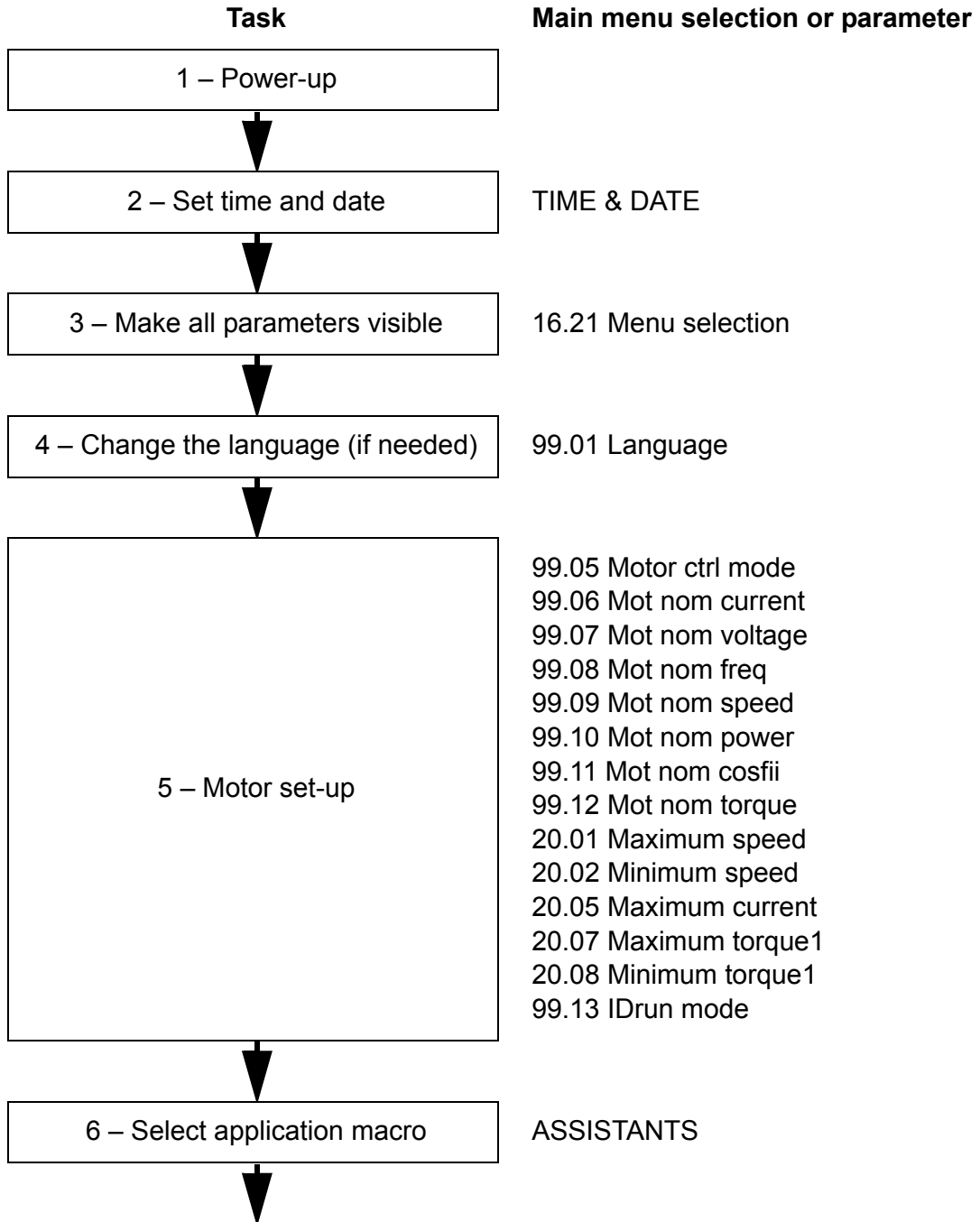
Wire sizes and tightening torques:

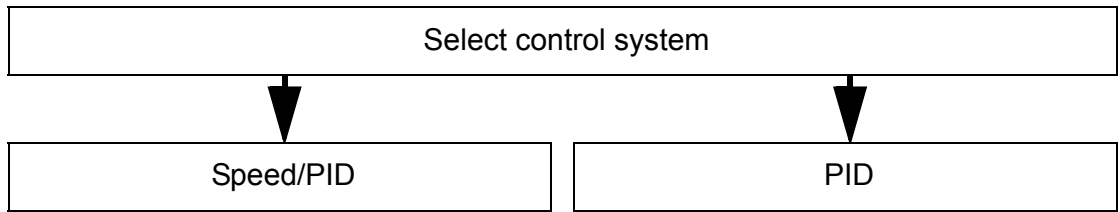
XPOW, XRO1, XRO2, XD24: 0.5 ... 2.5 mm² (24...12 AWG). Torque: 0.5 N·m (5 lbf·in)

XDI, XDIO, XAI, XAO, XD2D, XSTO: 0.5 ... 1.5 mm² (28...14 AWG). Torque: 0.3 N·m (3 lbf·in)

Start-up flowchart

This flowchart describes start-up procedure in short. For more information on each task, see section [Start-up](#) on page 8.


