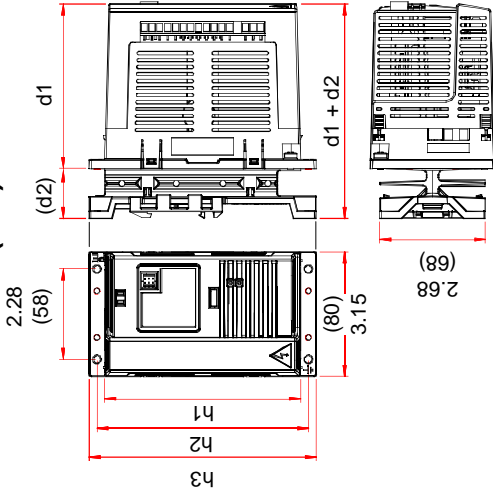


Installation

Study this guide carefully before proceeding. Failure to observe the warnings and instructions given may cause a malfunction or personal hazard.

- 1 CHECK the environment. See **Q**
- 2 INSTALL the ACS 100. See **A, B**
- 3 USE a warning sticker with the language of your choice. See **E**
- 4 IDENTIFY power and control terminals. See **D, E, G**
- 5 CHECK voltage supply. See **F**
- 6 CHECK the motor. See **H**
- 7 SET configuration switch S1. See **I**
- 8 CONNECT power terminals. See **D, E**
- 9 CONNECT control wires. See **E, G, J**
- 10 REPLACE the cover. See **K**
- 11 TURN the power on. See **L**

A Dimensions - Inches / (mm)



| Frame Size IP 20 | Inches / (mm) | | | | | | Weight (lb) | | |
|---------------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|------|--|
| | h1 | h2 | h3 | d1 | (d2) | d1+d2 | 1~ | 3~ | |
| A | 4.96 (126) | 5.35 (136) | 5.75 (146) | 4.17 (106) | 1.26 (32) | 5.43 (138) | 1.98 | 1.76 | |
| B | 4.96 (126) | 5.35 (136) | 5.75 (146) | 4.17 (106) | 2.72 (69) | 6.89 (175) | 2.64 | 2.42 | |
| C | 7.80 (198) | 8.19 (208) | 8.59 (218) | 4.17 (106) | 4.10 (104) | 8.27 (210) | 4.84 | 4.40 | |
| D | 8.86 (225) | 9.25 (235) | 9.65 (245) | 4.45 (113) | 4.53 (115) | 8.98 (228) | 5.94 | 5.50 | |

B Installing the ACS 100

Install the ACS 100 vertically. Leave one (1) inch of free space above and below the unit. Ensure that there is sufficient cool air in the cabinet to compensate for the power losses listed at the end of section **P**, Technical Data.

Wall-mounting

Use M4 screws.

DIN rail (35 mm)

Press the lever on top of the unit while installing on / removing from DIN rail.

Flange-mounting

The ACS 100 can be installed so that the heat sink is external to the enclosure. The power circuit losses will then be dissipated outside leaving only the control circuit losses to be dissipated inside (see **P**).

C Removing the Cover

Press the four snap-on buttons in the top and bottom corners of the unit simultaneously.

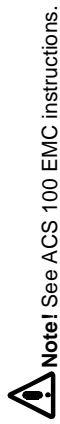


Warning! Turn power off and wait 5 minutes before removing cover.

