ABB Low Voltage Drives, July 2009

ACS310
Dedicated Drive for Industrial Pumps and Fans

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Power and productivity for a better world™

Introduction
ABB standard drives

- ACS310
  - Extension to the ABB standard drives family
  - Dedicated drive for pump and fan applications
- Applications like
    - Booster pumps
    - Submersible pumps
    - Irrigation pumps
    - Fans
    - Blowers
    - Compressors

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Introduction
ABB standard drives

- Powerful set of P&F specific features including
  - PID – features (2 independent PID)
  - Multipump control
  - Specific pump protection and pump control features
- Impressive set of drive features including
  - Energy efficiency counters
  - Embedded Modbus RTU EIA-485 as standard
  - Intuitive user interface
  - Start-up assistants with Advanced Control Panel
  - Wide ambient temperature range up to 50°C ambient
  - Optimum cabinet compatibility

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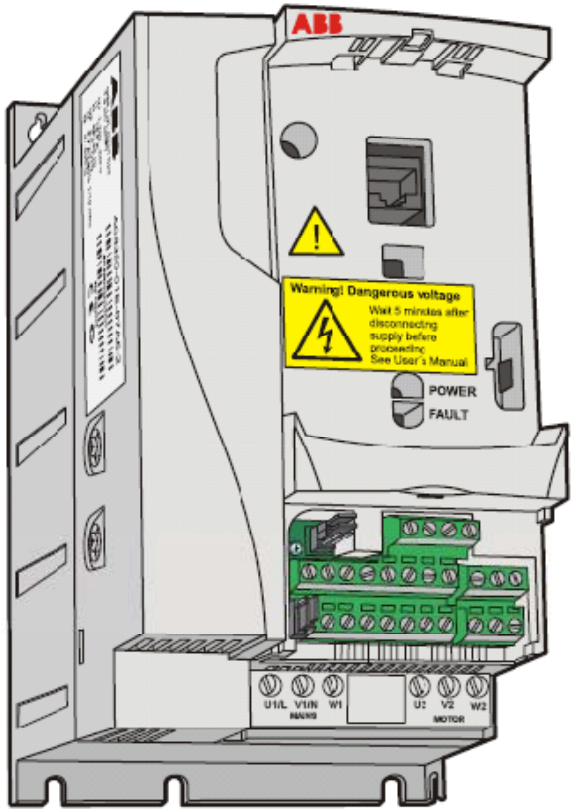
Product features
Hardware

- **ACS310 motor connection range**
  - 3-phase, 240V, **0.5 to 15 hp** (0.37 to 11 kW)
  - 3-phase, 480V, **0.5 to 30 hp** (0.37 to 22 kW)
- **Drive control methods**
  - Scalar control
  - U/f curves: Linear, squared, user defined
- **Five frame sizes (R0 – R4)**
- **Frequency 0 to 500 Hz**
- **Switching frequency**
  - 0.37 to 22 kW: 4 / 8 / 12 / 16 kHz
  - Ensure that parameter 2607 SWITCH FREQ CTRL = 1 (ON), which reduces the switching frequency if the drive's internal temperature is too high
- **Enclosure class**
  - IP20 (UL Open)
  - UL Type 1 kit as an option
- **EMC compliance**
  - C3 (2nd environment) built in as standard
- **Optimum installation layout and efficient cabinet space usage**
  - Unified height and depth
  - Side mounting
  - Side by side mounting
  - Screw or DIN rail mounting



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ACS310 Ratings Table

[1] I_{LD} continuous output current at max ambient temperature of +50 °C. 110% overloadability for one minute every ten minutes.

[2] I_{2N} maximum continuous output current at ambient temperature of +40 °C. No overloadability, derating 1% for every additional 1 °C up to 50 °C.

