

LOW VOLTAGE AC DRIVES

ABB drives for HVAC

ACH531 R1-R6, 0.75 to 75 KW



Industry specific drives for HVAC ACH531 series.

Comfortable and efficient, your
best choice.

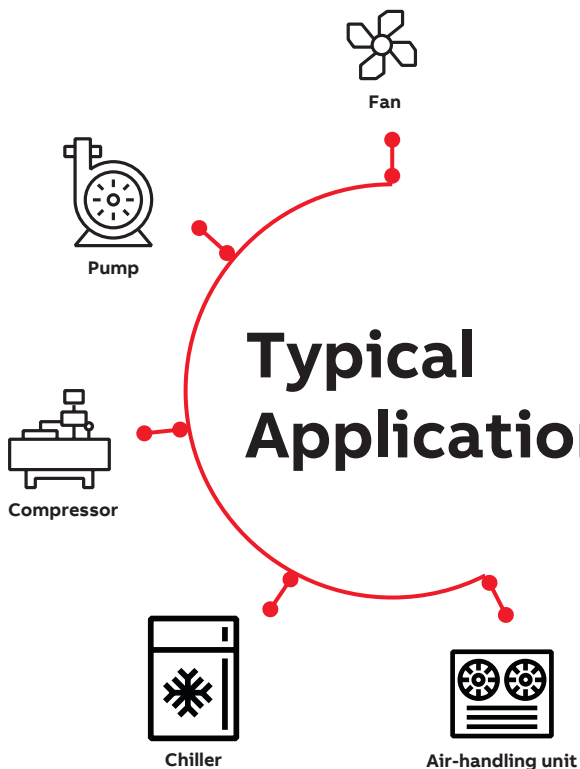
Table of Contents

04	ACH531 drives for HVAC
06	Reliable, and ease of use
08	Standard configuration with HVAC basic control panel
09	Control panel interface setting and automatic switching
10	Standard interface and plug-in extended connection
11	Technical Data Dimensions
12	How to select a drive
13	Ratings, types and voltages
14	Simple drive commissioning and use of control panel Cabinet door opening size of basic control panel
15	Flexible fieldbus options for easy connection
16	Industry specific, fast commissioning
17	ABB Ability™ smartphone apps
18	We keep your world turning
20	A lifetime of peak performance

ACH531 drives for HVAC

A reliable choice for your HVAC equipment

ACH531 is an industry specific drive for HVAC. The installation and commissioning are very simple and convenient. With the safe and reliable performance, complete configurations as well as the powerful quality assurance, technical support and services provided by ABB, it is a reliable choice for your equipment such as various fans, pumps and compressors.



Safe and reliable

Featuring enhanced coated circuit board, minimized airflow through control board area, grounding fault protection and 50 °C designed ambient temperature, etc., ACH531 has become a reliable choice for customers. The features are guaranteed by the full load test of each drive during the production.

Built-in STO (Safe Torque Off) function ensures the mechanical safety.

The product has passed CE certification and meets RoHS standards.

Complete configuration

Full-power EMC filter and double DC reactor are equipped internally as the standard configuration. The EMC filter conforms to EN 61800-3 C2 standard. It can be used in both commercial and industrial condition environment. With the lower high frequency radiation, it reduces interference to outside.

The built-in double DC reactors greatly reduce the harmonics as per IEC/EN 61800-3-12 at nominal load.

The drive is integrated with the function of TÜV certified Safe Torque Off (STO). With these integrated security functions, users can fully protect the safety of personnel and machines through effective investment.

The standard configuration includes a HVAC basic control panel which is provided with a basic menu. It is very convenient for you to complete basic settings through the menu.

Powerful industry specific software for HVAC

Designed based on the HVAC applications, the product has richer functions and more detailed control schemes for HVAC applications, so as to ensure convenient commissioning and reliable use.

It has a variety of specific macros and PID controls.



Reliable, and ease of use

With a series of advanced functions, ACH531 provides excellent user experience and also facilitates the integration, commissioning and operation of the drive.

Built-in EMC filter and double DC reactors

Built-in EMC filter and double DC reactors are provided as the standard configuration in the full-power range.

The EMC filter conforms to EN 61800-3 C2 standard, is applicable in the industrial and commercial environment and has lower high frequency radiation to reduce interference to outside.

The built-in double DC reactors greatly reduce the harmonics as per IEC/EN 61800-3-12 at nominal load.

Designed for reliability

Featuring enhanced coated circuit board, minimized air flow through control board area, grounding fault protection up to 50 ° C (with de-rating) designed ambient temperature, etc., ACH531 has become a reliable choice for customers. The features of the drive are guaranteed by the full load test of each drive during the production.

Powerful specific software for HVAC

The product is designed based on HVAC applications. It has richer functions and more detailed control schemes for various HVAC applications so as to ensure convenient commissioning and reliable use.

