

Appendix A: ACS310 Product Features and Specifications

Product Features

UL, cUL and CE, C-Tick, GOST-R
Full output current at 50°C ambient temperature
Optional Full Graphic and Multilingual Display with real time clock
(Advanced Control Panel) (+J400)
Optional Basic Control Panel (+J404)
Embedded Modbus RS-485
Blank Cover (as standard)
Start-Up, Maintenance and Diagnostic Assistant
Scalar Control
Two (2) Programmable Analog Inputs
Five (5) Programmable Digital inputs
One (1) Programmable Analog Output
One (1) Programmable Form C Relay Output
(3 more relay output available as an option (MREL-01))
One (1) Programmable Digital Output (pulse train output)
Input Speed Signals
Two (2) Current 0 (4) - 20 mA, 0 (2) - 10VDC
Bipolar voltage reference with external power supply
Pulse Train Input
Start/Stop
2 wire control (dry contact closure)
3 wire control (momentary dry contacts)
Adjustable Current Limit
Nine (9) Supervision Functions
Electronic Reverse
Power Loss Ride-Through
DC Injection Braking
DC Magnetizing Start (provides maximum starting torque)
Seven (7) Preset Speeds
Three (3) Critical Speed Lockout Bands
Two (2) Independently Adjustable Accel and Decel Ramps
U/f curves: linear, squared, user defined
Ramp to Stop or Coast to a Stop
Maximum Frequency Programmable up to 500 Hz
Integral Programmable PID Setpoint Controller
Coated Boards
RoHS (Verify RoHS label)
Built-in EMC Filter
Unified height and depth
Programmable Fault Functions
AI<Min (A1,2 loss)
Panel Loss
External Fault 1, 2
Motor Thermal Protection
Motor Stall Protection
Communications Fault
Over / Undervoltage

Pump & Fan Specific Features:

Pump & Fan Control Macros
Soft Pump & Fan Control
Pump Protection Features
Pump Cleaning
On/Off Cooling Fan Control
Software controlled phase inversion
Energy Optimizer
Energy Efficiency tools
Load Analyzer

Preprogrammed Protections:

Overvoltage (Intermediate Circuit) 1.3 * input voltage
Undervoltage (Intermediate Circuit) 0.65 * input voltage
Short Circuit
Input Phase Loss and output mis-wiring
Overcurrent
Ambient temperature
Drive overtemperature
DC over / undervoltage
Motor over temperature
Overspeed
Underload
Motor Phase Loss

Available options

FlashDrop (MFDT-01) (Version 1.2 or later)
NEMA 1 Enclosure Kit (MUL1-R1 / -R3 / -R4)
NEMA 4x Cabinet Panel Mounting (ACS/H-CP-EXT-IP66)
DriveWindows Light®-based Start-up & Programming Tool (Version 2.9 or later)
ACS310 Options
Relay Output Module (3 additional Form C relays) (MREL-01)

Input Connection

Input Voltage (U1, V1, W1) 208/220/230/240Vac
3-phase +/-10%, (0.5 to 15 Hp)
380/400/415/440/460/480Vac
3-phase +/-10% (0.5 to 30 hp)
Input Frequency 48 to 63 Hz, maximum rate of
change 17%/second
Line Imbalance Max +/-3% of nominal phase to
phase input voltage
Fundamental Power Factor 0.98 (at nominal load)
Connection Terminals U1, V1, W1

Output Connection

Output Voltage 0 to U1, 3-phase symmetrical, U_{max}
at the field weakening point
Output Frequency 0 to 500 Hz
Frequency Resolution 0.01 Hz
Continuous Current

I_{IN} continuous rms input current (for dimensioning cables and fuses) at ambient temperature of +40 °C
I_{LD} continuous output current at max ambient temperature of +50 °C. 10% overloadability for one minute every ten minutes.
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.
I_{2max} maximum instantaneous output current. Available for two seconds every ten minutes at start-up, or as long as allowed by the drive temperature.
P_N typical motor power. The kilowatt ratings apply to most IEC 4-pole motors. The horsepower ratings apply to most NEMA 4-pole motors.
R0...R4 ACS310 is manufactured in frame sizes R0...R4. Some instructions and other information that only concern certain frame sizes are marked with the symbol of the frame size (R0...R4)

Short Term Overload Capacity 1.1 * I_{LD} (at least 1 min / 10 min)
Field Weakening Point 10 to 500 Hz
Switching Frequency
Derate according to the switching frequency used (see parameter 2606 SWITCHING FREQ) as follows:

Switching frequency	Drive voltage rating	
	U _N = 200...240 V	U _N = 380...480 V
4 kHz	No derating	No derating
8 kHz	Derate I _{2N} to 90%.	Derate I _{2N} to 75% for R0 or to 80% for R1...R4.
12 kHz	Derate I _{2N} to 80%.	Derate I _{2N} to 50% for R0 or to 65% for R1...R4 and derate maximum ambient temperature to 30 °C (86 °F).
16 kHz	Derate I _{2N} to 75%.	Derate I _{2N} to 50% and derate maximum ambient temperature to 30 °C (86 °F).

