

CATALOG

# ABB drives for water and wastewater

## ACQ580, 0.75 to 500 kW



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## ACQ580 series

Always flowing. Never still.

Water utilities require reliable solutions securing the flow of water and wastewater.

The ACQ580 drive for water is part of ABB's all-compatible drives portfolio. This robust drive is designed to secure optimal operation of water and wastewater pumps, while ensuring low energy consumption.

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# The energy efficient drive for water and wastewater pumping

Whether your pump system requires redundancy in multi-pump applications or built-in pump application functionalities designed for the water and wastewater industry, the ACQ580 is designed to meet your requirements.



## Simplicity at your fingertips

The control panel's straightforward primary settings menu with assistants helps you set up the drive quickly and effectively.

## Speaks water-specific terminology

The drive has built-in pump application control programs to secure optimal operation of the water and wastewater pump.

## Boosting energy efficiency

The energy optimizer helps you to save energy, and the energy efficiency information made available to you help monitor and save the energy used in your processes.



## Reliable, integrated safety

ATEX certified thermistor protection module CPTC-02 provides enhanced process safety and easy, simplified installation.



## Remote monitoring solutions

Remote monitoring via standard web browsers will help lower costs by reducing the amount of routine site visits.



The ACQ580 water and wastewater drives are part of ABB's all-compatible drives portfolio. The drives secure the flow of water and wastewater in the pumping system throughout their whole life cycle. The ACQ580 drive is easy to commission and use. With built-in pump functionalities, the drive keeps the pumping system operating optimally, lowering the energy bill. The drive is used in water and wastewater treatment plants, pumping stations, desalination plants, industrial wastewater facilities and irrigation environments. The drive is used with inflow pumps, transfer pumps, dosing pumps, sludge pumps, booster pumps, submersible pumps and compressors, blowers, decanter centrifuges, mixers and fans.



#### Controls virtually any kind of motor

The drive has the ability to control almost any motors from induction and permanent magnet motors to synchronous reluctance motors.



#### Startup and maintenance tool

Drive composer PC tool for startup, configuration, monitoring and process tuning. The PC tool is connected to the drive's control panel via USB.

#### Robust with built-in features

A robust performer that is simple to select, and easy to install and use. Built-in features such as an EMC filter, choke, a Modbus RTU fieldbus interface and safe torque off (STO) functionality simplify drive selection, installation and use.



#### Reliable communication

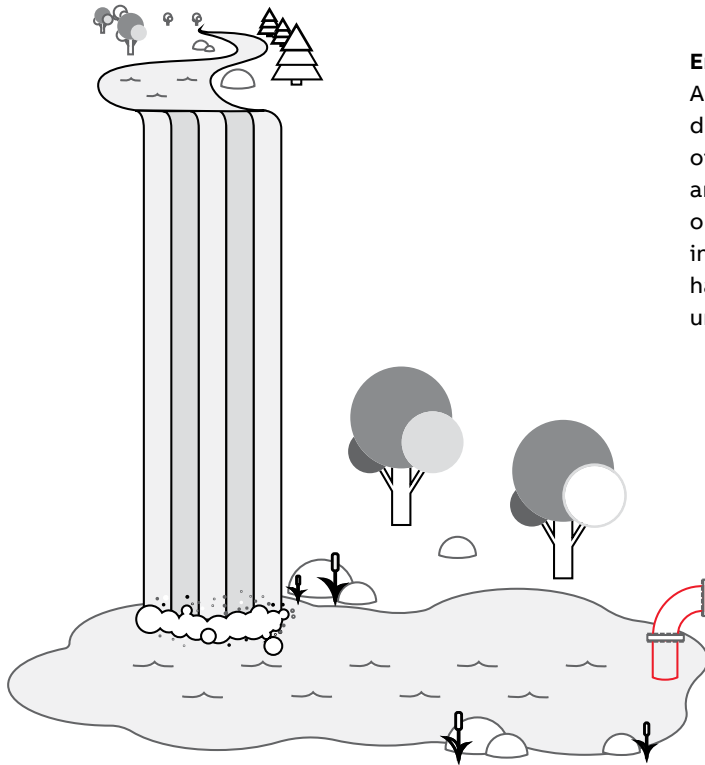
With its wide range of optional fieldbus adapters, the drive enables connectivity with all major automation networks and control systems.



#### Input/output extensions

In addition to the standard interfaces, the drive has a built-in slot for additional input/output extension modules.

# All-compatible solutions for water and wastewater applications

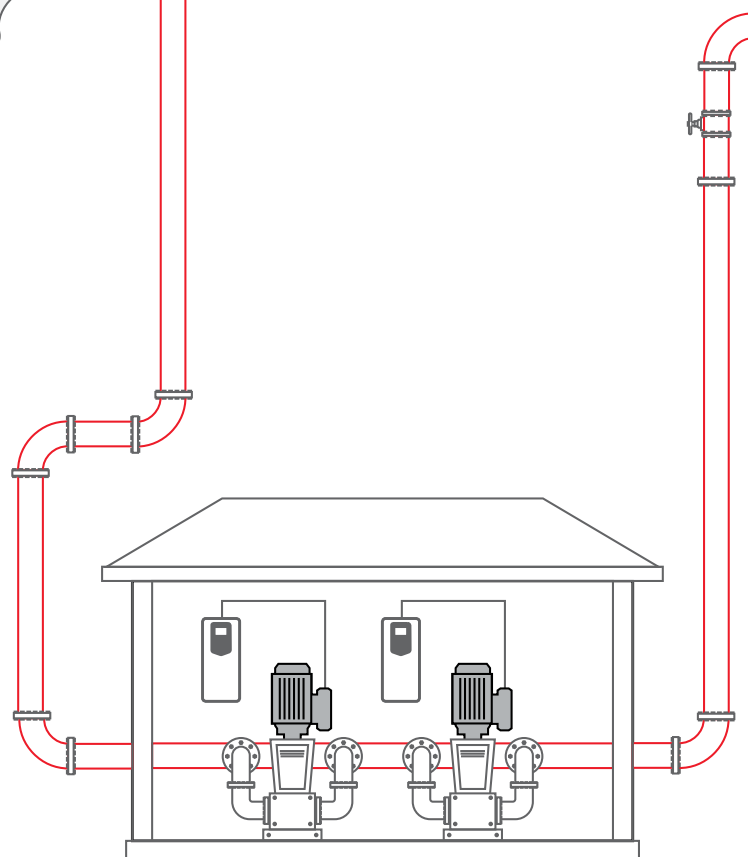


## Environment all-compatible

Achieve your environmental goals with our energy-efficient drive for water and wastewater. The all-compatible drives offer built-in energy efficiency calculators. They help you to analyze and optimize your pump processes to reduce stress on the environment. Other environmentally friendly features include the built-in soft pipe fill function to ensure less water hammering on the water pipes, thus preventing the risk of unwanted leaks, unplanned outage and repair costs.

## Process all-compatible

Water and wastewater processes consist of many phases which require optimal performance of your pump solution from start to finish. Our robust drives are available with enclosures up to IP55. The drive controls virtually any kind of motors from induction and permanent magnet motors to synchronous reluctance motors up to 500 kW. The drive is compatible with a wide range of fieldbus protocols, ensuring reliable communication between the drive and automation system.



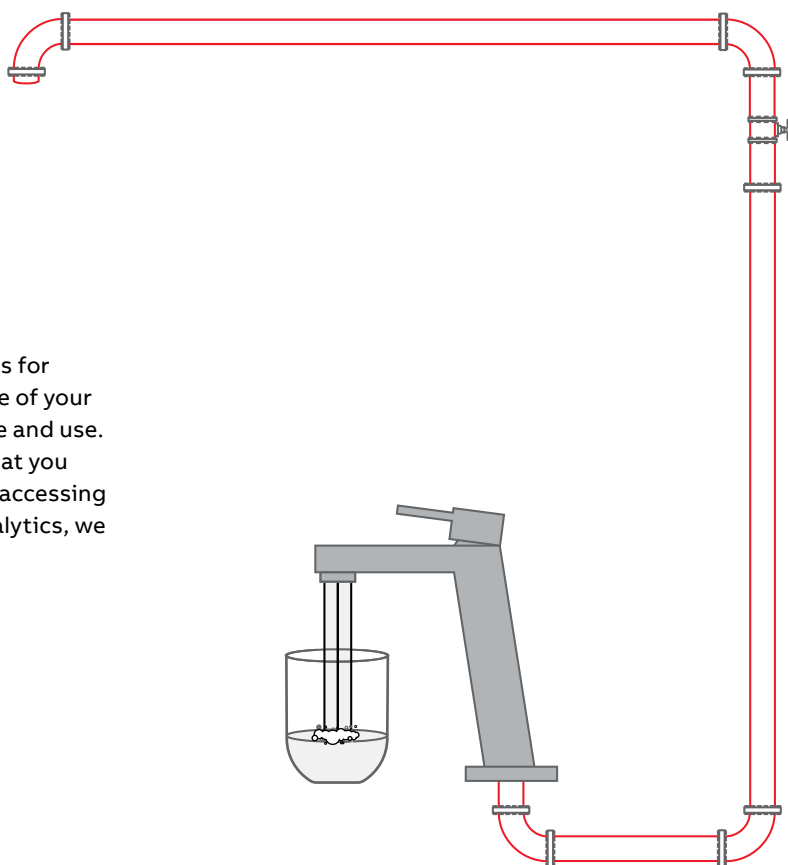


### Business all-compatible

As a reliable global partner, we provide water process solutions that keep the life cycle costs of your pump solution stable. Additionally, we help keep your water process productive and consistent in an energy efficient way. Our wide range of water industry products and solutions offer optimal flow of water all hours of the day. This means lower energy consumption, improved productivity, flexibility and ease of use. With offices in over 90 countries and a global technical partner network, we offer technical advice and local support worldwide.

### Human all-compatible

You can feel confident using our all-compatible drives for water and wastewater. The drive speaks the language of your pump application, making it easy to set up, configure and use. The intuitive Hand-Off-Auto control panel ensures that you have access to the essential information quickly. For accessing your drive from a distance and receiving valuable analytics, we offer remote monitoring solutions.



# Optimizing the flow of water and wastewater in your pumping solutions

The ACQ580 water and wastewater drive is built to help users, designers, OEMs, system integrators and EPC professionals secure pumping of water and wastewater in municipal utilities, pumping stations, industrial wastewater facilities, desalination plants and irrigation environments. It offers long-term, technically-compatible drive solutions supported by full service and support.

## Soft pipe filling

Increase the lifetime of the piping and pump system by avoiding pressure peaks.