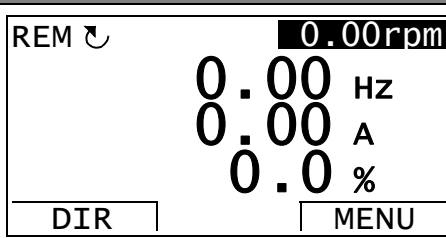



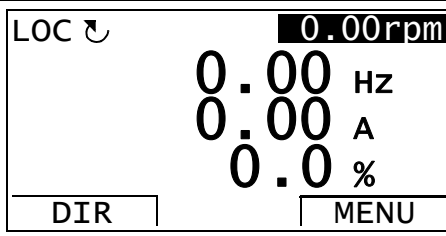





























Parameters in Single pump macro (Factory default):

- | | |
|------------------------|------------------------|
| 12.01 Ext1/Ext2 sel | |
| 10.02 Ext1 start in1 | |
| 21.01 Speed ref sel | |
| 13.01 AI1 filt time | |
| 13.02 AI1 max | |
| 13.03 AI1 min | |
| 13.04 AI1 max scale | |
| 13.05 AI1 min scale | |
| 19.01 Speed scaling | 19.01 Speed scaling |
| 22.02 Acc time | 22.02 Acc time |
| 22.03 Dec time | 22.03 Dec time |
| 26.02 Const speed sel1 | 26.02 Const speed sel1 |
| 26.06 Const speed1 | 26.06 Const speed1 |
| 10.05 Ext2 start in1 | 10.05 Ext2 start in1 |
| 28.02 Act val 1 src | 28.02 Act val 1 src |
| 28.06 Act unit sel | 28.06 Act unit sel |
| 28.05 Act max val | 28.05 Act max val |
| 13.08 AI2 min | 13.08 AI2 min |
| 13.07 AI2 max | 13.07 AI2 max |
| 13.10 AI2 min scale | 13.10 AI2 min scale |
| 13.09 AI2 max scale | 13.09 AI2 max scale |
| 29.02 Setpoint 1 src | 29.02 Setpoint 1 src |
| 29.04 Internal set 1 | 29.04 Internal set 1 |
| 27.12 PID gain | 27.12 PID gain |
| 27.13 PID integ time | 27.13 PID integ time |
| 77.01 Sleep mode sel | 77.01 Sleep mode sel |
| 77.02 Sleep int sel | 77.02 Sleep int sel |
| 77.03 Sleep level | 77.03 Sleep level |
| 77.04 Sleep delay | 77.04 Sleep delay |
| 77.08 Wake up mode sel | 77.08 Wake up mode sel |
| 77.10 Wake up level | 77.10 Wake up level |
| 77.11 Wake up delay | 77.11 Wake up delay |


Start-up

Safety		
	<p>The start-up may only be carried out by a qualified electrician.</p> <p>The safety instructions must be followed during the start-up procedure. See the safety instructions on the first pages of the appropriate <i>Hardware manual</i>.</p>	
<input type="checkbox"/>	<p>Check the installation. See the installation checklist in the appropriate <i>Hardware manual</i>.</p>	
<input type="checkbox"/>	<p>Check that the starting of the motor does not cause any danger.</p> <p>De-couple the driven machine if</p> <ul style="list-style-type: none"> • there is a risk of damage in case of an incorrect direction of rotation, or • a normal ID run is required during the drive start-up, when the load torque is higher than 20% or the machinery is not able to withstand the nominal torque transient during the ID run. 	
1 – Power-up, control panel basics		
<input type="checkbox"/>	<p>Power up the drive. After a few moments, the panel shows the Output mode (right).</p> <p>Note: The Output mode display will alternate with “Alarm 2021 NO MOTOR DATA” until an assistant is launched later in this procedure.</p>	
<input type="checkbox"/>	<p>Switch to local control to ensure that external control is disabled by pressing the  key on the control panel. Local control is indicated by the text “LOC” on the top row on the display.</p> <p>The two boxes on the bottom row of the display indicate the function of the two soft keys  and . The contents of the boxes depend on the visible menu choices.</p>	
<input type="checkbox"/>	<p>Press  (MENU) to access the Main menu.</p> <p>Within any menu, the desired selection is highlighted. Press the  and  keys to make a new choice; activate by pressing  (ENTER).</p> <p>The Main menu is the starting point for the procedures described below.</p>	