Product type

Construction

Nominal current

Supply voltage

240Vac Ratings

Type Codes below include Blank Panel only	Ratings				Frame Size
	P_N Hp	P_N kW	50°C (122°F) I_{LD}[1] A (110% Overloadability)	40°C (104°F) I_{2N}[2] A	
3-Phase Un = 200...240V (200, 208, 230, 240V)					
ACS310-03U-02A6-2	0.5	0.37	2.4	2.6	R0
ACS310-03U-03A9-2	0.75	0.55	3.5	3.9	R0
ACS310-03U-05A2-2	1	0.75	4.7	5.2	R1
ACS310-03U-07A4-2	1.5	1.1	6.7	7.4	R1
ACS310-03U-08A3-2	2	1.5	7.5	8.3	R1
ACS310-03U-10A8-2	3	2.2	9.8	10.8	R2
ACS310-03U-19A4-2	5	4.0	17.6	19.4	R2
ACS310-03U-26A8-2	7.5	5.5	24.4	26.8	R3
ACS310-03U-34A1-2	10	7.5	31.0	34.1	R4
ACS310-03U-50A8-2	15	11.0	46.2	50.8	R4

480Vac Ratings

Type Codes below include Blank Panel only	Ratings				Frame Size
	P_N Hp	P_N kW	50°C (122°F) I_{LD}[1] A (110% Overloadability)	40°C (104°F) I_{2N}[2] A	
3-Phase Un = 380...480V (380, 400, 415, 440, 460, 480V)					
ACS310-03U-01A3-4	0.5	0.37	1.2	1.3	R0
ACS310-03U-02A1-4	0.75	0.55	1.9	2.1	R0
ACS310-03U-02A6-4	1	0.75	2.4	2.6	R1
ACS310-03U-03A6-4	1.5	1.1	3.3	3.6	R1
ACS310-03U-04A5-4	2	1.5	4.1	4.5	R1
ACS310-03U-06A2-4	3	2.2	5.6	6.2	R1
ACS310-03U-09A7-4	5	4.0	8.8	9.7	R1
ACS310-03U-13A8-4	7.5	5.5	12.5	13.8	R3
ACS310-03U-17A2-4	10	7.5	15.6	17.2	R3
ACS310-03U-25A4-4	15	11.0	23.1	25.4	R3
ACS310-03U-34A1-4	20	15.0	31.0	34.1	R4
ACS310-03U-41A8-4	25	18.5	38.0	41.8	R4
ACS310-03U-48A4-4	30	22.0	44.0	48.4	R4

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Product features
Current ratings

Why I_{LD}???!

- **Ambient temperature affects negatively on drive's output current**
  - Higher ambient temperature means less output current
    - **I_{LD}** means: no need to derate, calculate or guess right drive ratings at 50 °C
      - Simplifies drive selection
- **Meets low cost motor current ratings**
  - Low cost motors normally have higher current ratings compared to high efficiency motors
    - **I_{LD}** means: no need to select higher rated drive
      - Simplifies drive selection

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Product features
ACS310 HP (kW) Range

208 to 240V					
Frame Size	R0	R1	R2	R3	R4
HP	0.5 to 0.75	1 to 2	3 to 5	7.5	10 to 15
kW	0.37 to 0.55	0.75 to 1.5	2.2 to 4.0	5.5	7.5 to 11

380 to 480Vac					
Frame Size	R0	R1	R2	R3	R4
HP	0.5 to 0.75	1 to 5		7.5 to 15	20 to 30
kW	0.37 to 0.55	0.75 to 4.0		5.5 to 11.0	15.0 to 22.0

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Product features
ACS310 Dimensions

ACS310

Frame Size	IP20 / UL open				NEMA 1 / UL Type 1			
	H[1] (in)	W (in)	D (in)	Weight (lb)	H[2] (in)	W (in)	D (in)	Weight (lb)
R0	9.41	2.76	6.34	2.6	11.02	2.76	6.65	3.5
R1	9.41	2.76	6.34	2.6	11.02	2.76	6.65	3.5
R2	9.41	4.13	6.50	3.3	11.10	4.13	6.65	4.2
R3	9.29	6.65	6.65	5.5	11.77	6.65	6.97	6.8
R4	9.61	10.24	6.65	9.7	12.60	10.24	6.97	11.0

1) Height with fastenings and clamp plate
2) Height with fastenings, NEMA 1 connection box and hood.