## Quick ramps

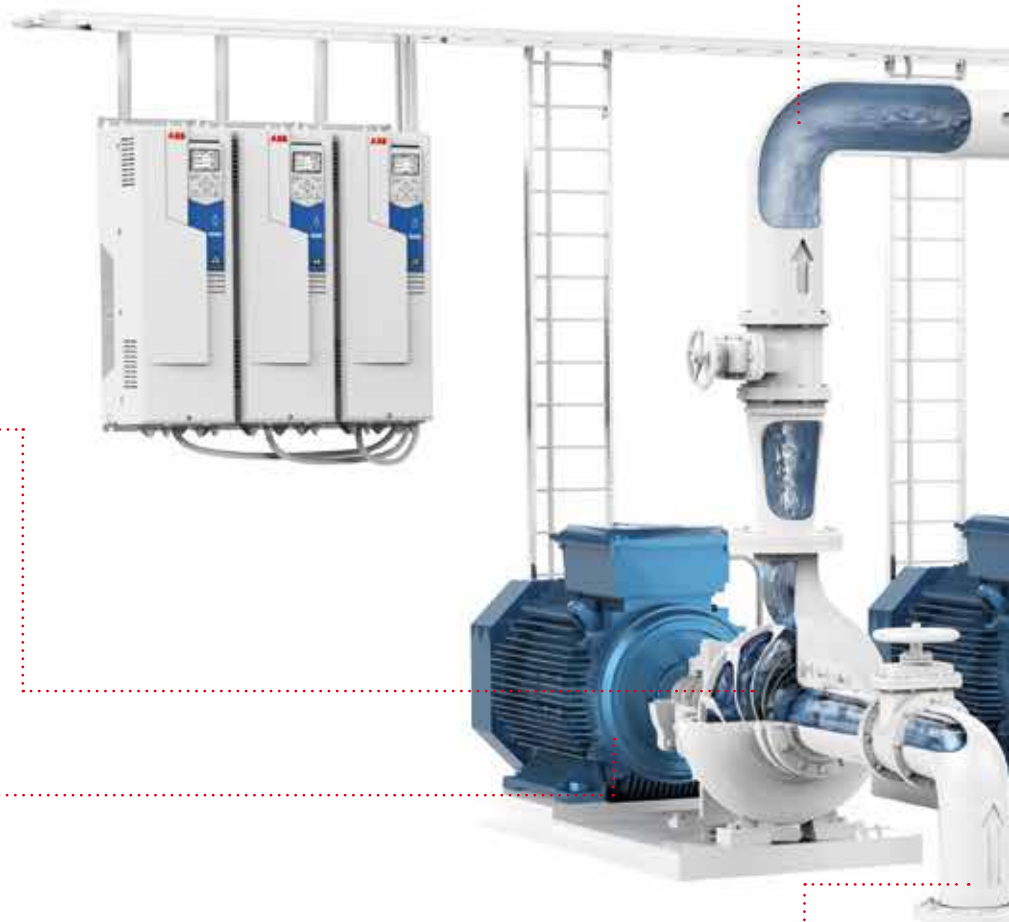
Extend the lifecycle of a submersible pump by reducing wear of the mechanical parts using ramp sets to accelerate and decelerate the pump.

## Pump priority

Achieve energy savings with optimal pump alternation by running the higher capacity pump when the consumption rate is higher.

## Multi-pump control

Ensure stable and uninterrupted production with multi-pump controls by optimizing the speed and number of running pumps.







- **Sleep boost**

Save energy while extending the life of the pump and motor by decreasing start/stop cycles during all hours of the day.

- **Auto-change**

Increase the mean time between repairs and save in service costs by balancing the long-term operating time of all pumps in a parallel pumping system.

- **Level control**

Ensures optimal efficiency when filling and emptying the tank.

- **Sensorless flow calculation**

Reduce costs by eliminating external components or backup the flow meters to avoid interruptions in the process.

- **Flow and pressure protection**

The drive protects the pumping system from a low and / or high pressure and flow, as well as prevents the pump from running dry.

- **Pump cleaning**

Achieve savings by preventing unplanned downtime as a result of accumulating obstructions being removed from the impeller of the pump.

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# Securing the flow of water and wastewater in the pump system

We want to be part of securing the operation of your water and wastewater utilities and distribution system. We want to help prevent any interruptions in your pump operation. We also want to ensure that the water is flowing in an effortless and energy efficient manner in accordance with required standards and regulations.

## **Complete offering of devices and services for the water industry**

As a global partner, we can manage your water assets and bring you clear benefits from a total cost of ownership perspective. We do this by reducing costs throughout the whole life cycle of your pumping solution. Our portfolio includes drives, motors, PLCs and sensors. We also offer remote monitoring solutions to access information from a pump operating at a distance, saving time and reducing costs. Our devices have been designed to be compatible with each other, which ensures reliable communication and functionality.

## **Proactive maintenance for minimizing disruption to your pump and water distribution system**

Motor-driven applications can be found throughout the water and wastewater industry. They have a high degree of reliance placed upon them and often perform critical duties and have a high in-service value. A possible failure of a device in the water and wastewater distribution system can result in loss of production, and introduce safety and environmental consequences. To reduce the risk of failure, each element of the pump solution - whether a drive, motor, bearing, coupling or gearing - must be properly maintained at the right times in their life cycle. From the moment you make the first enquiry to the disposal and recycling of each component, the services offered by ABB span the entire life cycle of your pump. Throughout the value chain, training, technical support and customized contracts are also available.





# How to select a drive?

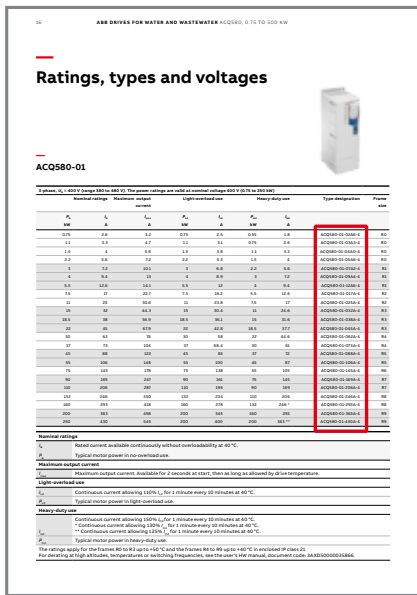
It is very easy to select the right drive. This is how you build up your own ordering code using the type designation key.

Start with identifying your supply voltage. This tells you what rating table to use. The ACQ580 supports 380 to 480 V.

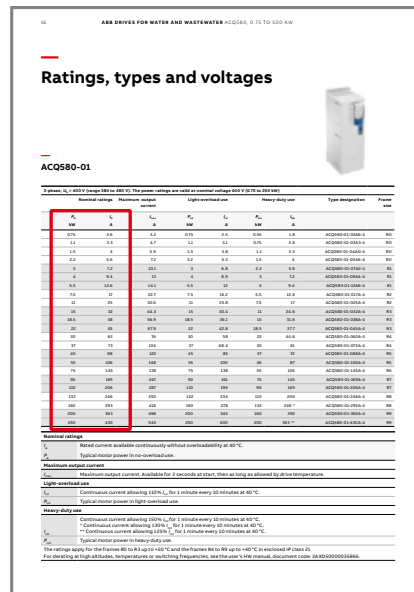


Choose your motor's nominal power rating from the ratings table on pages 16, 17 and 18.

Select your drive's type code from the rating table based on your motor's nominal power rating.

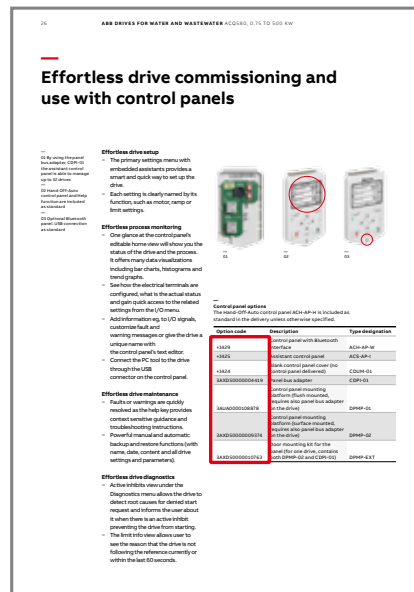
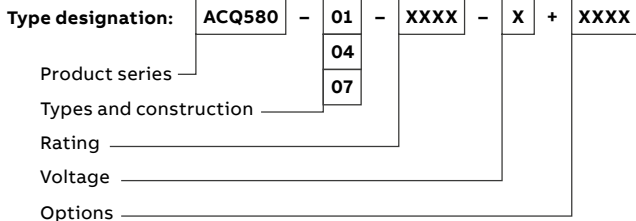


Pages 16, 17 and 18



Pages 16, 17 and 18

Choose your options. Details about each option begin on page 26. Add the option codes to the end of the drive's ordering code. Remember to use a "+" before each option code.



Page 26

# Technical specification

Mains connection		Environmental limits	
Voltage and power range	3-phase, $U_N$ 380 to 480 V, +10%/-15% 0.75 to 250 kW (-01) 250 to 500 kW (-04) 75 to 250 kW (-07)	Ambient temperature	
Frequency	50/60 Hz $\pm$ 5%	Transport	-40 to +70 °C
Power factor	$\cos\varphi = 0.98$	Storage	-40 to +70 °C
Efficiency (at nominal power)	98%	Operation area	ACQ580-01 Frames R0 to R3: -15 to +50 °C. No derating required, no frost allowed. Frames R4 to R9: -15 to +40 °C. No derating required, no frost allowed, +40 to +50 °C derating required ACQ580-04 Frames R10 to R11 -15 to +55 °C. No frost allowed. Frames R10 to R11 from +40 to +55 °C with derating 1% per 1 °C ACQ580-07 Frames R6 to R9: 0 to +40 °C. No derating required, no frost allowed. +40 to +50 °C derating required See HW manual for more information.
Motor connection		Cooling method	
Voltage	0 to $U_N$ , 3-phase	Air-cooled	Dry clean air
Frequency	0 to 500 Hz	Altitude	
Motor control	Scalar and vector control	0 to 1.000 m	Without derating
Torque control	Torque step rise time: <10 ms with nominal torque Non-linearity: $\pm$ 5% with nominal torque	1.000 to 4.000 m	With derating of 1%/100 m
Speed control	Static accuracy: 20% of motor nominal slip Dynamic accuracy: 1% seconds with 100% torque step	Relative humidity	5 to 95%. no condensation allowed
Product compliance		Degree of protection	ACQ580-01: IP21 as standard and IP55 as option ACQ580-04: IP00 as standard and IP20 as option ACQ580-07: IP21 as standard IP42 and IP54 as option
CE Low Voltage Directive 2006/95/EC, EN 61800-5-1: 2007 Machinery Directive 2006/42/EC, EN 61800-5-2: 2007 EMC Directive 2004/108/EC, EN 61800-3: 2004 + A1: 2012 RoHS directive 2011/65/EU Quality assurance system ISO 9001 and Environmental system RCM ISO 14001 EAC UL, cUL TÜV Nord (safety functions)		Functional safety	Safe torque off (STO according EN 61800-5-2) IEC 61508 ed2: SIL 3, IEC 61511: SIL 3, IEC 62061: SIL CL 3, EN ISO 13849-1: PL e
<b>EMC according to EN 61800-3: 2004 + A1: 2012</b>		Contamination levels	No conductive dust allowed
ACQ580-01 wall-mounted drive with built-in C2 category filter as standard (frames R0 to R9) ACQ580-04 drive module with built-in C3 category as standard (frames R10 to R11) ACQ580-07 cabinet-built drive with built-in C2 category filter as standard (frames R6 to R9)		Storage	IEC 60721-3-1. Class 1C2 (chemical gases). Class 1S2 (solid particles)*
		Operation	IEC 60721-3-3. Class 3C2 as standard and 3C3 as option (chemical gases). Class 3S2 (solid particles)*
		Transportation	IEC 60721-3-2. Class 2C2 (chemical gases). Class 2S2 (solid particles)*
		* C = chemically active substances S = mechanically active substances	

# Securing the flow of water and wastewater with the ACQ580

The ACQ580 is a robust and compact drive ensuring low energy consumption and continuous, reliable motor control with a power and voltage range from 0.75 to 500 kW and 380 to 480 V. It has coated boards and offers enclosure classes up to IP55 for different environments. The drive is designed for water and wastewater pumps, blowers, mixers, centrifuges and fans.