D Cable Connections

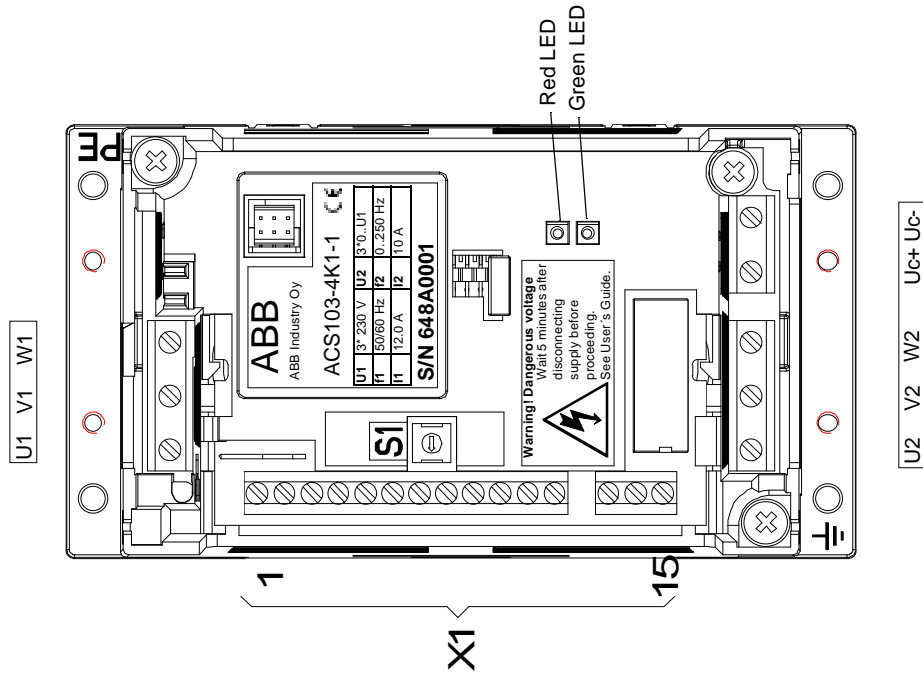
| Terminal | Description | Note |
|------------|-----------------------|--|
| L, N | 1~ power supply input | In figure below (see E), a 3~ unit is shown. |
| U1, V1, W1 | 3~ power supply input | Do not use in 1~ supply! |
| PE | Protective Ground | Min. 4 mm ² Cu wire |
| U2, V2, W2 | Power output to motor | Max. cable length 75 m without output choke. |
| Uc+, Uc- | DC bus voltage 325 V | Do not connect! |
| | Motor cable shield | |

Follow local codes for cable sizing. Use shielded motor cable. Route the motor cable away from control wires and power supply cable to avoid electromagnetic interference.



Note! See ACS 100 EMC instructions.

E Terminal Interface

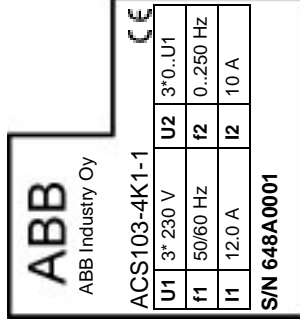


F Type Designation Label and Code Key

Supply:
ACS 101 = 1 ~
ACS 103 = 3 ~

Power:
4K1 = 4.1 kVA

Serial number:
S/N 648A0001
6 = Year
48 = Week
A0001= Internal
number



G Control Terminals

| X1 Identification | Description |
|-------------------|--|
| 1 SCR | Terminal for signal cable screen. (Connected internally to frame ground.) |
| 2 AI | Analog input 0-10 V <=> 0-f _{nom} output frequency. R _i = 190 kΩ (0-10 V signal) / 500 Ω (0-20 mA signal). Resolution 0.1 % accuracy ±1 %. |
| 3 AGND | Analog input circuit common. (Connected internally to frame ground through 1 MΩ.) |
| 4 10 V | 10 V reference voltage output for analog input potentiometer, accuracy ±2 %, 10 mA. |
| 5 AI1 | Analog input AI can be configured to accept 0- 20 mA signal by shorting terminals 5 and 6. Then R _i = 500 Ω. |
| 6 AGND | Terminals for DI return wires. |
| 7 AGND | |
| 8 12 V | Aux. voltage output 12 V DC. I _{max} = 100 mA (reference to AGND). Short circuit protected. |
| 9 DCOM | Digital input common. To activate a digital input, there must be +12 V (or -12 V) between that input and DCOM. The 12 V may be provided by the ACS 100 (X1:8) as in the connection examples (see J) or from an external 12-24 V source of either polarity. |
| DI Configuration | ABB Standard 2-wire (f _{nom} = 50 Hz) S1 = (0;1;2;3;4). See I 3-wire (f _{nom} = 60 Hz) S1 = (5;6;7;8;9). See I |
| 10 DI 1 | Start. Activate to start. Motor will ramp up to frequency reference. Disconnect to stop. Motor will coast to stop. Stop. Momentary inactivation always stops the ACS 100. |
| 11 DI 2 | Reverse. Activate to reverse rotation direction. Reverse. Activate to reverse rotation direction. |
| 12 DI 3 | Jog. Activate to set output frequency to constant 5 Hz. |
| 13 RO 1 | Fault relay output. Fault: RO 1 and RO 2 connected. 12 V-250 V AC/30 V DC 10 mA - 2 A |
| 14 RO 2 | |
| 15 RO 3 | |