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Output Connection (continued)

Accel. & Decel. Time	0.1 to 1800 s
Efficiency	98% at nominal power level
Short circuit withstand rating	100 KAIC per IEC 61800-5-1 and UL 508C.
Connection	Terminals U2, V2, W2

Ambient Conditions, Operation

Air Temperature	-10°C (14°F) to 50°C (122°F), no frost allowed
Relative Humidity	5 to 95%, no condensation allowed, maximum relative humidity is 60% in the presence of corrosive gasses
Contamination Levels	
IEC	60721-3-3
Chemical Gasses	3C2
Solid Particles	3S2
Installation Site Altitude	0 to 1000 m (3300 ft) above sea level. At sites from 1000 m to 2000 m (3300 ft to 6600 ft) above sea level, the maximum power is de-rated 1% for every additional 100 m (330 ft).

Ambient Conditions, Storage & Transportation (in Protective Shipping Package)

Air Temperature	-40° to 70°C (-40° to 158°F)
Relative	Humidity Less than 95%, no condensation allowed
Atmospheric Pressure	70 to 106 kPa (10.2 to 15.4 PSI)

Cooling Information

Cooling	Frame size R0 has natural convection cooling. Frame sizes R1...R4 are provided with an internal fan. The air flow direction is from bottom to top.
Power Loss	Approximately 3% of rated power

Analog Inputs

Two (2) Programmable Analog Inputs	
Current Reference	
Unipolar	0 (4) to 20 mA, Rin= 100 ohm
Bipolar	-20 mA to 20 mA, Rin= 100 ohm
Voltage Reference	
Unipolar	0 (2) to 10 V, Rin > 312 kohm
Bipolar	-10 V to 10 V, Rin > 312 kohm
Resolution	0.1%
Accuracy	+/-1%

Reference Power Supply

Voltage	+10 VDC, +/-1% at 25oC (77°F)
Maximum Load	10 mA
Applicable Potentiometer	1 kohm to 10 kohm

Analog Outputs

One (1) Programmable Current Output	
Signal Level	0 (4) to 20 mA
Accuracy	+/-3% Full Scale Range at 25°C (77°F)
Maximum Load Impedance	500 ohms

Digital Inputs

Five (5) Programmable Digital Inputs	
Signal Level	12-24 VDC, with internal or external supply
Type	PNP and NPN
Input Current	15 mA at 24 VDC
Input Update Time	8 ms, +/- 1ms
Frequency Input	Pulse Train 0 to 16 KHz (X1A:16 only)
Internal 24 VDC Supply for Digital Inputs	
Voltage	24 VDC, +/- 10%
Maximum Current	200 mA

Relay Outputs

One (1) Programmable Relay Output	
Type	NO + NC
Switching Voltage	12-250VAC / 30VDC
Maximum Switching Current	0.5A / 30VDC; 5A / 230 VAC
Maximum Continuous Current	2 Amps RMS

Digital Outputs

One (1) Programmable Digital Output	
Type	Transistor Output PNP
Maximum Switching Voltage	30VDC
Maximum Switching Current	100 mA / 30 VDC, short circuit protected
Frequency	10 Hz ... 16 kHz
Resolution	1 Hz
Accuracy	0.2%

RS-485 Interface (Embedded Modbus)

Cable	Shielded twisted pair, impedance 100...150 ohm
Termination	Trunk line, drop lines allowed
Isolation	Bus interface isolated from the drive
Transfer Rate	1.2 ... 76.8 kbit/s
Communication Type	Serial, Asynchronous, Half Duplex
Protocol	Modbus

Protections

Single Phase	Input Protected
Overvoltage Trip Limit	1.3 * Input Voltage
Undervoltage Trip Limit	0.65 * Input Voltage
Overtemperature	Protected
Auxiliary Voltage	Short Circuit Protected
Microprocessor Fault	Protected
Motor Stall Protection	Protected
Motor Overtemperature	Protected (I2t)