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01 The ACQ580 drive series

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02 Flange mounting for panel installation ensures less thermal load inside panel by keeping most of the losses outside the panel

## Built-in pump functionality for optimal flow of water

Built-on ABB's common drives architecture, the drive offers pump operation, energy savings and usability benefits supported by a local network of service and support. The water and wastewater drive has several different built-in pump application programs for optimal pump operation (see page 22).

## Intuitive usability supported by simple connectivity

To ensure fast set-up and operation of the drive, adjusting drive settings has been made easy with the robust and intuitive Hand-Off-Auto control panel. The control panel has a powerful diagnostics menu that makes it possible to quickly access information, even in facilities with poor visibility. Drive usability is further enhanced via wireless Bluetooth connectivity between the drive and mobile devices, making it easy to access the drive in difficult-to-reach locations. Connectivity to automation systems is ensured with the drive connecting to various fieldbus protocols. To ensure compliance with electric grids, the ACQ580 has a built-in 1st environment EMC filter and choke. The drive also supports functional safety design, as it offers integrated safety features with safe torque off (STO) built-in as standard. The wall-mounted drive (ACQ580-01) offers flange mounting as an option, separating the control electronics from the main circuit cooling airflow, saving space and ensuring optimal cooling and extends the lifetime of the drive. The cabinet-built drive (ACQ580-07) offers flange mounting as a standard solution. This results in better thermal management during panel installation. The advanced pedestal system and ramp of the drive module (ACQ580-04) ensure easy installation and reduce time needed for setup and commissioning.



# Complete offering from wall-mounted drives to cabinet installations

No matter the frame size or power range, all ACQ580 drives bring you ease of use, scalability and quality.

- 01 Wall-mounted ACQ580 IP55 drive
- 02 ACQ580 Drive module IP00 drive
- 03 Cabinet-built ACQ580 IP42 drive

## The wall-mounted IP21 drives

The wall-mounted IP21 drives are available with the power and voltage range from 0.75 to 250 kW and 3-ph 380 to 480 V. Side-by-side mounting, flange mounting and horizontal mounting are all available for the wall-mounted ACQ580 drives.

## The wall-mounted IP55 drives

The IP55 drive is designed for applications exposed to dust, moisture, vibrations and other harsh environments. It is similar in size to the compact IP21 drives, which provides significant savings in space, maintenance, engineering, material costs, as well as in setup and commissioning time.

## Drive modules for cabinet installations

The ACQ580 drive modules are optimal for system integrators, cabinet builders or OEMs who want to optimize the cabined design in the 250 to 500 kW range, but do not want to compromise the easy installation, commissioning and maintenance.

## Cabinet-built drives

The cabinet-built drives are available with IP21 protection class as standard and IP42/54 as options in frame sizes R6 to R9. The drives have a new cooling arrangement and a global cabinet design with high quality standard. The power and voltage range is from 75 kW to 250 kW, 3-ph 380 to 480 V.



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02



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03

# Ratings, types and voltages



## ACQ580-01

3-phase,  $U_N = 400$  V (range 380 to 480 V). The power ratings are valid at nominal voltage 400 V (0.75 to 250 kW)

Nominal ratings		Maximum output current		Light-overload use		Heavy-duty use		Type designation	Frame size
$P_N$ kW	$I_N$ A	$I_{max}$ A	$P_{Ld}$ kW	$I_{Ld}$ A	$P_{Hd}$ kW	$I_{Hd}$ A			
0.75	2.6	3.2	0.75	2.5	0.55	1.8	ACQ580-01-02A6-4	R0	
1.1	3.3	4.7	1.1	3.1	0.75	2.6	ACQ580-01-03A3-4	R0	
1.5	4	5.9	1.5	3.8	1.1	3.3	ACQ580-01-04A0-4	R0	
2.2	5.6	7.2	2.2	5.3	1.5	4	ACQ580-01-05A6-4	R0	
3	7.2	10.1	3	6.8	2.2	5.6	ACQ580-01-07A2-4	R1	
4	9.4	13	4	8.9	3	7.2	ACQ580-01-09A4-4	R1	
5.5	12.6	14.1	5.5	12	4	9.4	ACQ580-01-12A6-4	R1	
7.5	17	22.7	7.5	16.2	5.5	12.6	ACQ580-01-017A-4	R2	
11	25	30.6	11	23.8	7.5	17	ACQ580-01-025A-4	R2	
15	32	44.3	15	30.4	11	24.6	ACQ580-01-032A-4	R3	
18.5	38	56.9	18.5	36.1	15	31.6	ACQ580-01-038A-4	R3	
22	45	67.9	22	42.8	18.5	37.7	ACQ580-01-045A-4	R3	
30	62	76	30	58	22	44.6	ACQ580-01-062A-4	R4	
37	73	104	37	68.4	30	61	ACQ580-01-073A-4	R4	
45	88	122	45	83	37	72	ACQ580-01-088A-4	R5	
55	106	148	55	100	45	87	ACQ580-01-106A-4	R5	
75	145	178	75	138	55	105	ACQ580-01-145A-4	R6	
90	169	247	90	161	75	145	ACQ580-01-169A-4	R7	
110	206	287	110	196	90	169	ACQ580-01-206A-4	R7	
132	246	350	132	234	110	206	ACQ580-01-246A-4	R8	
160	293	418	160	278	132	246 *	ACQ580-01-293A-4	R8	
200	363	498	200	345	160	293	ACQ580-01-363A-4	R9	
250	430	545	200	400	200	363 **	ACQ580-01-430A-4	R9	

### Nominal ratings

$I_N$	Rated current available continuously without overloadability at 40 °C.
$P_N$	Typical motor power in no-overload use.

### Maximum output current

$I_{max}$	Maximum output current. Available for 2 seconds at start, then as long as allowed by drive temperature.
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### Light-overload use

$I_{Ld}$	Continuous current allowing 110% $I_{Ld}$ for 1 minute every 10 minutes at 40 °C.
$P_{Ld}$	Typical motor power in light-overload use.

### Heavy-duty use

$I_{Hd}$	Continuous current allowing 150% $I_{Hd}$ for 1 minute every 10 minutes at 40 °C. * Continuous current allowing 130% $I_{Hd}$ for 1 minute every 10 minutes at 40 °C. ** Continuous current allowing 125% $I_{Hd}$ for 1 minute every 10 minutes at 40 °C.
$P_{Hd}$	Typical motor power in heavy-duty use.

The ratings apply for the frames R0 to R3 up to +50 °C and the frames R4 to R9 up to +40 °C in enclosed IP class 21

For derating at high altitudes, temperatures or switching frequencies, see the user's HW manual, document code: 3AXD50000035866.



# Ratings, types and voltages



## ACQ580-04

3-phase,  $U_N = 400$  V (range 380 to 480 V). The power ratings are valid at nominal voltage 400 V (250 to 500 kW)

Nominal ratings		Maximum output current		Light-overload use		Heavy-duty use		Type designation	Frame size
$P_N$	$I_N$	$I_{max}$	$P_{Ld}$	$I_{Ld}$	$P_{Hd}$	$I_{Hd}$			
kW	A	A	kW	A	kW	A			
250	505	560	250	485	200	361	ACQ580-04-505A-4	R10	
315	585	730	315	575	250	429	ACQ580-04-585A-4	R10	
355	650	730	355	634	250	477	ACQ580-04-650A-4	R10	
400	725	1020	400	715	315	566	ACQ580-04-725A-4	R11	
450	820	1020	450	810	355	625	ACQ580-04-820A-4	R11	
500	880	1100	500	865	400	725	ACQ580-04-880A-4	R11	

### Nominal ratings

$I_N$  Rated current available continuously without overloadability at 40 °C.

$P_N$  Typical motor power in no-overload use.

### Maximum output current

$I_{max}$  Maximum output current. Available for 2 seconds at start, then as long as allowed by drive temperature.

### Light-overload use

$I_{Ld}$  Continuous current allowing 110%  $I_{Ld}$  for 1 minute every 10 minutes at 40 °C.

$P_{Ld}$  Typical motor power in light-overload use.

### Heavy-duty use

$I_{Hd}$  Continuous current allowing 150%  $I_{Hd}$  for 1 minute every 10 minutes at 40 °C.

$P_{Hd}$  Typical motor power in heavy-duty use.

The ratings apply for the frames R0 to R3 up to +50 °C and the frames R4 to R9 up to +40 °C in enclosed IP class 21

The ratings apply for the frames R10 to R11 up to +40 °C in enclosed IP00/IP20.

For derating at high altitudes, temperatures or switching frequencies, see the user's HW manual, document code: 3AXD50000048677.

# Ratings, types and voltages



## ACQ580-07

3-phase,  $U_N = 400$  V (range 380 to 480 V). The power ratings are valid at nominal voltage 400 V (75 to 250 kW)

Nominal ratings		Maximum output current	Light-overload use		Heavy-duty use		Type designation	Frame size
$P_N$ kW	$I_N$ A	$I_{max}$ A	$P_{Ld}$ kW	$I_{Ld}$ A	$P_{Hd}$ kW	$I_{Hd}$ A		
75	145	178	75	138	55	104.9	ACQ580-07-0145A-4	R6
90	169	247	90	161	75	145	ACQ580-07-0169A-4	R7
110	206	287	110	196	90	169	ACQ580-07-0206A-4	R7
132	246	350.2	132	234	110	206	ACQ580-07-0246A-4	R8
160	293	418.2	160	278	132	246*	ACQ580-07-0293A-4	R8
200	363	498.1	200	345	160	293	ACQ580-07-0363A-4	R9
250	430	544.5	200	400	200	363**	ACQ580-07-0430A-4	R9

### Nominal ratings

$I_N$  Rated current available continuously without overloadability at 40 °C.

$P_N$  Typical motor power in no-overload use.

### Maximum output current

$I_{max}$  Maximum output current. Available for 2 seconds at start, then as long as allowed by drive temperature.

### Light-overload use

$I_{Ld}$  Continuous current allowing 150%  $I_{Ld}$  for 1 minute every 10 minutes at 40 °C.

\* Continuous current allowing 130%  $I_{Ld}$  for 1 minute every 10 minutes at 40 °C.

\*\* Continuous current allowing 125%  $I_{Ld}$  for 1 minute every 10 minutes at 40 °C.

$P_{Ld}$  Typical motor power in light-overload use.

### Heavy-duty use

$I_{Hd}$  Continuous current allowing 150%  $I_{Hd}$  for 1 minute every 10 minutes at 40 °C.

$P_{Hd}$  Typical motor power in heavy-duty use.

The ratings apply for the frames R6 to R9 up to +40 °C in enclosed IP class 21

For derating at high altitudes, temperatures or switching frequencies, see the user's HW manual, document code: 3AXD50000045817.