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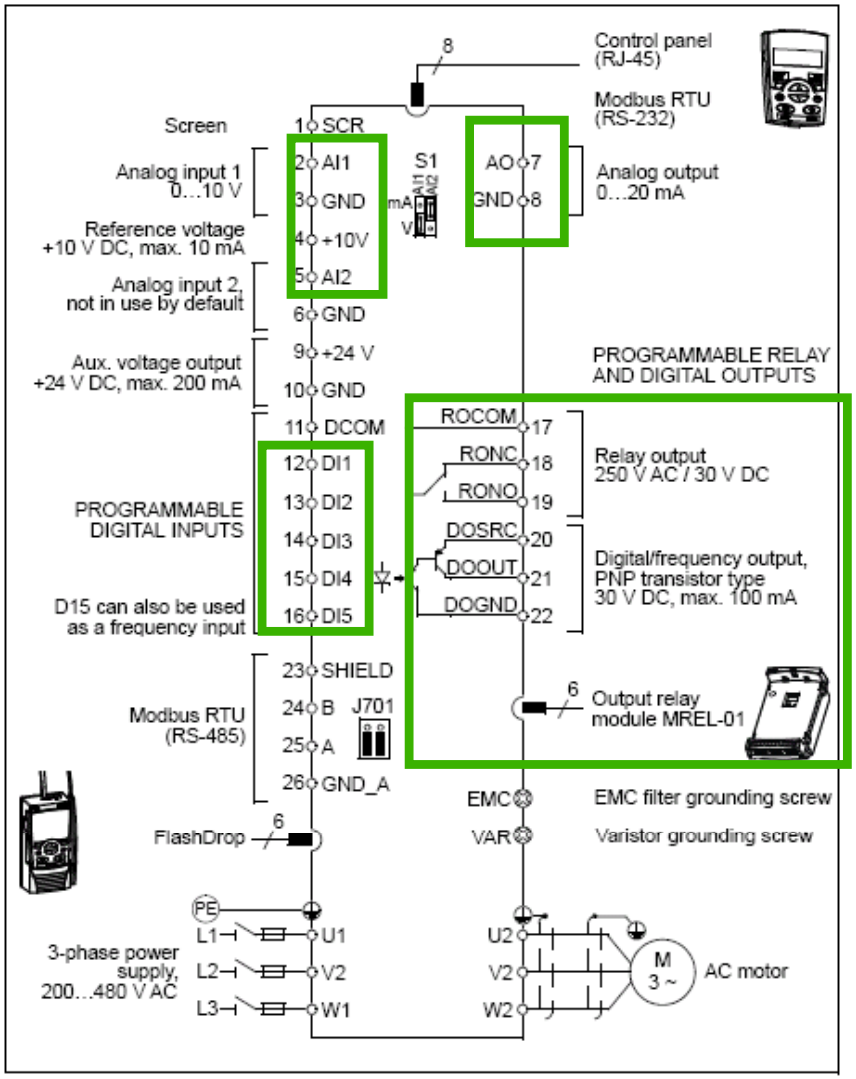
Product features
Power Connections

Power connections and control interfaces



- **Inputs and outputs**
  - Digital inputs / outputs
    - 5 DI / 1 DO (transistor / frequency output)
  - Pulse train input
    - DI5
  - Analog inputs / outputs
    - 2 AI (bipolar) / 1 AO
  - Relay outputs
    - 1 RO as standard + 3 RO as option (MREL-01, relay output extension module)