2 – Setting time and date	
<input type="checkbox"/> In the Main menu, highlight TIME & DATE option and press ENTER.	<div style="border: 1px solid black; padding: 5px;"> LOC ↻ MAIN MENU — 1 PARAMETERS ASSISTANTS CHANGED PAR EXIT 00:00 ENTER </div> <div style="border: 1px solid black; padding: 5px;"> LOC ↻ TIME & DATE — 1 CLOCK VISIBILITY TIME FORMAT DATE FORMAT SET TIME SET DATE EXIT 00:00 SEL </div>
<input type="checkbox"/> Specify the time format. Select TIME FORMAT on the menu, press  (SEL) and select a suitable format with keys  and  . Press  (SEL) to save or  (CANCEL) to cancel your changes.	<div style="border: 1px solid black; padding: 5px;"> LOC ↻ TIME FORMAT — 1 24-hour 12-hour CANCEL 00:00 SEL </div>
<input type="checkbox"/> Specify the date format. Select DATE FORMAT on the menu, press  (SEL) and select a suitable format. Press  (OK) to save or  (CANCEL) to cancel your changes.	<div style="border: 1px solid black; padding: 5px;"> LOC ↻ DATE FORMAT — 1 dd.mm.yy mm/dd/yy dd.mm.yyyy mm/dd/yyyy CANCEL 00:00 OK </div>
<input type="checkbox"/> Set the time. Select SET TIME on the menu and press  (SEL). Specify the hours with keys  and  , and press  (OK). Then specify the minutes. Press  (OK) to save or  (CANCEL) to cancel your changes.	<div style="border: 1px solid black; padding: 5px;"> LOC ↻ SET TIME — <div style="text-align: center; font-size: 2em; font-weight: bold;">15:41</div> CANCEL OK </div>
<input type="checkbox"/> Set the date. Select SET DATE on the menu and press  (SEL). Specify the first part of the date (day or month depending on the selected date format) with keys  and  , and press  (OK). Repeat for the second part. After specifying the year, press  (OK). To cancel your changes, press  (CANCEL).	<div style="border: 1px solid black; padding: 5px;"> LOC ↻ SET DATE — <div style="text-align: center; font-size: 2em; font-weight: bold;">19.07.2009</div> CANCEL 00:00 OK </div>

3 – Adjusting parameter values








Notes:

- At any point, press  (CANCEL or EXIT) to return to the previous level.
- By default, not all parameters are visible. Set parameter 16.21 *Menu selection* to *Long* to make all parameters visible.

To adjust a parameter within an assistant:

- Use the  and  keys to adjust the setting. Press SAVE to accept the setting shown and to proceed to the next parameter.

To adjust a parameter at any other time:

- In the Main menu, highlight PARAMETERS and press  (ENTER).
- Use  and  to browse the list of parameter groups. Highlight the desired group and press  (SEL) to display the parameters within that group.
- Highlight a parameter and press  (EDIT) to adjust the setting.
- Use  and  to adjust the setting. Press SAVE to accept the setting shown. Press EXIT twice to return to the Main menu.

Notes for more complicated edits:

- With parameters that define a digital source, the **Const** setting can be used to fix the value to constant 1 (C.TRUE) or 0 (C.FALSE).
- With parameters that define an analog or digital source, the **Pointer** setting can be used to freely choose any parameter value (analog) or a specific bit of a packed boolean parameter (digital) as the source:

- With an analog source, the parameter group and parameter index have to be specified. After selecting the group, press NEXT to move to the index setting.

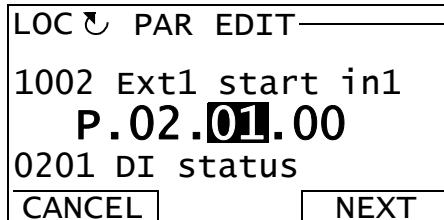
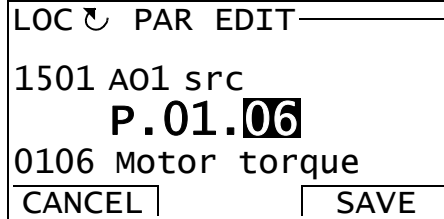
The text below the cursor reflects the present setting.


After setting the index, press SAVE to accept the value. Press CANCEL at any point to discard any changes and to return to the parameter list.