# Dimensions

ACQ580-01						
Frames	Height IP21/IP55	Width IP21/IP55	Depth IP21	Depth IP55	Weight IP21	Weight IP55
	mm	mm	mm	mm	kg	kg
R0	303	125	210	222	4.5	5.1
R1	303	125	223	223	4.6	5.5
R2	394	125	227	239	7.5	7.8
R3	454	203	228	237	14.9	15.1
R4	600	203	257	265	19	20
R5	732	203	295	320	28.3	29
R6	727	252	369	380	42.4	43
R7	880	284	370	381	54	56
R8	965	300	393	452	69	77
R9	955	380	418	477	97	103



ACQ580-04				
Frames	Height	Width	Depth	Weight
	mm	mm	mm	kg
R10	1462	350	529	162
R11	1662	350	529	200



ACQ580-07						
Frames	Height	Width	Depth IP21	Depth IP42, IP54	Weight IP21, IP42	Weight IP54
	mm	mm	mm	mm	kg	kg
R6	2145	400	673	698	210	225
R7	2145	400	673	698	220	235
R7	2145	400	673	698	220	235
R8	2145	500	673	698	255	275
R8	2145	500	673	698	255	275
R9	2145	500	673	698	275	295
R9	2145	500	673	698	275	295



# Pump control program

## ● Pump control

The pump control functionality includes auto-change and control of auxiliary pumps with contactor/soft starter control via relay outputs. In a pressure controlled pump system, the pump control functionality of the drive is useful when various pumps are operated in parallel mode at the same time and the flow required is variable. The functionality provides balanced and optimal operation at different loading points due to equal duty times between auxiliary motors. The pump control connects motors online from zero speed. One drive controls several pumps or blowers in parallel and eliminates the need for an external programmable logic controller. This results in reduced stress on the mains and the system as well as in lower maintenance and operation costs.

## ● Startup assistant

The intelligent and intuitive startup assistant allows first-time users to quickly customize the drive, out of the box, according to their needs. This is complemented by a built-in help function to make parameter-by-parameter setting easy. These features allow the drive to be quickly commissioned, even without manuals.

## ● Optimize energy use

The drives come with features that help you save and manage energy. The energy optimizer feature operates both in scalar and vector control modes, ensuring maximum torque per ampere and reducing energy drawn from the supply. You can monitor the hourly, daily and cumulative energy consumption via kWh counters. When the drive replaces other control methods (eg, direct-online control), you can follow the saved energy, CO2 emissions or money, and see how fast the drive brings you a return on investment.

## ● Sophisticated process control

The drives offer sophisticated process control in scalar and vector control modes. They support a wide range of motors including induction, permanent magnet and synchronous reluctance motors. Many embedded protection and other features improve performance of the motor and process.

## ● Reduced motor noise

The drive reduces motor noise by spreading the switching frequencies over a user-specified range. Users can define an allowed range of used switching frequency. As a result, the drive maximizes the actual used switching frequency based on thermal measurement. The higher used switching frequency reduces motor noise at low load without limiting full current at maximum load.

## ● Diagnostic menu

The drive is equipped with a diagnostic assistant that helps in locating the cause of any disturbance to the drive, and even suggests possible remedies. This reduces process downtime by making repairs or adjustments effortless.

## ● PID built-in

A built-in and stand-alone process PID/loop controller makes the drive a self-governing unit that requires no external logic input from the control room, but requires only an external process measurement. The sleep mode with boost functionality elevates the required level of operation momentarily eg, level or pressure of fluid, just before turning to sleep mode. This prolongs the time spent in sleep mode and saves energy.

## ● Load profile

Drive values, such as current, are collected by the load profile feature and stored in a log. The log shows how the drive is operating and enables you to analyze and optimize the application, to analyze historical load and optimize the application.

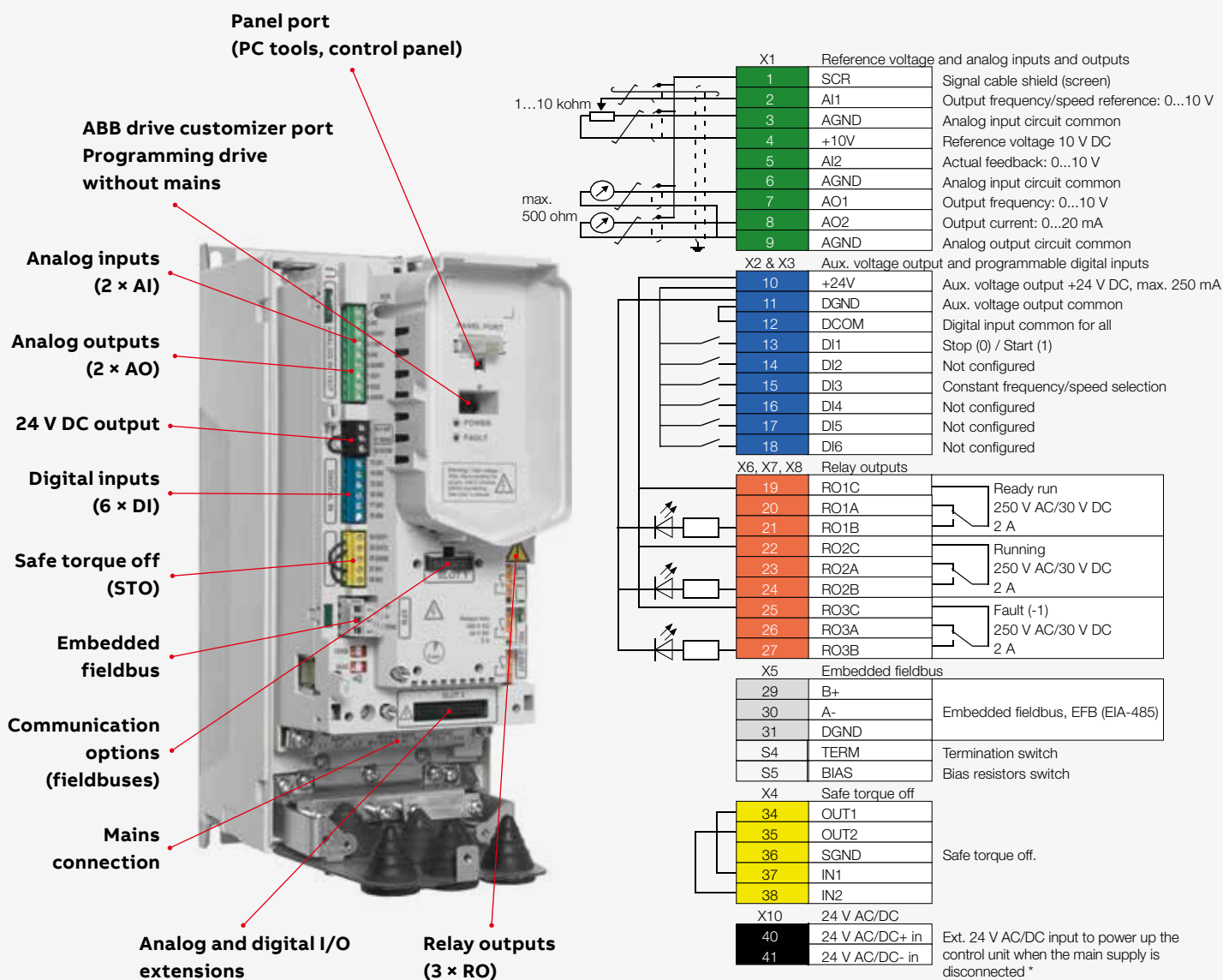
## ● Adaptive programming

Provides extra flexibility by offering easy alternative for simple programming needs.

# Comprehensive connectivity

The ACQ580 drives offer a wide range of standard interfaces. In addition, the drive has two option slots that can be used for extensions including fieldbus adapter modules and input/output extension modules.

## Default control connections to the CCU-23 control unit



\* only available in the CCU-24 control unit

# Built-in pump application software

The built-in pump application software in the ACQ580 drives is designed to enhance the reliability and durability of the water and wastewater application in which it is used. The functions protect the pump and secure its optimal functionality, increasing cost efficiency. The built-in functionalities also support the user in securing the flow of the water and wastewater in the pump solution.

## Multi-pump functionality

This built-in functionality ensures continuous operation for multipump systems if one or more pumps fails or requires maintenance. The function maintains stable process conditions for several parallel pumps (up to 8 pumps at the same time) operating together. It is possible to optimize the speed and number of pumps needed when the required flow or pressure rate is variable.

## Sensorless flow calculation

Ensure the appropriate amount of water flowing without the need for external sensors. This will enable you to reduce costs as there is no need for setting up and using additional sensors or back up the flow meters to avoid interruptions in the process.

## Level control

Control the filling or emptying of wastewater storage and water tower tanks. Level control can be used within a station controlling up to eight pumps. The level control function has varying pre-set water levels and the pumps will start and stop based on measured level. This method allows the pumps to run at an efficient speed and ensures the pump sump does not become over contaminated by sediment.

## Soft pipe fill

The soft pipe fill function manages the pressure of water filling the pipeline with a gentle approach. This helps to avoid sudden pressure peaks and reduces the risk of water hammer which can cause damage to the water pipes.

## Quick-ramp

Protect bearings when a submersible pump is started without water. Quick ramp allows your pump to reach optimal speed to extend pump life, ensure operation and prevent unplanned outages.

## Pump cleaning

Keeps the impeller of the pump clean by running a sequence of aggressive ramps between minimum and maximum pump speed.

## Turbidity reduction

When a pump starts as slow as possible, it creates the lowest turbidity values for the water being moved or extracted. When you combine the quick ramps and soft pipe fill functions, the drive will adjust the second acceleration rate to the best value possible based on your application needs.

## Pump protection

The built-in protection functionalities ensures that pumps can operate at the best possible conditions. The maximum pressure protections help to protect the pump and the system in case of a blockage in the pipeline. In case of a pipe rupture, the minimum pressure protection can generate an alarm or fault or can be programmed to run at certain speed to avoid dirty water entering the pipeline. The inlet pressure protection can help to avoid cavitation. When the inlet pressure of a water pump falls below pump design specifications, tiny vapor bubbles form. These bubbles collapse when they meet the impeller, causing shock waves and points of high temperature that can corrode the surface of the impeller.

## Dry run protection

This function prevents the pump from running dry. The water pump shaft and impeller are rotating at fast rates and if there is no water in the system, the energy is released as heat. This will damage the pump over time, limiting its lifetime.

# Ultimate efficiency and reliability to minimize your system cost of ownership

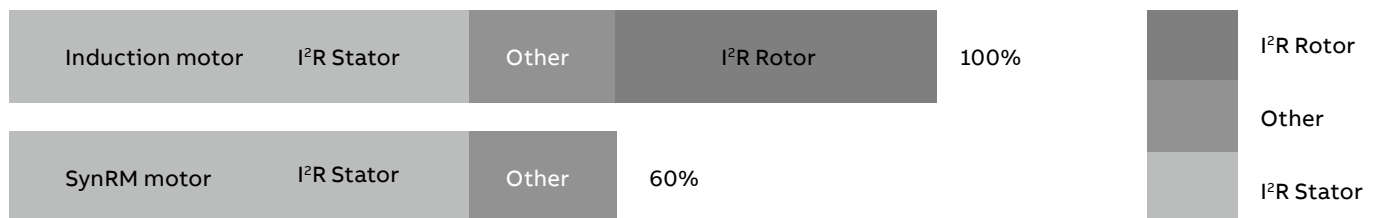


Traditional IE2 induction motor



IE4 SynRM motor

## Losses



### Innovation inside

The idea is simple. Take a conventional, proven stator technology and a totally new, innovative rotor design. Then combine them with a dedicated water industry drive loaded with new, application-designed software. Most of the pumps are constantly running at partial loads due to conservative design. With the Synchronous reluctance motor (SynRM) the energy efficiency remains at excellent levels also at partial loads.