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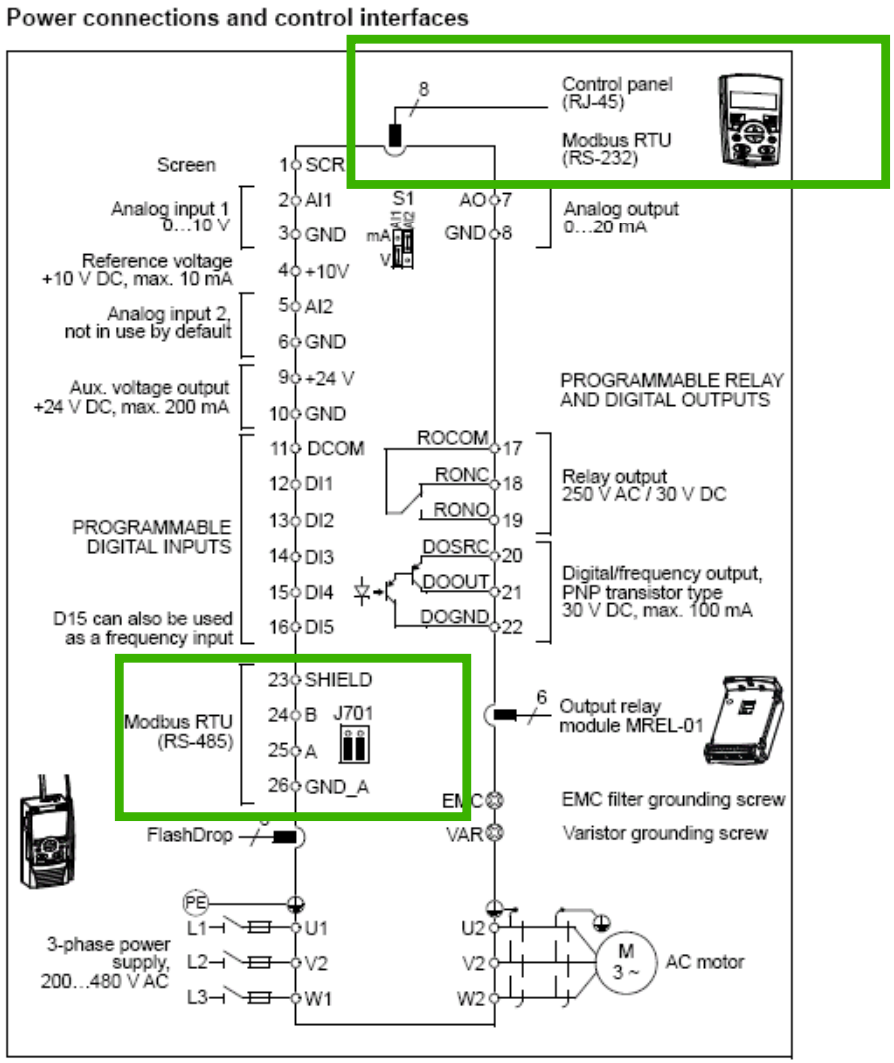
Product features
Fieldbus



- ACS310 has embedded fieldbus connection
  - RS-485 and RS-232 serial communication interfaces built in **as standard**
  - Embedded and built in Modbus RTU available through panel port (point-to-point RS-232) and through (multidrop RS-485) screw terminals
  - F-series modules are not supported with ACS310