Digital input impedance 1.5 kΩ.
Use multi-strand 0.5-1.5 mm² wire.

Note! For fail safe reasons the fault relay signals a "fault", when the ACS 100 is powered down.

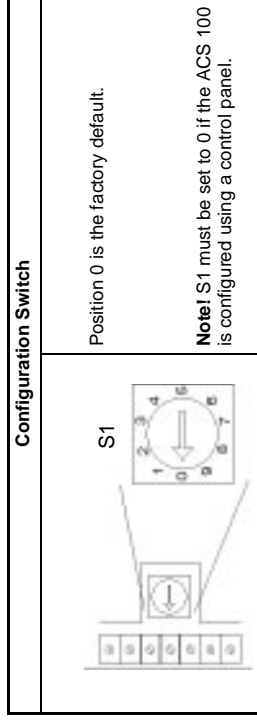
H Motor

Check that the motor is compatible. The motor must be a three-phase induction motor, with V_N from 200 to 240 V and f_N either 50 Hz or 60 Hz. The motor nominal current, I_N , must be less than the nominal output current of the ACS 100, I_2 (See **F** and **P**).

I Configuration Switch

The position of the configuration switch S1 determines:

- the nominal frequency f_{nom} (set to motor f_N)
- the acceleration and deceleration ramp time
- the I/O configuration of digital inputs (See **J**)



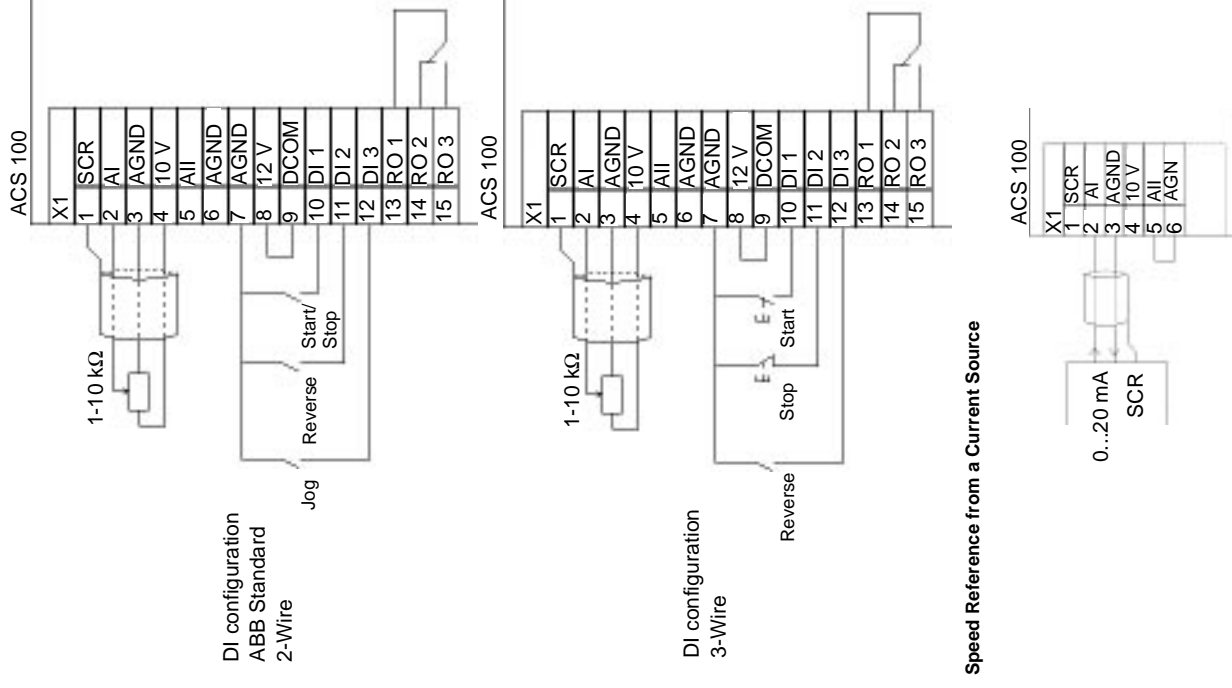
When setting the position of S1, first determine the motor nominal frequency f_N and then select the desired ramp time.