### Magnet-free design

Synchronous reluctance technology combines the performance of the permanent magnet motor with the simplicity and service-friendliness of an induction motor. The new rotor has neither magnets nor windings and suffers virtually no power losses. And because of identical footprints, maintenance is as straightforward as with induction motors.

### Superior reliability to minimize the cost of not running

IE4 synchronous reluctance motors have very low winding temperatures, which increases the reliability and lifetime of the winding. More importantly, the cool synchronous reluctance rotor means significantly lower bearing temperatures – an important factor because bearing failures cause about 70 percent of unplanned motor outages.

**WHOLE LIFE COST** = + +

Capital costs      Operating costs      Cost of NOT running

## Selection guide

### IE4 synchronous reluctance motors

This table presents technical performance data for IE4 SynRM motors. Variant codes and construction details are based on the M3BP motor. Protection IP55, cooling IC 411, insulation class F, temperature rise class B. Motor values are given with an ACQ580 drive supply.

Output kW	Motor type		Product code	Speed $n_n$ r/min	Fre- quency $f_n$ Hz	Motor efficiency with drive supply %	Current $I_N$ A	Torque $T_N$ Nm	Package efficiency ** IES at nominal point (Pn)	PDS*** IES2 efficiency class low limit	Above IES2 low limit in % -units	Motor weight m kg	Suggested ACQ580 drive for no overload pump use*	Frame size	
<b>3000 rpm</b>				<b>400 V network</b>											
1.5	M3AL	90	L 4	3GAL 092 507- <sub>SB</sub> <sup>2)</sup>	3000	100	84.2	3.9	4.8	82.1	76.2	7.7	13	ACQ580-01-04A0-4	R0
2.2	M3AL	90	LA 4	3GAL 092 517- <sub>SB</sub> <sup>2)</sup>	3000	100	85.9	5.6	7.0	83.8	78.3	6.9	13	ACQ580-01-05A6-4	R0
3	M3AL	100	LB 4	3GAL 92527- <sub>SB</sub> <sup>1)2)</sup>	3000	100	88.6	9.5	9.6	86.4	79.8	8.2	23	ACQ580-01-09A4-4	R1
4	M3AL	112	LC 4	3GAL 92527- <sub>SB</sub> <sup>1)2)</sup>	3000	100	89.9	13.6	12.7	87.7	81.1	8.1	33	ACQ580-01-12A6-4	R1
5.5	M3AL	132	SMA 4	3GAL 132217- <sub>SC</sub>	3000	100	90.9	12.6	17.5	88.4	82.5	7.2	41	ACQ580-01-12A6-4	R1
7.5	M3AL	132h	SMB 4	3GAL 132227- <sub>SC</sub>	3000	100	91.7	16.9	23.9	89.3	83.9	6.4	41	ACQ580-01-017A-4	R2
11	M3AL	132	SMC 4	3GAL 132237- <sub>SC</sub>	3000	100	92.6	25	35.0	90.0	85.3	5.5	47	ACQ580-01-025A-4	R2
15	M3AL	132	SMD 4	3GAL 132247- <sub>SC</sub>	3000	100	93.3	33.5	47.7	90.7	86.2	5.2	47	ACQ580-01-038A-4	R3
11	M3BL	160	MLA 4	3GBL 162417- <sub>SC</sub>	3000	100	92.6	25.0	35.0	90.2	85.3	5.8	133	ACQ580-01-025A-4	R2
15	M3BL	160	MLB 4	3GBL 162427- <sub>SC</sub>	3000	100	93.3	34.8	48.0	90.5	86.2	5.0	133	ACQ580-01-038A-4	R3
18.5	M3BL	160	MLC 4	3GBL 162437- <sub>SC</sub>	3000	100	93.7	42.8	59.0	91.4	86.9	5.2	133	ACQ580-01-045A-4	R3
22	M3BL	180	MLA 4	3GBL 182417- <sub>SC</sub>	3000	100	94.0	50.0	70.0	91.6	87.3	4.9	160	ACQ580-01-062A-4	R4
30	M3BL	200	MLA 4	3GBL 202417- <sub>SC</sub>	3000	100	94.5	68.8	95.0	92.2	88.1	4.6	259	ACQ580-01-073A-4	R4
37	M3BL	200	MLB 4	3GBL 202427- <sub>SC</sub>	3000	100	94.8	84.6	118	92.7	88.6	4.7	259	ACQ580-01-088A-4	R5
45	M3BL	225	SMA 4	3GBL 222217- <sub>SC</sub>	3000	100	95.0	103	143	92.2	89.0	3.6	282	ACQ580-01-106A-4	R5
55	M3BL	225	SMF 4	3GBL 222267- <sub>SC</sub>	3000	100	95.3	122	175	92.6	89.4	3.5	282	ACQ580-01-145A-4	R6
<b>1500 rpm</b>															
1.1	M3AL	90	LA 4	3GAL 092 513- <sub>SB</sub> <sup>2)</sup>	1500	50	81.4	2.9	7.0	79.4	74.0	7.3	13	ACQ580-01-03A3-4	R0
1.5	M3AL	90	LB 4	3GAL 092 523- <sub>SB</sub> <sup>2)</sup>	1500	50	82.8	3.8	9.6	80.7	76.2	5.9	16	ACQ580-01-04A0-4	R0
2.2	M3AL	100	LB 4	3GAL 102523- <sub>SB</sub> <sup>1)2)</sup>	1500	50	86.2	5.8	14.0	84.0	78.3	7.3	23	ACQ580-01-07A2-4	R1
3	M3AL	100	LB 4	3GAL 102523- <sub>SB</sub> <sup>2)</sup>	1500	50	85.5	7.1	19.1	83.4	79.8	4.4	23	ACQ580-01-07A2-4	R1
4	M3AL	112	MB 4	3GAL 112323- <sub>SB</sub> <sup>1)2)</sup>	1500	50	88.0	10.6	25.5	85.8	81.1	5.8	33	ACQ580-01-12A6-4	R1
5.5	M3AL	132	SMA 4	3GAL 132213- <sub>SC</sub>	1500	50	91.9	12.1	35.0	89.6	82.5	8.6	63	ACQ580-01-12A6-4	R1
7.5	M3AL	132	SMB 4	3GAL 132223- <sub>SC</sub>	1500	50	92.6	16.2	47.7	90.1	83.9	7.4	63	ACQ580-01-017A-4	R2
11	M3AL	132	SMC 4	3GAL 132233- <sub>SC</sub>	1500	50	93.3	24	70	90.6	85.3	6.2	69	ACQ580-01-025A-4	R2
11	M3BL	160	MLA 4	3GBL 162413- <sub>SC</sub>	1500	50	93.3	24.9	70	90.9	85.3	6.6	160	ACQ580-01-025A-4	R2
15	M3BL	160	MLB 4	3GBL 162423- <sub>SC</sub>	1500	50	93.9	33.7	95	91.3	86.2	5.9	177	ACQ580-01-038A-4	R3
18.5	M3BL	180	MLA 4	3GBL 182413- <sub>SC</sub>	1500	50	94.2	42.0	118	92.0	86.9	5.9	177	ACQ580-01-045A-4	R3
22	M3BL	200	MLF 4	3GBL 202463- <sub>SC</sub>	1500	50	94.5	49.1	140	92.2	87.3	5.6	304	ACQ580-01-062A-4	R4
30	M3BL	200	MLA 4	3GBL 202413- <sub>SC</sub>	1500	50	94.9	66.7	191	92.6	88.1	5.1	304	ACQ580-01-073A-4	R4
37	M3BL	250	SMF 4	3GBL 252263- <sub>SC</sub>	1500	50	95.2	82.0	236	93.1	88.6	5.1	428	ACQ580-01-088A-4	R5
45	M3BL	250	SMG 4	3GBL 252273- <sub>SC</sub>	1500	50	95.4	99.5	286	92.8	89.0	4.3	428	ACQ580-01-106A-4	R5
55	M3BL	250	SMA 4	3GBL 252213- <sub>SC</sub>	1500	50	95.7	121	350	93.1	89.4	4.1	454	ACQ580-01-145A-4	R6
75	M3BL	280	SMA 4	3GBL 282213- <sub>DC</sub>	1500	50	96.0	173	478	93.6	90.0	4.0	639	ACQ580-01-206A-4	R7
90	M3BL	280	SMB 4	3GBL 282223- <sub>DC</sub>	1500	50	96.1	202	573	93.7	90.2	3.9	639	ACQ580-01-206A-4	R7
110	M3BL	280	SMC 4	3GBL 282233- <sub>DC</sub>	1500	50	96.3	245	699	93.5	90.5	3.3	697	ACQ580-01-246A-4	R8
110	M3BL	315	SMA 4	3GBL 312213- <sub>DC</sub>	1500	50	96.3	244	702	94.0	90.5	3.9	873	ACQ580-01-246A-4	R8
132	M3BL	315	SMB 4	3GBL 312223- <sub>DC</sub>	1500	50	96.4	290	842	94.0	90.7	3.6	925	ACQ580-01-293A-4	R8
160	M3BL	315	SMC 4	3GBL 312233- <sub>DC</sub>	1500	50	96.6	343	1018	94.2	90.9	3.6	965	ACQ580-01-363A-4	R8
200	M3BL	315	MLA 4	3GBL 312413- <sub>DC</sub>	1500	50	96.7	427	1272	94.5	91.1	3.7	1116	ACQ580-01-430A-4	R9
250	M3BL	315	LKA 3	3GBL 312813- <sub>DC</sub>	1500	50	96.7	542	1591	94.4			1357	ACQ580-04-585A-4 <sup>3)</sup>	R10
315	M3BL	315	LKA 3	3GBL 312833- <sub>DC</sub>	1500	50	96.7	650	2006	94.3			1533	ACQ580-04-585A-4 <sup>3)</sup>	R10

<sup>1)</sup> Motor with restamped output required (option +002)

<sup>2)</sup> Motor non-conformable with IE4 EE class

<sup>3)</sup> ACQ580-04 drive module, protection IP00

\* Motor type M3AL = aluminum motor frame

\* Motor type M3BL = cast iron motor frame

\*\* Calculated package efficiency values for ACQ580-01 and -04, measured values TBA

\*\*\* PDS = Power Drive System



## Selection guide

### IE4 synchronous reluctance motors

This table presents technical performance data for IE4 SynRM motors. Variant codes and construction details are based on the M3BP motor. Protection IP55, cooling IC 411, insulation class F, temperature rise class B. Motor values are given with an ACQ580 drive supply.