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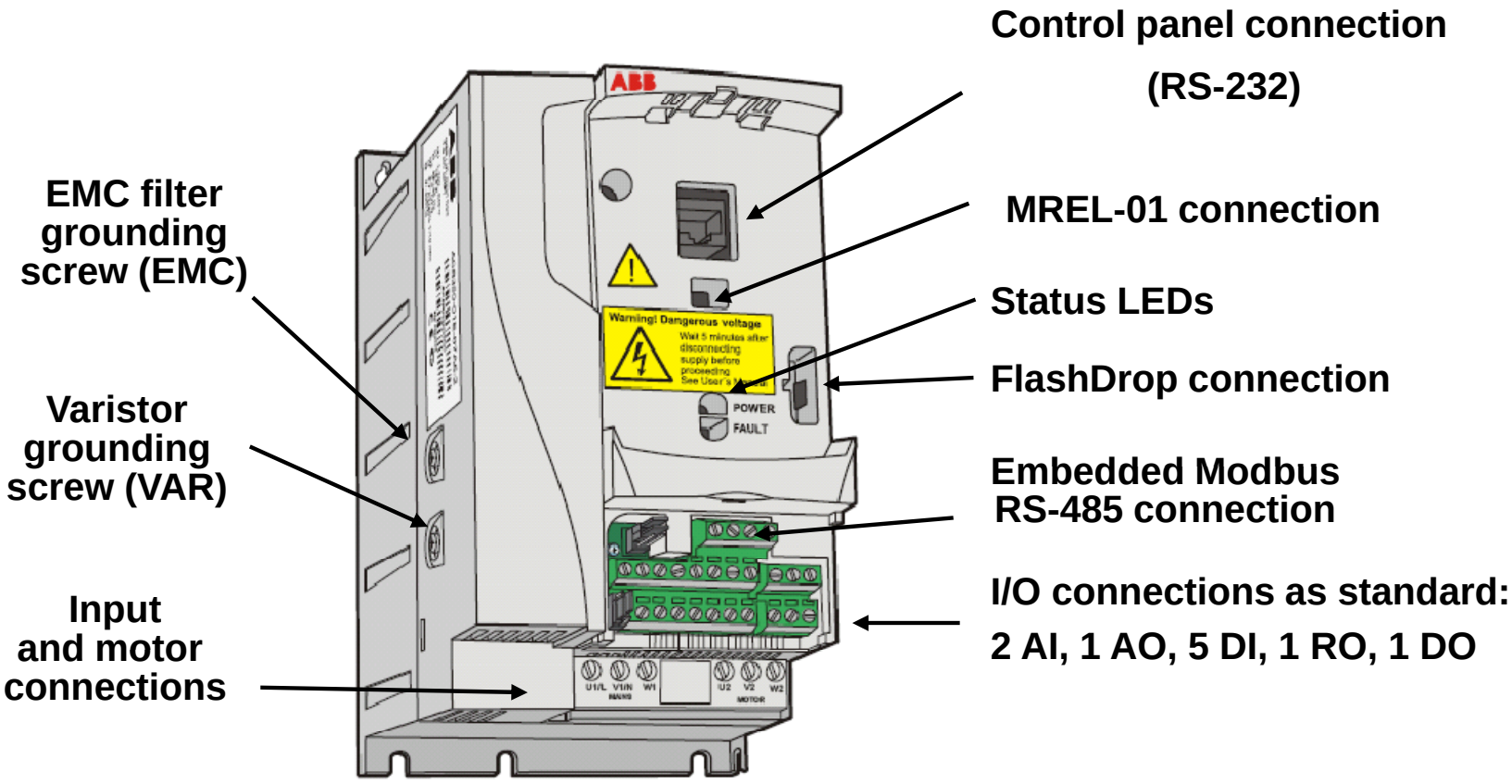
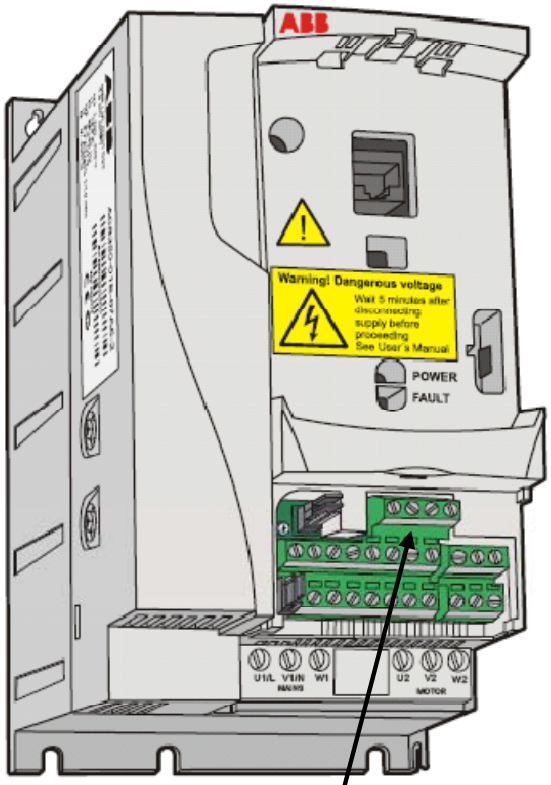
ACS310 Connectivity

- Connection to application systems through multiple I/Os and plug-in options

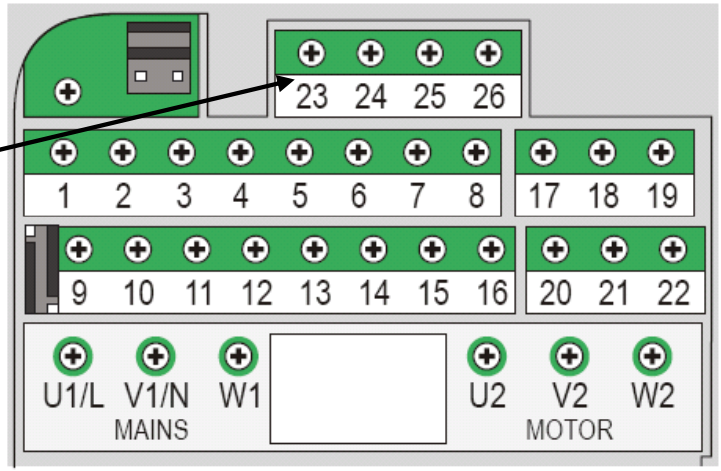


ACS310 Connectivity cont.