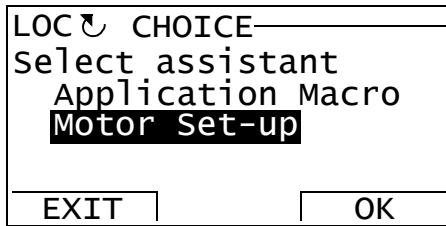
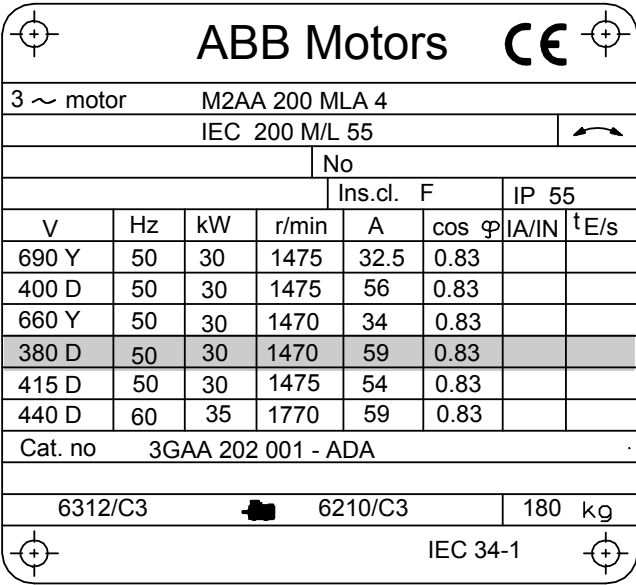
- With a digital source, the parameter group, parameter index, and bit number are specified. After setting an item, press NEXT to move to the next.


The text below the cursor reflects the current setting.

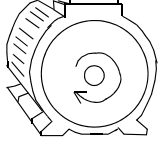
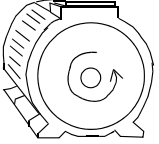
After the bit number is set, press SAVE to accept the value. Press CANCEL at any point to discard any changes and to return to the parameter list.



4 – Changing the language		
	By default, the language of the text shown is English. If desired, the language can be changed as follows.	
<input type="checkbox"/>	In the Main menu, make sure PARAMETERS is highlighted, and press ENTER.	<pre> LOC ↻ MAIN MENU——1 PARAMETERS ASSISTANTS CHANGED PAR EXIT ENTER </pre>
<input type="checkbox"/>	Navigate to parameter group 99 Start-up data and press SEL. Note that the list will wrap around in either direction between groups 99 and 01 – it is quicker to press  for group 99.	<pre> LOC ↻ PAR GROUPS——99 99 Start-up data 01 Actual values 02 I/O values 03 Control values 04 Appl values EXIT SEL </pre>
<input type="checkbox"/>	Make sure parameter “9901 Language” is highlighted and press EDIT.	<pre> LOC ↻ PARAMETERS—— 9901 Language English 9905 Motor ctrl mode 9906 Mot nom current 9907 Mot nom voltage EXIT EDIT </pre>
<input type="checkbox"/>	Select the desired language and press SAVE. Note: Other languages are not supported by the time of publishing this guide. Press EXIT twice to return to the Main menu.	<pre> LOC ↻ PAR EDIT—— 9901 Language English [0809 hex] CANCEL SAVE </pre>
5 – Motor set-up		
<input type="checkbox"/>	Ensure you have the motor nameplate and encoder data (if needed) at hand.	
<input type="checkbox"/>	In the Main menu, highlight ASSISTANTS and press ENTER.	<pre> LOC ↻ MAIN MENU——1 PARAMETERS ASSISTANTS CHANGED PAR EXIT ENTER </pre>
<input type="checkbox"/>	Highlight Firmware assistants and press SEL.	<pre> LOC ↻ ASSISTANTS——1 Firmware assistants Application assistant EXIT SEL </pre>