Output kW	Motor type		Product code		Speed	Fre-	Motor	Current	Torque	PackagePDS***	IES2	Above	Motor	Suggested ACQ580	Frame
					$n_N$ r/min	quency $f_{el}$ Hz	efficiency with drive supply %	$I_N$ A	$T_N$ Nm	efficiency ** IES at nominal point (Pn)	efficiency class low limit	IES2 low limit in % -units	weight m kg	drive for no overload pump use*	size
<b>3000 rpm</b>															
<b>400 V network</b>															
55	M3BL	225	SMF 4	3GBL 222267-_SC	3000	100	95.3	122	175	92.6	89.4	3.5	282	ACQ580-07-145A-4	R6
<b>1500 rpm</b>															
55	M3BL	250	SMA 4	3GBL 252213-_SC	1500	50	95.7	121	350	93.1	89.4	4.1	454	ACQ580-07-145A-4	R6
75	M3BL	280	SMA 4	3GBL 282213-_DC	1500	50	96.0	173	478	93.6	90.0	4.0	639	ACQ580-07-206A-4	R7
90	M3BL	280	SMB 4	3GBL 282223-_DC	1500	50	96.1	202	573	93.7	90.2	3.9	639	ACQ580-07-206A-4	R7
110	M3BL	280	SMC 4	3GBL 282233-_DC	1500	50	96.3	245	699	93.5	90.5	3.3	697	ACQ580-07-246A-4	R8
110	M3BL	315	SMA 4	3GBL 312213-_DC	1500	50	96.3	244	702	94.0	90.5	3.9	873	ACQ580-07-246A-4	R8
132	M3BL	315	SMB 4	3GBL 312223-_DC	1500	50	96.4	290	842	94.0	90.7	3.6	925	ACQ580-07-293A-4	R8
160	M3BL	315	SMC 4	3GBL 312233-_DC	1500	50	96.6	343	1018	94.2	90.9	3.6	965	ACQ580-07-363A-4	R8
200	M3BL	315	MLA 4	3GBL 312413-_DC	1500	50	96.7	427	1272	94.5	91.1	3.7	1116	ACQ580-07-430A-4	R9

<sup>1)</sup> Motor with restamped output required (option +002)

<sup>2)</sup> Motor non-conformable with IE4 EE class

\* Motor type M3AL = aluminum motor frame

\* Motor type M3BL = cast iron motor frame

\*\* Calculated package efficiency values for ACQ580-07, measured values TBA

\*\*\* PDS = Power Drive System

# Effortless drive commissioning and use with control panels

- 01 By using the panel bus adapter, CDPI-01 the assistant control panel is able to manage up to 32 drives
- 02 Hand-Off-Auto control panel and Help function are included as standard
- 03 Optional Bluetooth panel. USB connection as standard

## Effortless drive setup

- The primary settings menu with embedded assistants provides a smart and quick way to set up the drive.
- Each setting is clearly named by its function, such as motor, ramp or limit settings.

## Effortless process monitoring

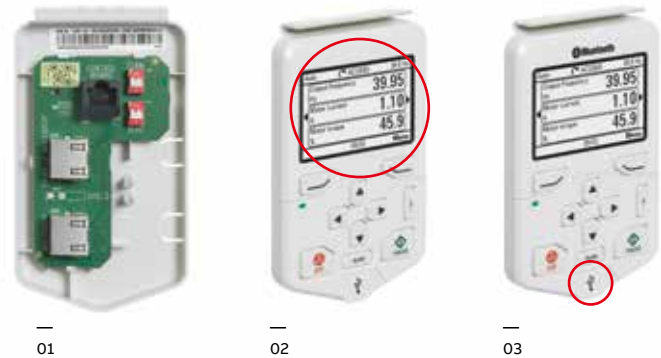
- One glance at the control panel's editable home view will show you the status of the drive and the process. It offers many data visualizations including bar charts, histograms and trend graphs.
- See how the electrical terminals are configured, what is the actual status and gain quick access to the related settings from the I/O menu.
- Add information eg, to I/O signals, customize fault and warning messages or give the drive a unique name with the control panel's text editor.
- Connect the PC tool to the drive through the USB connector on the control panel.

## Effortless drive maintenance

- Faults or warnings are quickly resolved as the help key provides context sensitive guidance and troubleshooting instructions.
- Powerful manual and automatic backup and restore functions (with name, date, content and all drive settings and parameters).

## Effortless drive diagnostics

- Active inhibits view under the Diagnostics menu allows the drive to detect root causes for denied start request and informs the user about it when there is an active inhibit preventing the drive from starting.
- The limit info view allows user to see the reason that the drive is not following the reference currently or within the last 60 seconds.



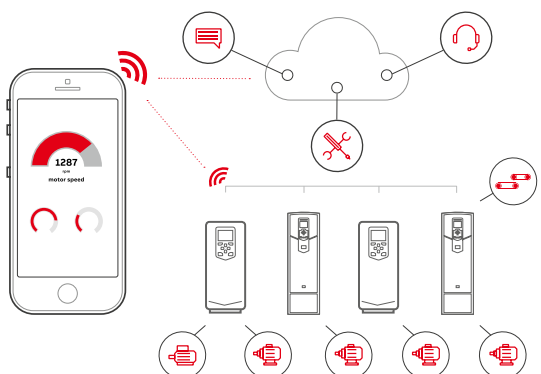
## Control panel options

The Hand-Off-Auto control panel ACH-AP-H is included as standard in the delivery unless otherwise specified.

Option code	Description	Type designation
+J429	Control panel with Bluetooth interface	ACH-AP-W
+J425	Assistant control panel	ACS-AP-I
+J424	Blank control panel cover (no control panel delivered)	CDUM-01
3AXD5000004419	Panel bus adapter	CDPI-01
3AUA0000108878	Control panel mounting platform (flush mounted, requires also panel bus adapter on the drive)	DPMP-01
3AXD50000009374	Control panel mounting platform (surface mounted, requires also panel bus adapter on the drive)	DPMP-02
3AXD50000010763	Door mounting kit for the panel (for one drive, contains both DPMP-02 and CDPI-01)	DPMP-EXT

# Save time, ease troubleshooting and improve drive performance with ABB smartphone apps

## Better connectivity and user experience with Drivetune



Easy and fast access to product information and support

### Manage your drives and the process lines and machines they control



Easy access to cloud-based drive and process information from anywhere via an online connection



Start up, commission and tune your drive and application

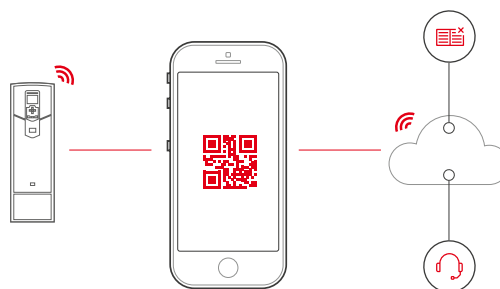


Simplified user guidance with instant access to drive status and configuration



Performance optimization via drive troubleshooting features and fast support

## Services and support on the go with Drivebase



Search for support documents and contacts

### Maintain and service all your installed drives on one or multiple sites



Get 6 months extra warranty for free by registering your drive with the Drivebase app



Access your product and service information in the cloud from anywhere



Access your drive's diagnostics data



Push notifications for critical product and service updates

## Access information anywhere

Download the apps using the QR codes below or directly from the app stores



**Drivetune** for commissioning and managing drives



**Drivebase** for ensured reliability and reduced downtime on production sites

## High protection for operation in harsh environments

The ACQ580 can be installed in clean rooms, or even dusty and wet environments, thanks to the drive's wall-mountable construction in both IP21 and IP55 configurations. The module variant is as standard IP00 but available as IP20 with additional finger shrouds. The cabinet-built variant comes with IP21 as standard and is also available with IP42 and IP54 protection class for use in harsh environments.

The robust and protective design ensures that no additional enclosures or components, such as filters and fans, are needed. Overall, the harsh protection drives provide smaller capital expenses by avoiding or advancing maintenance of external components, which in turn improves the reliability of the drive and the process. To ensure reliable operation, the printed circuit boards are also offered to comply with class 3C3 in IP55 drives.

Option code	Description
+C218 + B056	3C3 rated PCBS

## Flange mounting

The ACQ580 wall-mounted drive offers flange mounting as an option, separating the control electronics from the main circuit cooling airflow, saving space and ensuring optimal cooling. This results in better thermal management during panel installation.

Option code	Description
C135	Flange mounting

## Advanced cooling

The simple and robust design of the ACQ580-07 ensures reliable operation even in the harsh environments. The flange mounting feature comes as standard for cabinet-built ACQ580 drive, which makes the whole cooling arrangement of the cabinet advanced.



# Quick configuration for unpowered drives

01 Cold configuration adapter CCA-01

02 Remote monitoring tool NETA-21

03 The Drive composer PC tool

Cold configuration adapter CCA-01 provides a serial communication interface for unpowered ACQ580 drives, among other selected drives. With the adapter, safety isolation of both serial communication and control board power supply is possible. The power supply is taken from a PC USB port.

## PC tool for drive monitoring and process tuning capabilities

The Drive composer PC tool offers fast and harmonized setup, commissioning and monitoring for the whole all-compatible drives portfolio. The free version of the tool provides startup and maintenance capabilities and gathers all drive information such as parameter loggers, faults, backups and event lists into a support diagnostics file with a single mouse click. This provides faster fault tracking, shortens downtime and reduces operational and maintenance costs. The entry version also includes AP programming.

The Drive composer tool is connected to the drive using the mini USB connection on the assistant control panel.

## Drive composer pro offers extended functionality

Drive composer pro provides additional features such as custom parameter windows, graphical control diagrams of the drive's configuration and improved monitoring and diagnostics. The control diagrams save users from browsing long lists of parameters and help set the drive's logic quickly and easily. The tool has



## Cold configurator adapter

Ordering code	Description	Type designation
3AXD50000019865	Cold configurator adapter, packed kit	CCA-01

## Remote monitoring option

Ordering code	Description	Type designation
3AUA0000094517	2 x panel bus interface, 2 x 32 = max. 64 drives 2 x Ethernet interface SD memory card USB port for WLAN/3G	NETA-21

fast monitoring capabilities of multiple signals from several drives in the panel bus. Full backup and restore functions are also included.

## Remote monitoring access worldwide

The remote monitoring tool, NETA-21, gives easy access to the drive via the Internet or local Ethernet network. NETA-21 comes with a built-in web server.

Compatible with standard web browsers, it ensures easy access to a web-based user interface. Through the web interface, the user can configure drive parameters, monitor drive log data, load levels, run time, energy consumption, I/O data and bearing temperatures of the motor connected to the drive.

# Flexible connectivity to automation networks

—  
01 ACQ580 is compatible with many fieldbus protocols

The drives for water and wastewater are compatible with a wide range of fieldbus protocols. The drive comes with a Modbus RTU fieldbus interface as standard. Optional fieldbus adapters can easily be mounted inside the drive.

## Drive monitoring

A set of drive parameters and/or actual signals, such as torque, speed, current, etc., can be selected for cyclic data transfer, providing fast data access.

## Drive diagnostics

Accurate and reliable diagnostic information can be obtained through the alarm, limit and fault words, allowing easy interfacing with plantwide HMIs.

## Cabling

Substituting the large amount of conventional drive control cabling and wiring with a single cable reduces costs and increases system reliability and flexibility.

## Design

The use of a fieldbus control reduces engineering time at installation due to the modular structure of the hardware and software and the simplicity of the connections to the drives.

