

Ultra-low harmonic drives for water and wastewater

5 to 400 hp



The ACQ580 ultra-low harmonic (ULH) drives provide all the features, benefits, and value of the ACQ580 platform in an unprecedented compact design that delivers unity power factor with 3% or less THiD.

By meeting the most stringent requirements of IEEE519, the ACQ580 ULH drive minimizes risk of electrical disturbance when operating on a back-up generator.

There's no need to mitigate harmonics if you barely create them to begin with. It's not a problem as ABB Ultra-low harmonic drives:

Do you see



Power factor penalties on your utility bill



Generator voltage instability



Sensitive electronic equipment operating erratically or failing



Motors not connected to drives running hotter than expected



Distribution transformers overheating



Circuit breakers randomly tripping



Fuses blowing unexpectedly



Back-up generators seem larger than necessary

- Meet the most stringent recommendations of IEEE519 at the drive terminals.
- Are generator-friendly.
- Have a perfect 1.0 power factor (no leading power factor).
- Requires less installation space than other harmonic mitigation solutions.
- Do not require external harmonic mitigation devices.
- Install easily with 3 wires in and 3 wires out.
- Reduce electrical network losses and improve transformer utilization.
- Supply full voltage to the motor in low line voltage conditions.
- Embody four generations of ABB ULH experience.
- Employ a common all-compatible user interface.
- Use familiar, menu-driven, simple text for programming.

For all water industry applications

Offers built-in pump functionalities:

- Intelligent multi-pump control
- Sensorless flow calculation
- Level control
- Soft pipe fill
- Quick ramps
- Pump cleaning
- Dry pump protection
- Cavitation detection and control

Technical data

Power range	5 to 400 hp 460 V, 5 to 75 hp 230 V
Voltage range	380-480 V, 3-phase input, 3-phase output 208-240 V, 3-phase input, 3-phase output
Power factor (cosφ) at nominal load	1.0
Power loss	Approx. 2-3% of rated power
Frequency	50/60 Hz ±5%
Supported motor control	Scalar and vector
Supported motor types	Asynchronous motor, permanent magnet motor (vector), SynRM (vector)
Degree of protection	ACQ580-31: UL Type 1 (IP21) as standard UL Type 12 (IP55) as option ACQ580-34: UL Type 00 (IP00)
Ambient conditions	ACQ580-31: -15°C to 40°C. No frost allowed. From +40°C to +50°C with derating 1% per 1°C ACQ580-34: -15°C to 40°C. No frost allowed. From +40°C to +50°C with derating 1% per 1°C
Compliance	UL, cUL, CSA, CE, EAC, RCM
Harmonic performance	Harmonics are below the limits defined in IEEE519
Control connections	Two analog inputs, two analog outputs, six digital inputs including thermistor input, three relay outputs, EIA-485 Modbus RTU, safe torque off (STO), external 24 V DC supply input, USB via control panel
Optional I/O extension modules	CMOD-01: External 24 V DC/AC and digital I/O extension (2 x relay output and 1 x digital output) CMOD-02: External 24 V and isolated PTC interface CHDI-01: External six 115/230V AC digital inputs and two relay outputs CAIO-01: Analog I/O extension (3x AI bipolar and 2x AO unipolar)
Optional communication extension modules	EtherNet/IP, Modbus TCP, Profibus- DP, ProfiNet, DeviceNet
PC tools	Drive composer tool entry, available for free via ABB website Drive composer tool pro
Control panel options	Hand-Off-Auto control panel as standard Optional bluetooth Hand-Off-Auto control panel Control panels feature battery back-up

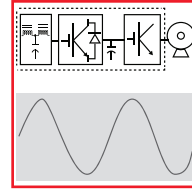
Harmonic Distortion

How do you meet IEEE 519?

Methods of managing harmonic distortion

Active front end (ULH drive)

Typical input current distortion
3 - 5 %

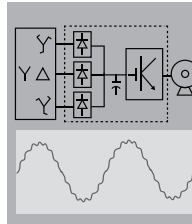


Ultra-Low Harmonic drive (ULH)

- Control line current to near sinusoidal waveform
- Low total distortion of current and voltage
- Meet most stringent standards (IEEE519) at drive terminals
- Not susceptible to unbalanced supply voltages and background voltage distortion

Multi-pulse rectifiers

Typical input current distortion
5 - 10 %

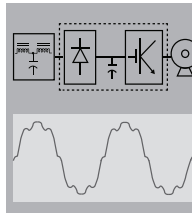


18-pulse drive

- Three rectifiers mean more parts and increased complexity
- Better harmonic performance than lower multi-pulse configurations
- Sensitive to network voltage imbalances

6 pulse rectifier, passive filter

Typical input current distortion
5 - 15 %

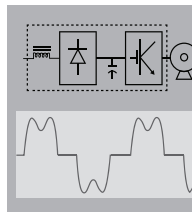


6-pulse drives with passive filter

- Increases size and heat dissipation
- Harmonic performance is load-dependent
- Leading power factor can affect generator performance

6 pulse rectifier, input reactor

Typical input current distortion
35 - 45 %

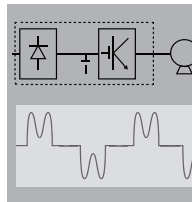


6-pulse drive with reactors

- Reactors may be located on the AC line or a DC link choke in the drive
- May cause generator instability

6 pulse rectifier, no harmonic reduction

Typical input current distortion
80 - 120 %



6-pulse drive

- No harmonic reduction (e.g., line reactors, DC link choke or passive filter)
- Least expensive and simplest drive configuration
- Uses more current
- Causes generator instability