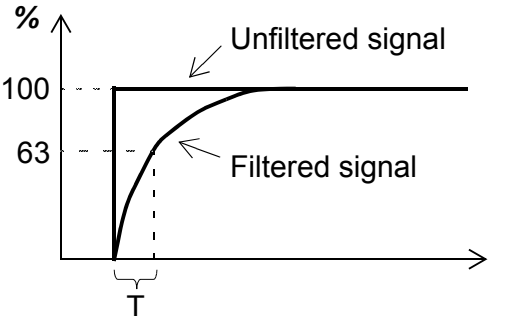
<input type="checkbox"/>	<p>Highlight Motor Set-up and press OK. The assistant will guide you through the motor set-up.</p>	
<input type="checkbox"/>	<p>Select the motor control mode. DTC is suitable for most cases. Scalar mode is recommended if</p> <ul style="list-style-type: none"> the nominal current of the motor is less than 1/6 of the nominal current of the drive, the drive is used for test purposes with no motor connected, or the drive controls multiple motors and the number of motors connected is variable. 	<p>99.05 Motor ctrl mode</p>
	<p>Enter the motor data from the motor nameplate. Asynchronous motor nameplate example:</p> 	<p>Note: Set the motor data to exactly the same value as on the motor nameplate. For example, if the motor nominal speed is 1470 rpm on the nameplate, setting the value of parameter 99.09 <i>Mot nom speed</i> to 1500 rpm results in incorrect operation of the drive. If D (delta) data is chosen, then connect the motor in delta. If Y (star) data is selected, then connect the motor in star.</p>
<input type="checkbox"/>	<ul style="list-style-type: none"> motor nominal current <p>Allowed range: approximately $1/6 \times I_{2n} \dots 2 \times I_{2n}$ of the drive ($0 \dots 2 \times I_{2nd}$ if parameter 99.05 <i>Motor ctrl mode</i> = <i>Scalar</i>).</p>	<p>99.06 <i>Mot nom current</i></p>
<input type="checkbox"/>	<ul style="list-style-type: none"> motor nominal voltage <p>Allowed range: $1/6 \times U_N \dots 2 \times U_N$ of the drive. (U_N refers to the highest voltage in each nominal voltage range). Note that the nominal voltage is not equal to the equivalent DC motor voltage (E.D.C.M.) value given by some motor manufacturers. The nominal voltage can be calculated by dividing the E.D.C.M. voltage by 1.7 (= square root of 3).</p>	<p>99.07 <i>Mot nom voltage</i></p>

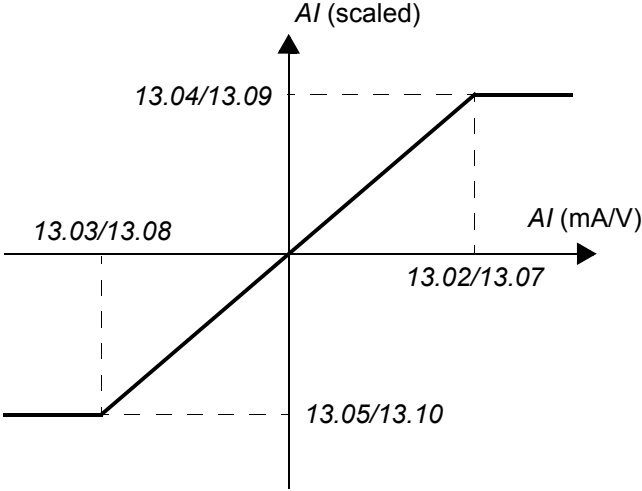
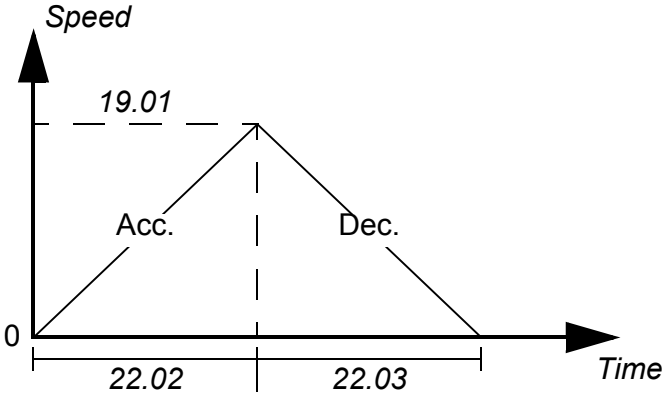
<input type="checkbox"/>	• motor nominal frequency	<i>99.08 Mot nom freq</i>
<input type="checkbox"/>	• motor nominal speed	<i>99.09 Mot nom speed</i>
<input type="checkbox"/>	• motor nominal power	<i>99.10 Mot nom power</i>
	The following motor data parameters can be set to improve control accuracy. If not known, set the values to 0.	
<input type="checkbox"/>	• motor nominal $\cos\varphi$	<i>99.11 Mot nom cosφ</i>
<input type="checkbox"/>	• motor nominal shaft torque	<i>99.12 Mot nom torque</i>
	The following parameters define operation limits to protect the driven equipment.	
<input type="checkbox"/>	• maximum speed This value should be higher than 55% of the motor nominal speed defined earlier.	<i>20.01 Maximum speed</i>
<input type="checkbox"/>	• minimum speed This value should be less than or equal to 0 rpm.	<i>20.02 Minimum speed</i>
<input type="checkbox"/>	• maximum current This value should be higher than the motor nominal current defined earlier.	<i>20.05 Maximum current</i>
<input type="checkbox"/>	• maximum torque This value should be at least 100% of motor nominal torque defined earlier.	<i>20.07 Maximum torque1</i>
<input type="checkbox"/>	• minimum torque	<i>20.08 Minimum torque1</i>
<input type="checkbox"/>	The question “Do you want to perform id-run now?” is displayed. The ID run (identification run) will identify the characteristics of the motor for optimum control. If you do not wish to perform the ID run at this point, select No to complete the Motor Set-up firmware assistant. If you wish to perform the ID run, continue with the following steps BEFORE selecting Yes .	
		WARNING! With Normal or Reduced ID run the motor will run at up to approximately 50... 100% of the nominal speed during the ID run. ENSURE THAT IT IS SAFE TO RUN THE MOTOR BEFORE PERFORMING THE ID RUN!