The configuration of digital inputs (DI) is dependent on the nominal frequency f_{nom} .

| f_{nom} | Ramp Time 0 - f_{nom} | S1-position | DI Configuration |
|-----------|----------------------------|-------------|------------------------|
| 50 Hz | 5 s | 0 | ABB standard 2-wire |
| | 1 s | 1 | |
| | 10 s | 2 | |
| | 30 s | 3 | |
| | 60 s | 4 | |
| 60 Hz | 1 s | 5 | 3-wire |
| | 5 s | 6 | |
| | 10 s | 7 | |
| | 30 s | 8 | |
| | 60 s | 9 | |

Note! The ACS 100 reads the position of the configuration switch during power up. Never set S1 when the ACS 100 is powered on.

J Connection Examples



K Replace the Cover

Do not turn the power on before snapping the cover back on.

L Power On

When power is supplied to the ACS 100, the green LED comes on.

M Protection Features

The ACS 100 has a number of protective features:

- Overcurrent
- Undervoltage
- Overtemperature
- Output ground fault
- Output short circuit
- Input phase loss (3~)
- Power loss ride through (500 ms)
- I/O terminal short circuit
- Long-term overcurrent limit trip 110 %
- Short-term current limit 150 %
- Motor overload protection (see **N**)

The ACS 100 has the following LED alarm and fault indicators:

| | |
|--|----------------------------|
| Red LED: off | Green LED: blinking |
| ABNORMAL CONDITION: | |
| <ul style="list-style-type: none"> • ACS 100 cannot fully follow control commands. • Blinking lasts 15 seconds. | |
| POSSIBLE CAUSES: | |
| <ul style="list-style-type: none"> • Acceleration or deceleration ramp is too fast in relation to load torque requirement • A short voltage interruption | |

| | |
|--|----------------------|
| Red LED: on | Green LED: on |
| ACTION: | |
| <ul style="list-style-type: none"> • Give a stop signal to reset fault. • Give a start signal to restart the drive. | |
| NOTE: | |
| <p>If the drive fails to start, check that the input voltage is within the tolerance range (200...240 V ±10 %).</p> | |
| POSSIBLE CAUSES: | |
| <ul style="list-style-type: none"> • Transient overcurrent • Over-/undervoltage • Overtemperature | |
| CHECK: | |
| <ul style="list-style-type: none"> • supply line for phase loss or disturbances. • the drive for mechanical problems that might cause overcurrent. • that heat sink is clean. | |

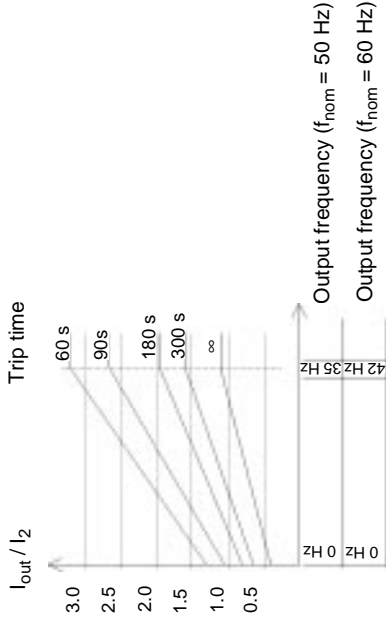
| | |
|--|----------------------|
| Red LED: blinking | Green LED: on |
| ACTION: | |
| <ul style="list-style-type: none"> • Turn the power off. • Wait for the LEDs to turn off. • Turn the power back on. | |
| Caution! This action may start the drive. | |
| CHECK: | |
| <ul style="list-style-type: none"> • the isolations in the motor circuit. | |