- Modbus RS-485 (available through screw terminals) and RS-232 (available through panel port)
- Embedded
  - Modbus RTU EIA-485
  - Modbus RS-232

EIA-485 Terminal



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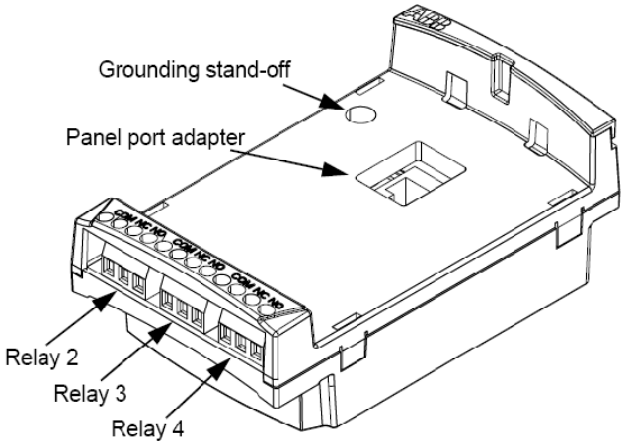
NEW Option MREL-01



MREL-01 module

- The optional MREL-01 module offers three (3) additional FORM C relay outputs. The outputs can be configured for different functions by setting selected parameters.
- When will this be used:
  - When the application requires the drive to control multiple pumps

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Product features
Fieldbus

- Modbus TCP/IP available together with SREA-01
  - Remote drive monitoring tool
  - Ethernet adapter module (gateway)
  - Can be connected by Ethernet or by GSM/GPRS modem
  - Graphical internal web server
    - Configuring and monitoring interface: process data, collect loggind data, real-time drive parameters and event messages

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Product features
Energy efficiency

- **Energy efficiency counters**
  - Consumed energy (kWh, MWh)
  - Energy efficiency (Savings in kWh, savings in local currency units and reduction in CO_2)
- **Software controlled cooling fan**
  - On/Off controlled
- **Load analyzer**
  - For optimized dimensioning of the drive, motor and process
- **Drive control methods**
  - U/f curves: linear, squared, user defined
- **Energy optimizer**
  - Increases drive efficiency
  - To minimize motor losses and noise especially while operating on partial loads

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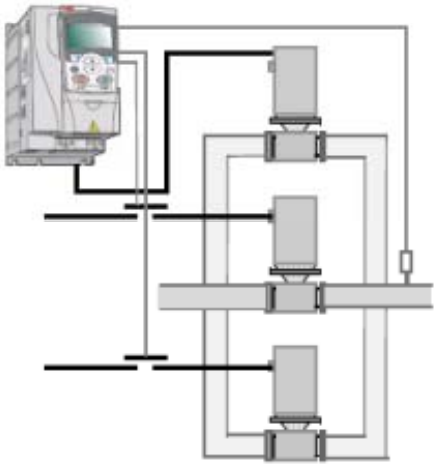
Product features
P&F features



Standard PFC mode

- Essential features for pump/fan installations:
  - Pump protection functions for preventive maintenance and protection of operating system
    - Supervision of pump/fan inlet/outlet pressure and pump cleaning function
  - Two powerful, independent and built-in PID controllers for regulating pressure, flow or other quantities on the basis of actual needs
  - Multipump control
    - Built-in traditional Pump and Fan Control (PFC) functionality for running pumps in parallel
    - Soft PFC (SPFC) for reducing unwanted pressure peaks on pipelines when starting new auxiliary motors

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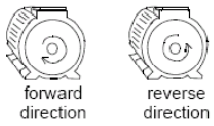
Product features
Easiness of use

- **Short and long parameter menus**
  - Short parameter view (Set Par 1611 = 2)
    - As default only most needed drive parameters shown
  - Long parameter view (Set Par 1611 = 3)
    - All drive parameters shown



- **Software controlled phase inversion (Par 9914)**
  - Fast and easy way to change the phase order of the motor rotation

- **Embedded Modbus (RS-485) connection**
  - Integrated and compact design as standard

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Product features
Easiness of use

- **Preprogrammed application macros**
- **Short form User's manual**
  - Complete User's manual available from ABB Library and paper format can be ordered separately
- **User definable views**
  - Parameter visibility & values with FlashDrop tool