## Commissioning and assembly

The modular product configuration allows pre-commissioning of single machine sections and provides easy and fast assembly of the complete installation.

## Universal communication with ABB fieldbus adapters

The ACQ580 supports the following fieldbus protocols:



—  
01

## Fieldbus adapters

Option code	Fieldbus protocol	Adapter
+K451	DeviceNet	FDNA-01
+K454	PROFIBUS-DP	FPBA-01
+K458	Modbus/RTU	FSCA-01
+K473	Ethernet (EtherNet/IP™, Modbus TCP, PROFINET)	FENA-11
+K475	2-port Ethernet (EtherNet/IP™, Modbus TCP, PROFINET)	FENA-21

# Input/output extension and thermistor protection modules for increased connectivity and safety

—  
01 ACQ580 has wide selection of input/output extensions

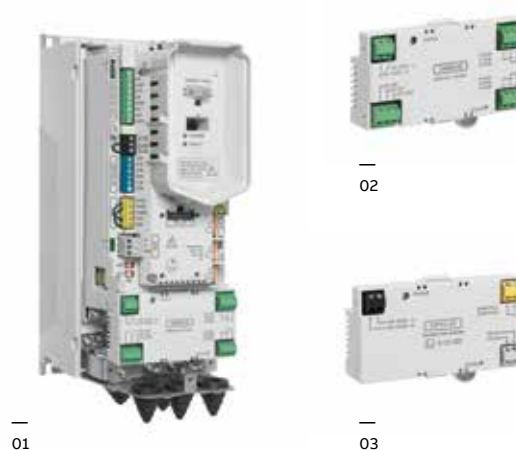
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02 Input/output extension modules CMOD-01

—  
03 Input/output extension modules CPTC-02

Standard input and output can be extended by using optional analog and digital input/output extension modules. The modules are easily installed in the extension slots located on the drive. The CMOD options also enable connection to an external +24 V supply, which allows the control panel, control board, fieldbus and I/O to stay on when mains supply is cut off. With the external supply, drive diagnosis and fault finding can still be carried out.

The ATEX certified thermistor protection module\* CPTC-02 provides enhanced process safety and easy, simplified installation.

\*For availability, check with ABB



## I/O options

Option code	Description	Type designation
+L501	External 24 V AC and DC 2 x RO and 1 x DO	CMOD-01
+L523	External 24 V and isolated PTC interface	CMOD-02
+L512	115/230 V digital input 6 x DI and 2 x RO	CHDI-01
+L537 +Q971	ATEX certified PTC interface and external 24V	CPTC-02

# EMC – electromagnetic compatibility

The ACQ580 drive is equipped with a built-in filter to reduce high frequency emissions. The EMC product standard (EN 61800-3) category C2 is fulfilled in ACQ580-01 and -07 drives as standard and category C3 in ACQ580-04 as standard.

## EMC standards

The EMC product standard (EN 61800-3) covers the specific EMC requirements stated for drives (tested with motor and motor cable) within the EU. EMC standards such as EN 55011 or EN 61000-6-3/4 are applicable to industrial and domestic equipment and systems including components inside the drive. Drive units complying with the requirements of EN 61800-3 are compliant with comparable categories in EN 55011 and EN 61000-6-3/4, but not necessarily vice versa. EN 55011 and EN 61000-6-3/4 do not specify cable length or require a motor to be connected as a load. The emission limits are comparable to EMC standards according to the table below.

## Domestic environments versus public low voltage networks

1st environment includes domestic premises. It also includes establishments directly connected without an intermediate transformer to a low voltage power supply network that supplies buildings used for domestic purposes. 2nd environment includes all establishments directly connected to public low voltage power supply networks.

## Mains chokes and built-in chokes

ABB cares about harmonics and we use chokes that help to mitigate noise at all operating ranges of the drive.

Comparison of EMC standards				
EMC according to EN 61800-3 product standard	EN 61800-3 product standard	EN 55011, product family standard for industrial, scientific and medical (ISM) equipment	EN 61000-6-4, generic emission standard for industrial environments	EN 61000-6-3, generic emission standard for residential, commercial and light-industrial environment
1 <sup>st</sup> environment, unrestricted distribution	Category C1	Group 1, Class B	Not applicable	Applicable
1 <sup>st</sup> environment, restricted distribution	Category C2	Group 1, Class A	Applicable	Not applicable
2 <sup>nd</sup> environment, unrestricted distribution	Category C3	Group 2, Class A	Not applicable	Not applicable
2 <sup>nd</sup> environment, restricted distribution	Category C4	Not applicable	Not applicable	Not applicable



# du/dt filters

du/dt filtering suppresses inverter output voltage spikes and rapid voltage changes that stress motor insulation. Additionally, du/dt filtering reduces capacitive leakage currents and high frequency emission of the motor cable as well as high frequency losses and bearing currents in the

motor. The need for du/dt filtering depends on the motor insulation. For information on the construction of the motor insulation, consult the manufacturer. More information on the du/dt filters can be found in the ACQ580 hardware manual.

**du/dt filter selection table**

Motor type	Nominal mains voltage ( $U_N$ )	Motor insulation requirement
ABB M2 and M3 motors	$U_N \leq 500 \text{ V}$	Standard insulation system.
ABB form-wound HXR and AM motors	$380 \text{ V} < U_N \leq 500 \text{ V}$	Standard insulation system.
ABB random-wound HXR and AM motors	$380 \text{ V} < U_N \leq 500 \text{ V}$	Check motor insulation system with the motor manufacturer.
Non-ABB random-wound and form-wound	$U_N \leq 420 \text{ V}$	If the insulation system withstands $\hat{U}_{LL} = 1600 \text{ V}$ and $\Delta t = 0.2 \mu\text{s}$ , du/dt filtering is not required. With du/dt filtering the insulation system must withstand $\hat{U}_{LL} = 1300 \text{ V}$ .

$U_N$  = Nominal mains voltage

$\hat{U}_{LL}$  = Peak line-to-line voltage at motor terminals

$\Delta t$  = Rise time, ie, interval during which line-to-line voltage at motor terminals changes from 10 to 90% of full voltage range



# Cooling and fuses

## Cooling

ACQ580 drives are fitted with variable-speed cooling fans. The speed-controlled fans cool the drive only when needed, reducing overall noise level and energy consumption.

## Fuse connection

Standard fuses can be used with the ACQ580 drives. For input fuses, see the table below:

## Wall-mounted drives, ACQ580-01

Cooling air flow and recommended input protection fuses for 380 to 415 V units												
Type designation	Frame size	Cooling air flow 380 to 415 V units						Recommended input protection fuses for 380 to 415 V units***				
		Heat dissipation*		Air flow		Max. noise level**	IEC fuses		UL fuses			
		W	BTU/Hr	m <sup>3</sup> /h	ft <sup>3</sup> /min		A	Fuse type	A	Fuse type		
ACQ580-01-02A6-4	R0	45	155	34	20	56	4	gG	6	UL Class T		
ACQ580-01-03A3-4	R0	55	187	34	20	56	6	gG	6	UL Class T		
ACQ580-01-04A0-4	R0	66	224	34	20	56	6	gG	6	UL Class T		
ACQ580-01-05A6-4	R0	84	288	34	20	56	10	gG	10	UL Class T		
ACQ580-01-07A2-4	R1	106	362	50	29	55	10	gG	10	UL Class T		
ACQ580-01-09A4-4	R1	133	454	50	29	55	16	gG	15	UL Class T		
ACQ580-01-12A6-4	R1	174	593	50	29	55	16	gG	15	UL Class T		
ACQ580-01-017A-4	R2	228	777	128	75	66	25	gG	20	UL Class T		
ACQ580-01-025A-4	R2	322	1100	128	75	66	32	gG	30	UL Class T		
ACQ580-01-032A-4	R3	430	1469	116	68	71	40	gG	35	UL Class T		
ACQ580-01-038A-4	R3	525	1791	116	68	71	50	gG	45	UL Class T		
ACQ580-01-045A-4	R3	619	2114	116	68	71	63	gG	50	UL Class T		
ACQ580-01-062A-4	R4	1153	3938	280	165	69	80	gG	80	UL Class T		
ACQ580-01-073A-4	R4	1153	3938	280	165	69	100	gG	90	UL Class T		
ACQ580-01-088A-4	R5	1156	3948	280	165	62	100	gG	110	UL Class T		
ACQ580-01-106A-4	R5	1331	4546	435	256	67	125	gG	150	UL Class T		
ACQ580-01-145A-4	R6	1476	5041	435	256	67	160	gG	200	UL Class T		
ACQ580-01-169A-4	R7	1976	6748	450	265	67	250	gG	225	UL Class T		
ACQ580-01-206A-4	R7	2346	8012	550	324	67	315	gG	300	UL Class T		
ACQ580-01-246A-4	R8	3336	11393	550	324	65	355	gG	350	UL Class T		
ACQ580-01-293A-4	R8	3936	13442	1150	677	65	425	gG	400	UL Class T		
ACQ580-01-363A-4	R9	4836	16516	1150	677	68	500	gG	500	UL Class T		
ACQ580-01-430A-4	R9	6036	20614	1150	677	68	700	gG	600	UL Class T		

\* Heat dissipation value is a reference for cabinet thermal design.

\*\* The maximum noise level at full fan speed. When the drive is not operating at full load and at maximum ambient temperature the noise level is lower.

\*\*\* For detailed fuse sizes and types, please see the ACQ580-01 HW manuals, document code: 3AXD50000035866

# Cooling and fuses

## Drive modules, ACQ580-04

Cooling air flow and recommended input protection fuses for 380 to 415 V units

Type designation	Frame size	Cooling air flow 380 to 415 V units					Recommended input protection fuses for 380 to 415 V units***			
		Heat dissipation*		Air flow		Max. noise level**	IEC fuses		UL fuses	
		W	BTU/Hr	m <sup>3</sup> /h	ft <sup>3</sup> /min	dBA	A	Fuse type	A	Fuse type
ACQ580-04-505A-4	R10	5600	19132	1200	707	72	***	***	***	***
ACQ580-04-585A-4	R10	6400	21888	1200	707	72	***	***	***	***
ACQ580-04-650A-4	R10	8100	27738	1200	707	72	***	***	***	***
ACQ580-04-725A-4	R11	8700	29931	1200	707	72	***	***	***	***
ACQ580-04-820A-4	R11	9800	33680	1200	707	72	***	***	***	***
ACQ580-04-880A-4	R11	10500	36126	1420	848	72	***	***	***	***

\* Heat dissipation value is a reference for cabinet thermal design.

\*\* The maximum noise level at full fan speed. When the drive is not operating at full load and at maximum ambient temperature the noise level is lower.