Note! Whenever the ACS 100 detects a fault condition, the fault relay activates. The motor will coast to stop and the ACS 100 will wait to be reset. If the fault still persists and no external cause has been identified, contact your ACS 100 supplier.

N Motor Overload Protection

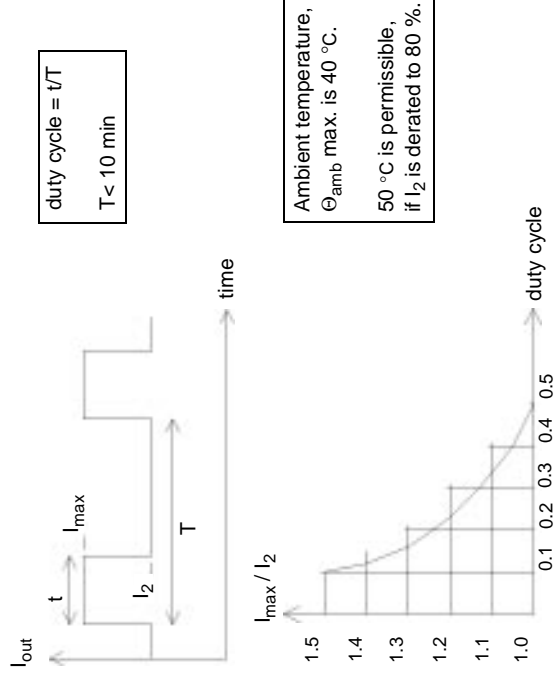
If the motor current I_{out} exceeds I_2 of the ACS 100 for a prolonged period, the ACS 100 automatically protects the motor from overheating by tripping.

Trip time depends on the extent of the overload (I_{out} / I_2), the output frequency and f_{nom} . Times given apply to a "cold start".



O Loadability of ACS 100

In the event of an output overload, the ACS 100 will trip.



P Type Series and Technical Data

| Nominal motor P _N | 0.75 | 0.5 | 0.75 | 1.0 | 1.5 | 2.0 | 3.0 |
|--------------------------------------|--|-------|-------|-------|-------|-------|-------|
| 1~ Input | ACS101- | K75-1 | 1K1-1 | 1K6-1 | 2K1-1 | 2K7-1 | 4K1-1 |
| 3~ Input | ACS103- | K75-1 | 1K1-1 | 1K6-1 | 2K1-1 | 2K7-1 | 4K1-1 |
| Frame size | | A | B | | C | | D |
| Nominal Ratings (See F, M) | | | | | | | |
| Input voltage U ₁ | 200 V-240 V ±10 % 50/60 Hz (ACS 101: 1~, ACS 103: 3~) | | | | | | |
| Output current I ₂ | A | 2.2 | 3.0 | 4.3 | 5.9 | 7.0 | 9.0 |
| Max. output current | A | 3.3 | 4.5 | 6.5 | 8.9 | 10.5 | 15.0 |
| Output voltage U ₂ | 0 - U ₁ 3~ | | | | | | |
| Input current I ₁ 1~ | A | 6.9 | 9.0 | 10.8 | 14.8 | 18.2 | 22.0 |
| Input current I ₁ 3~ | A | 3.2 | 4.2 | 5.3 | 7.2 | 8.9 | 12.0 |
| Switching frequency | 4 (Standard) 8 (Low noise **) | | | | | | |
| Protection limits (See M) | | | | | | | |
| Overcurrent (peak) | A | 7.1 | 9.7 | 13.8 | 19.0 | 23.5 | 34.5 |
| Overvoltage: Running | V DC (corresponds to 295 V input) | | | | | | |
| Start inhibit | V DC (corresponds to 276 V input) | | | | | | |
| Undervoltage: Running | V DC (corresponds to 142 V input) | | | | | | |
| Start inhibit | V DC (corresponds to 162 V input) | | | | | | |
| Overtemperature | °C (heat sink) 95 | | | | | | |
| Max. wire sizes | | | | | | | |
| Power terminals | mm ² 4 single core | | | | | | |
| Control terminals | mm ² 0.5 - 1.5 (AWG22...AWG16) | | | | | | |
| Line fuse 1~ | A | 6 | 10 | 16 | 16 | 20 | 25 |
| Line fuse 3~ | A | 6 | 6 | 6 | 10 | 10 | 16 |
| ACS101- ACS103- | | | | | | | |
| Power losses | | | | | | | |
| Power circuit | W | 13 | 19 | 27 | 39 | 48 | 70 |
| Control circuit | W | 14 | 16 | 17 | 18 | 19 | 20 |