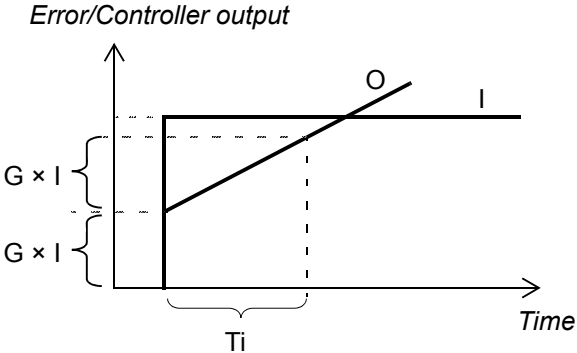
<input type="checkbox"/>	<p>Check the direction of rotation of the motor. During the run (Normal or Reduced), the motor will rotate in the forward direction.</p>	<p>When drive output phases U2, V2 and W2 are connected to the corresponding motor terminals:</p> <div style="text-align: center;">  <p>forward direction</p>  <p>reverse direction</p> </div>
<input type="checkbox"/>	<p>Ensure that the Start interlock (DIIL) is activated with +24 V and that the Safe torque off and emergency stop circuits (if present) are closed.</p>	
<input type="checkbox"/>	<p>Select Yes and press OK.</p>	
<input type="checkbox"/>	<p>Select the ID run method. The ID run will be performed at the next start of the drive.</p> <p>NORMAL ID run should be selected whenever possible.</p> <p>Note: The driven machinery must be de-coupled from the motor with Normal ID run:</p> <ul style="list-style-type: none"> • if the load torque is higher than 20%, or • if the machinery is not able to withstand the nominal torque transient during the ID run. <p>The REDUCED ID run should be selected instead of the Normal ID run if the mechanical losses are higher than 20%, i.e. the motor cannot be de-coupled from the driven equipment, or full flux is required to keep the motor brake open (conical motor).</p> <p>The STANDSTILL ID run should be selected only if the Normal or Reduced ID run is not possible due to the restrictions caused by the connected mechanics.</p>	<p><i>99.13 IDrun mode</i></p>

	<p>Notes:</p> <ul style="list-style-type: none"> • The motor shaft must NOT be locked and the load torque must be < 20% during Normal or Reduced ID run. • Mechanical brake is not opened by the logic for the ID run. • The ID run cannot be performed if parameter <i>99.05 Motor ctrl mode = Scalar</i>. 	
<input type="checkbox"/>	<p>Start the motor (by pressing the START button) to activate the ID run.</p> <p>ID run is indicated by alarm ID-RUN on the panel display. The alarm will disappear when the ID run stops.</p>	<p>Alarm: ID-RUN</p>
	<p>After the text “Done ok!” appears on the control panel, press OK to complete the motor set-up.</p>	

Firmware assistants		
<p>The start-up procedures described below make use of firmware assistants. These routines guide the user through the essential parameter settings.</p>		
6 – Application macro selection		
<input type="checkbox"/>	<p>In the Main menu, highlight ASSISTANTS and press ENTER.</p>	<pre> LOC ↻ MAIN MENU ——— 2 PARAMETERS ASSISTANTS CHANGED PAR EXIT ENTER </pre>
<input type="checkbox"/>	<p>Highlight Firmware assistants and press SEL.</p>	<pre> LOC ↻ ASSISTANTS ——— 1 Firmware assistants Application assistant EXIT SEL </pre>
<input type="checkbox"/>	<p>Highlight Application Macro and press OK. Application macros are pre-defined parameter settings that can be used as a basis for user applications.</p>	<pre> LOC ↻ CHOICE ——— Select assistant Application Macro Motor Set-up EXIT OK </pre>
<input type="checkbox"/>	<p>Highlight one of the macros and press OK. Single pump macro (Factory default) is introduced in this guide. More information on the macros is available in the <i>Firmware manual</i>.</p>	<pre> LOC ↻ CHOICE ——— How many pumps? Single Pump Multi Pump EXIT OK </pre>
<input type="checkbox"/>	<p>Highlight application and press OK.</p>	<pre> LOC ↻ CHOICE ——— Select application Factory default External control EXIT OK </pre>
<input type="checkbox"/>	<p>Highlight Yes and press OK. Parameter defaults for the macro are applied.</p>	<pre> LOC ↻ CHOICE ——— Factory defaults will be selected? NO Yes EXIT OK </pre>