\*\*\* For detailed fuse sizes and types, please see the ACQ580-04 HW manual 3AXD50000048677

## Cabinet-built drives, ACQ580-07

Cooling air flow and recommended input protection fuses for 380 to 415 V units

Type designation	Frame size	Cooling air flow 380 to 415 V units					Recommended input protection fuses for 380 to 415 V units***			
		Heat dissipation*		Air flow		Max. noise level**	IEC fuses		UL fuses	
		W	BTU/Hr	m <sup>3</sup> /h	ft <sup>3</sup> /min	dBA	A	Fuse type	A	Fuse type
ACQ580-07-0145A-4	R6	1827	1801	685	982	67	250	170M3816D	250	DFJ-250
ACQ580-07-0169A-4	R7	2335	2317	700	1004	67	250	170M3816D	300	DFJ-300
ACQ580-07-0206A-4	R7	2738	2716	700	1004	67	315	170M3817D	300	DFJ-300
ACQ580-07-0246A-4	R8	3719	3719	800	1147	65	400	170M5408	400	170M5408
ACQ580-07-0293A-4	R8	4352	4352	800	1147	65	500	170M5410	500	170M5410
ACQ580-07-0363A-4	R9	5321	5314	1400	2007	68	630	170M6410	630	170M6410
ACQ580-07-0430A-4	R9	6589	6579	1400	2007	68	700	170M6411	700	170M6411

\* Heat dissipation value is a reference for cabinet thermal design.

\*\* The maximum noise level at full fan speed. When the drive is not operating at full load and at maximum ambient temperature the noise level is lower.

\*\*\* For detailed fuse sizes and types, please see the ACQ580-07 HW manuals, document code: 3AXD50000045817

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# Choose the motor for your water application



## **Induction motors and the ACQ580 form a reliable combination**

Induction motors are used throughout the industry in many water and wastewater applications and in a wide range of environments. ACQ580 drives fit perfectly together with this type of motor by providing comprehensive functionality yet simple operation. IE3 motors and our drives provide a perfect foundation for energy efficiency, while delivering capabilities such as exceeding nominal motor speed when maximum power is needed.



## **Permanent magnet motors and the ACQ580 for smooth operation**

Permanent magnet technology is used for improved motor characteristics in terms of energy efficiency and compactness. This technology is particularly well-suited for low speed control applications, as they eliminate the need to use gear boxes. Even without speed or rotor position sensors, the ACQ580 drives control most types of permanent magnet motors.



## **IE4 synchronous reluctance motors and the ACQ580 for optimized energy efficiency**

Our drive and motor pairings guarantee your energy efficiency levels. The key is in the rotor design. Combining the ACQ580's control technology with our synchronous reluctance motors (SynRM) will give you a motor and a drive package that guarantees energy efficiency, reduces motor temperatures and provides a significant reduction in motor noise.

# ABB automation products



## AC500

ABB's powerful flagship PLC offering provides wide range of performance levels and scalability within a single simple concept where most competitors require multiple product ranges to deliver similar functionality.



## AC500-S

A PLC based modular automation solution that makes it easier than before to mix and match standard and safety I/O modules to expertly meet your safety requirements in all functional safety applications. "Extreme conditions" version is also offered.



## Programmability

Automation Builder integrates the engineering and maintenance for PLC, drives, motion, HMI and robotics. It complies with the IEC 61131-3 standard offering all five IEC programming languages for PLC and drive configuration. Automation Builder supports a number of languages and comes with new libraries. FTP functions, SMTP, SNMP, smart diagnostics and debugging capabilities.



## AC motors

ABB's low voltage AC motors are designed to save energy, reduce operating costs and enable demanding motor applications to perform reliably and without unscheduled downtime. General performance motors combine convenience and easy handling seamlessly with ABB's engineering expertise. Process performance motors provide the most comprehensive.



## AC500-eCo

Meets the cost-effective demands of the small PLC market while offering total inter-operability with the core AC500 range. Web server, FTP server

and Modbus-TCP for all Ethernet versions. A Pulse Train Out-put module is available for multi-axis positioning.

## AC500-XC

"Extreme conditions" modules with extended operating temperature, immunity to vibration and hazardous gases. for use at high altitudes, in humid conditions. etc. It replaces expensive cabinets with its built-in protection against dirt, water, gases and dust.



## Control panels

Our control panels offer a wide range of touchscreen graphical displays from 3.5" up to 15". They are provided with user-friendly configuration software that enables tailor made customized HMI solutions. Rich sets of graphical symbols and the relevant drivers for ABB automation products are provided. Control panels for visualization of AC500 web server applications are available.



## All-compatible drives portfolio

The all-compatible drives share the same architecture; software platform, tools, user interfaces and options. Yet, there is an optimal drive from the smallest water pump to the biggest cement kiln, and everything in the between. When you have learned to use one drive it, is easy use the other drives in the portfolio.



## Water library package

ABB's water library is compatible with the AC500 series PLC's. They provide advance pumping functions, data logging, remote access and reliable data communication. The libraries ensure saved engineering time and costs as well as ease of use with fast programming possibilities.



# Services to match your needs

Your service needs depend on your operation, life cycle of your equipment and business priorities. We have identified our customers' four most common needs and defined service options to satisfy them. What is your choice to keep your drives at peak performance?

Operational efficiency



Is uptime your priority?

Keep your drives running with precisely planned and executed maintenance.

**Example services include:**

- Life Cycle Assessment
- Installation and Commissioning
- Spare Parts
- Preventive Maintenance
- Reconditioning
- ABB Drive Care agreement
- Drive Exchange

Rapid response



Is rapid response a key consideration?

If your drives require immediate action, our global network is at your service.

**Example services include:**

- Technical Support
- On-site Repair
- Remote Support
- Response time agreements
- Training



# Drives service

## Your choice, your future

### The future of your drives depends on the service you choose.

Whatever you choose, it should be a well-informed decision. No guesswork. We have the expertise and experience to help you find and implement the right service for your drive equipment. You can start by asking yourself these two critical questions:

- Why should my drive be serviced?
- What would my optimal service options be?

From here, you have our guidance and full support along the course you take, throughout the entire lifetime of your drives.

### Your choice, your business efficiency

ABB Drive Care agreement lets you focus on your core business. A selection of predefined service options matching your needs provides optimal, more reliable performance, extended drive lifetime and improved cost control. So you can reduce the risk of unplanned downtime and find it easier to budget for maintenance.

### We can help you more by knowing where you are!

Register your drive at [www.abb.com/drivereg](http://www.abb.com/drivereg) for extended warranty options and other benefits.

Option code	Description
+P932	ACQ580 extension of warranty to 60 months from delivery

## Life cycle management



Need to extend your assets' lifetime?

Maximize your drive's lifetime with our services.

#### Example services include:

- Life Cycle Assessment
- Upgrades, Retrofits and Modernization
- Replacement, Disposal and Recycling

## Performance improvement



Is performance most critical to your operation?

Get optimal performance out of your machinery and systems.

#### Example services include:

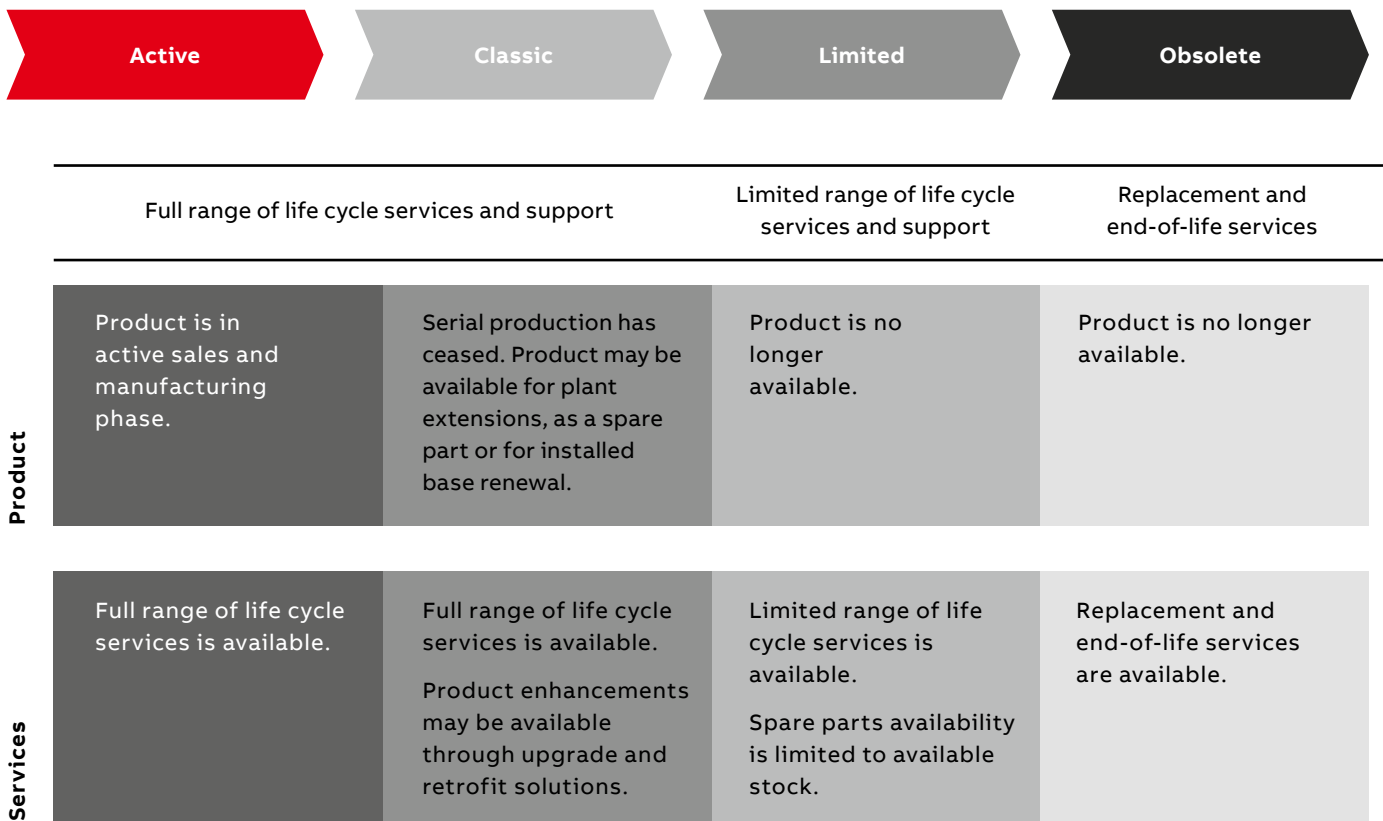
- Advanced services
- Engineering and Consulting
- Inspection and Diagnostics
- Upgrades, Retrofits and Modernization
- Workshop Repair
- Tailored services

# A lifetime of peak performance

You're in control of every life cycle phase of your drives. At the heart of drive services is a four-phase product life cycle management model. This model defines the services recommended and available throughout drives lifespan.

Now it's easy for you to see the exact service and maintenance available for your drives.

## ABB drives life cycle phases explained:



### Keeping you informed

We notify you every step of the way using life cycle status statements and announcements.

Your benefit is clear information about your drives' status and precise services available. It helps you plan the preferred service actions ahead of time and make sure that continuous support is always available.

### Step 1

#### Life Cycle Status Announcement

Provides early information about the upcoming life cycle phase change and how it affects the availability of services.

### Step 2

#### Life Cycle Status Statement

Provides information about the drive's current life cycle status, availability of product and services, life cycle plan and recommended actions.



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For more information, please contact  
your local ABB representative or visit

**[www.abb.com/drives](http://www.abb.com/drives)**  
**[www.abb.com/drivespartners](http://www.abb.com/drivespartners)**  
**[www.abb.com/motors&generators](http://www.abb.com/motors&generators)**

Online manuals for wall-mounted ACQ580 drives



Online manuals for ACQ580 drive modules



Online manuals for cabinet-built ACQ580 drives