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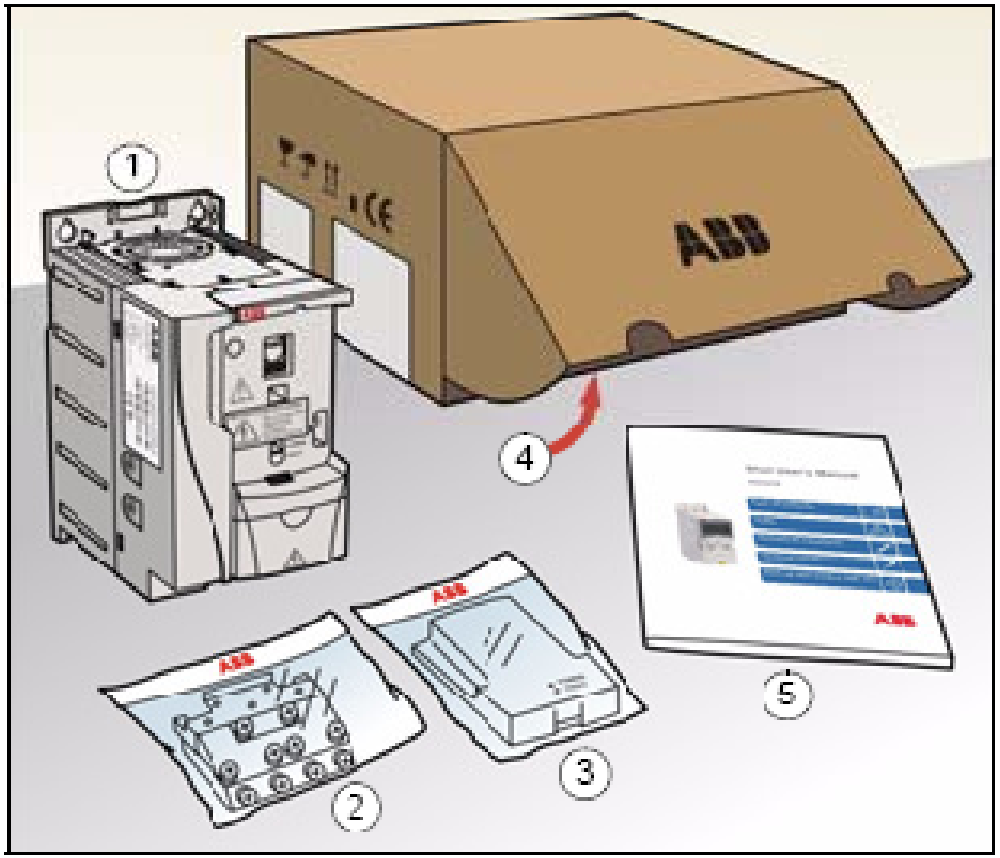
Product features
Delivery



- The shipping package includes
  1) ACS310 drive
  2) Clamping plates and screws
  3) Panel cover 
  4) Mounting template integrated into package
  5) Short user's manual (Full user's manual can be downloaded from abbnow.com or ordered for print)
- Possible Panel Options
  1) Advanced Control Panel 
  2) Basic Control Panel 

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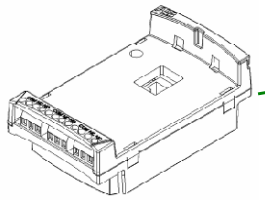
Product features
Options

Assistant control panel

- Advanced and Basic Control Panels
  - ACS310 is compatible with ACS-CP-A Advanced Control Panel Rev E or later (new panel series manufactured since 2007 with serial number XYYWWRXXXX, where year YY = 07 or greater and revision R = E, F, G, …)
  - ACS310 is compatible with ACS-CP-C Basic Control Panel Rev M or later
- PC tool
  - DriveWindow Light 2 - Commissioning and start-up tool, Compatible with **version 2.9 or later**
- Others
  - MREL-01 - Relay output extension module
  - SREA-01 - Ethernet adapter module
  - MFDT-01 - FlashDrop tool, ACS310 compatible DrivePM (ver. 1.2 or later)
  - Enclosure kit – UL Type 1 kits
  - Panel mounting kits (ACS-CP-EXT and OPMP-01 kits)



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Summary
ACS310

- Dedicated drive for pump and fan applications
  - Powerful set of P&F specific features including
    - PID –features
    - Multipump control
    - Pump protection functions and pump control features
- Designed to be fast drive in terms of installation, parameter setting and commissioning
- Increased energy efficiency due to energy optimized control method
- Energy efficiency counters
- Wide temperature range up to 50 °C ambient
- Embedded Modbus (RS-232 and EIA-485) as standard
- Software controlled cooling fan and phase inversion

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