<input type="checkbox"/>	<p>If you want to continue by using assistant, select Yes. If not, select No.</p>	<pre> LOC CHOICE Do You need assistant? No Yes EXIT OK </pre>
<input type="checkbox"/>	<p>Highlight the control system and press OK. Speed/PID control system switches between Speed and PID modes. Speed mode uses speed reference, PID mode uses PID logic. Speed/PID control system is intended for speed control applications, PID control system for process control applications.</p> <p>Assistant starts to go through the parameter settings related to this selection.</p>	<pre> LOC CHOICE Select control system Speed/PID PID EXIT OK </pre>
<p>Speed/PID</p>		
<input type="checkbox"/>	<p>Define the signal source to switch between external control locations EXT1 and EXT2.</p>	<p>12.01 Ext1/Ext2 sel</p>
<input type="checkbox"/>	<p>Program parameter 10.02 to choose the source of the start signal in Speed mode.</p>	<p>10.02 Ext1 start in1</p>
<input type="checkbox"/>	<p>Select the source of the speed reference signal in Speed mode.</p>	<p>21.01 Speed ref sel</p>
<input type="checkbox"/>	<p>Define the filter time constant for the analog input.</p>  <p>$O = I \times (1 - e^{-t/T})$</p> <p>I = filter input (step) O = filter output t = time T = filter time constant</p>	<p>13.01 AI1 filt time</p>

<input type="checkbox"/>	<p>Define the maximum and minimum values for the analog input AI1.</p> <p>Define the scaled values that correspond to the maximum and minimum values defined at the previous step. This is useful if full speed is required at lower analog input values.</p> 	<p>13.02 AI1 max 13.03 AI1 min 13.04 AI1 max scale 13.05 AI1 min scale</p>
<input type="checkbox"/>	<p>Define the speed scaling used for the acceleration/ deceleration time. Define the acceleration/ deceleration time.</p> <p>The diagram below shows the effect of parameter 19.01 Speed scaling on the acceleration/ deceleration time.</p> 	<p>19.01 Speed scaling 22.02 Acc time 22.03 Dec time</p>
<input type="checkbox"/>	<p>Set the constant speed selector source.</p>	<p>26.02 Const speed sel1</p>
<input type="checkbox"/>	<p>Enter the constant speed.</p>	<p>26.06 Const speed1</p>
<input type="checkbox"/>	<p>Select the signal source for external control location 2 (EXT2).</p>	<p>10.05 Ext2 start in1</p>

<input type="checkbox"/>	<p>Set the parameters for the process actual value:</p> <ul style="list-style-type: none"> • source of process actual value 1 • unit for both process actual value and process setpoint. Typically the measured quantity is selected. • actual value scaling. The setting equals 100% of process setpoint and is typically set to the value that corresponds to the top end of the sensor range. 	<p>28.02 Act val 1 src 28.06 Act unit sel 28.05 Act max val</p>
<input type="checkbox"/>	<p>Define the maximum and minimum values and the scaled values for the analog input AI2. For reference, see AI1 settings and the diagram on page 18.</p>	<p>13.08 AI2 min 13.07 AI2 max 13.10 AI2 min scale 13.09 AI2 max scale</p>
<input type="checkbox"/>	<p>Set process reference (setpoint) parameters:</p> <ul style="list-style-type: none"> • source of process setpoint 1 • process setpoint 1 when parameter 29.02 is set to Int set 1. 	<p>29.02 Setpoint 1 src 29.04 Internal set 1</p>
<input type="checkbox"/>	<p>Set process PID control parameters. PID controller is used to control process variables such as pressure, flow or fluid level. In process PID control, a process reference (setpoint) is connected to the drive instead of a speed reference. An actual value (process feedback) is also brought back to the drive. The process PID control adjusts the drive speed in order to keep the measured process quantity (actual value) at the desired level (setpoint).</p>  <p>I = controller input (error) O = controller output G = gain T_i = integration time</p>	<p>27.12 PID gain 27.13 PID integ time</p>

<input type="checkbox"/>	<p>Set sleep function parameters to save energy during the sleep time.</p> <p>The sleep function detects slow motor rotation and stops the unnecessary pumping after the sleep delay has passed.</p>	<p>77.01 Sleep mode sel 77.02 Sleep int sel 77.03 Sleep level 77.04 Sleep delay 77.08 Wake up mode sel 77.10 Wake up level 77.11 Wake up delay</p>
<p>The graph illustrates the motor speed profile during a sleep cycle. The vertical axis is labeled 'Motor Speed' and the horizontal axis is 'Time'. The speed curve starts at a high level, decelerates, and then enters a 'SLEEP MODE' where it remains at a constant 'Sleep level (77.03)'. A 'STOP' event occurs, and after a 'Wake-up delay (77.11)', the motor starts again. Time intervals are marked: $t < t_d$ (before sleep), t_d (sleep delay), and t_{wd} (wake-up delay).</p>		
<p>After the text “Done ok!” appears on the control panel, press OK to complete the firmware assistant.</p>		