**Low noise setting only available with optional control panel.
Derate ambient temperature to 30 °C or derate P_N and I₂ to 90 %.

Q Environment of Stationary Use

- Ambient temperature 0 - 40 °C
- Max ambient temperature 50 °C if P_N and I₂ derated to 80 %
- Installation altitude 0 - 1000 m
- Relative humidity less than 95 % (non-condensing)

The ACS 100 should be installed in clean and dry air, free from dripping water.

R Product Conformity

The ACS 100 complies with the requirements of the European

- Low Voltage Directive 73/23/EEC with amendments
- EMC Directive 89/336/EEC with amendments

Corresponding declarations are available on request.



Note! See ACS 100 EMC instructions.

S Safety



Warning! Only a competent electrician may install the ACS 100.



Warning! Dangerous voltages are present when mains supply is connected. Wait at least 5 minutes after disconnecting the supply before removing the cover.



Warning! Even when the motor is stopped there are dangerous voltages present at Power Circuit terminals U₁, V₁, W₁ (L, N) and U₂, V₂, W₂ and U_{C+}, U_{C-}.



Warning! Even when the ACS 100 is powered down, there may be dangerous external voltages at relay terminals RO1, RO2, RO3.



Warning! The ACS 100 is not a field repairable unit. Never attempt to repair a broken unit; contact the supplier to get the unit replaced.



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



Warning! The heat sink may reach high temperature (see P).

Note! For more technical information contact the supplier.

Accessories

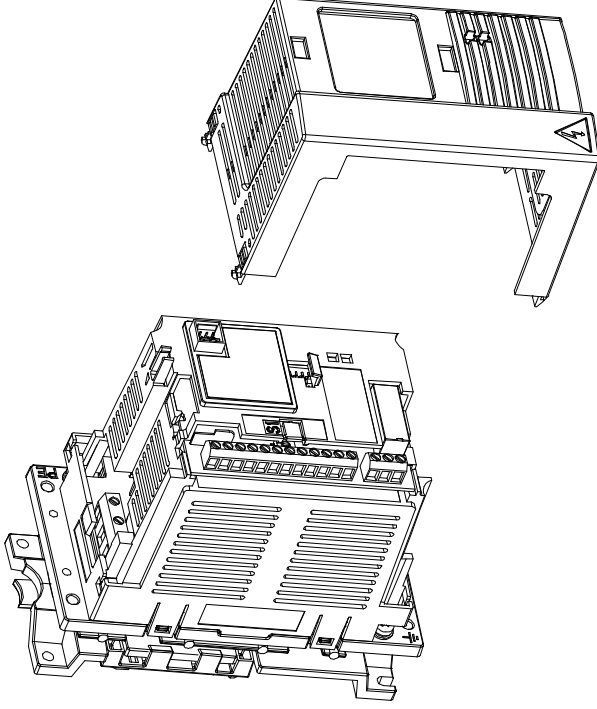


ACS 100-PAN

Control panel for use with the ACS 100.

ACS 100-EXT

Extension cable kit for use with the control panel.



ACS 100

User Guide

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ACS100-US-04
3AUA489002B3919 Rev A
Effective 9/1/97
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