PID		
<input type="checkbox"/>	Define the speed scaling used for the acceleration/ deceleration time. Define the acceleration/ deceleration time. See the diagram on page 18.	19.01 Speed scaling 22.02 Acc time 22.03 Dec time
<input type="checkbox"/>	Set the constant speed selector source.	26.02 Const speed sel1
<input type="checkbox"/>	Enter the constant speed.	26.06 Const speed1
<input type="checkbox"/>	Select the signal source for external control location 2 (EXT2).	10.05 Ext2 start in1
<input type="checkbox"/>	Set the parameters for the process actual value: <ul style="list-style-type: none"> • source of process actual value 1 • unit for both process actual value and process setpoint. Typically the measured quantity is selected. • actual value scaling. The setting equals 100% of process setpoint and is typically set to the value that corresponds to the top end of the sensor range. 	28.02 Act val 1 src 28.06 Act unit sel 28.05 Act max val
<input type="checkbox"/>	Define the maximum and minimum values and the scaled values for the analog input AI2. For reference, see AI1 settings and the diagram on page 18.	13.08 AI2 min 13.07 AI2 max 13.10 AI2 min scale 13.09 AI2 max scale
<input type="checkbox"/>	Set process reference (setpoint) parameters: <ul style="list-style-type: none"> • source of process setpoint 1 • process setpoint 1 when parameter 29.02 is set to Int set 1. 	29.02 Setpoint 1 src 29.04 Internal set 1
<input type="checkbox"/>	Set process PID control parameters. See the diagram on page 19.	27.12 PID gain 27.13 PID integ time
<input type="checkbox"/>	Set sleep function parameters to save energy during the sleep time. See the diagram on page 20.	77.01 Sleep mode sel 77.02 Sleep int sel 77.03 Sleep level 77.04 Sleep delay 77.08 Wake up mode sel 77.10 Wake up level 77.11 Wake up delay
After the text “Done ok!” appears on the control panel, press OK to complete the firmware assistant.		

UL checklist

- The ACQ810-04 drive module (IP20 frame sizes A to E; IP00 frame size G; UL Open Type) is to be used in a heated, indoor controlled environment. The drive must be installed in clean air according to enclosure classification. Cooling air must be clean, free from corrosive materials and electrically conductive dust. See appropriate *Hardware manual* for detailed specifications.
 - The maximum ambient air temperature is 40 °C (104 °F) at rated current. The current is derated for 40 to 55 °C (104 to 131 °F) with frame sizes A to E, and for 40 to 50 °C (104 to 122 °F) with frame size G.
 - Frame size G only: The drive is suitable for use in a circuit capable of delivering not more than 100,000 rms symmetrical amperes, 500 V maximum.
 - The cables located within the motor circuit must be rated for at least 75 °C (167 °F) in UL-compliant installations.
 - The input cable must be protected with fuses or circuit breakers. Circuit breakers must not be used without fuses in the USA. Suitable IEC (class gG for all frame sizes; class aR for frame sizes E and G) and UL (class T for all frame sizes; class L for frame size G) fuses are listed in the *Technical data* section of the *Hardware manual*. For suitable circuit breakers, contact your local ABB representative.
 - For installation in the United States, branch circuit protection must be provided in accordance with the National Electrical Code (NEC) and any applicable local codes. To fulfill this requirement, use the UL classified fuses.
 - For installation in Canada, branch circuit protection must be provided in accordance with the Canadian Electrical Code and any applicable provincial codes. To fulfill this requirement, use the UL classified fuses.
 - The drive provides overload protection in accordance with the National Electrical Code (NEC).
-

Further information

Product and service inquiries

Address any inquiries about the product to your local ABB representative, quoting the type designation and serial number of the unit in question. A listing of ABB sales, support and service contacts can be found by navigating to www.abb.com/drives and selecting *Sales, Support and Service network*.

Product training

For information on ABB product training, navigate to www.abb.com/drives and select *Training courses*.

Providing feedback on ABB Drives manuals

Your comments on our manuals are welcome. Go to www.abb.com/drives and select *Document Library – Manuals feedback form (LV AC drives)*.

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You can find manuals and other product documents in PDF format on the Internet. Go to www.abb.com/drives and select *Document Library*. You can browse the library or enter selection criteria, for example a document code, in the search field.



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