It has a variety of dedicated macros and rich PID controls, which can easily program HVAC application.

Equipped with HVAC basic control panel as the standard configuration

The control panel is provided with a full-HVAC menu. It is very convenient for you to complete basic settings through the menu.



ABB's HVAC drive is your ideal choice for a variety of HVAC applications, such as air-handling units, chillers, and cooling towers. They can be widely applied in all sorts of facilities, such as various civil and commercial buildings, hospitals, data centers, airports and tunnels.



Scalar and vector control

The drive improves the motor performance through the precise process control under scalar and vector control. It supports multiple types of motors, including induction motor and permanent magnet motor.

Fully compatible user interface

ACH531 is a member of ABB's fully compatible drive product portfolio. Other products in this portfolio include ACS380, ACS580 and ACS880. All these drives have the same, easy-to-use PC tools and similar intuitive multi-language user interface and parameter structure, which facilitates the learning and use.

STO – Safe Torque Off

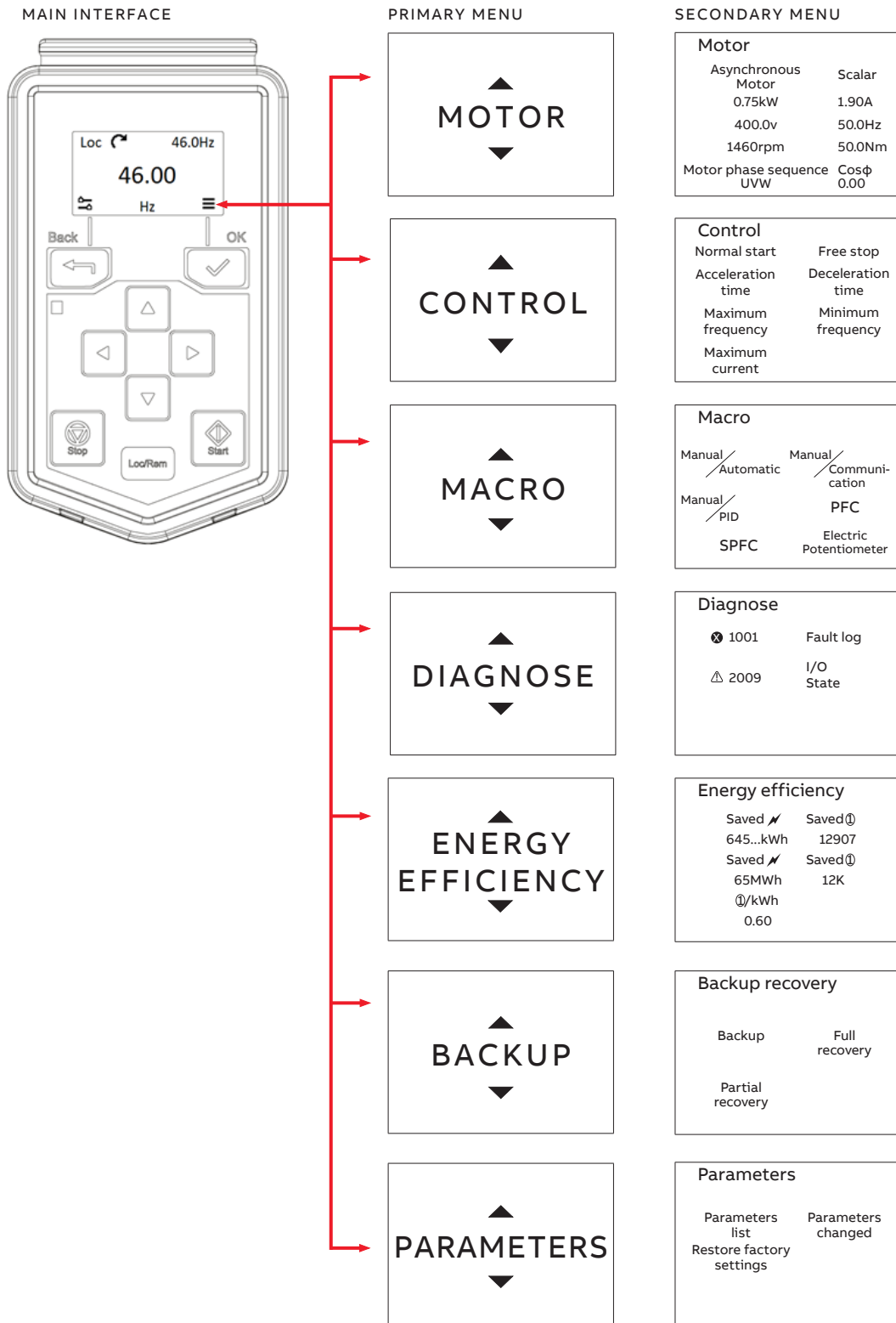
ACH531 has a built-in STO function in the standard configuration. It is designed according to IEC61800-5-2 standard, and conforms to the EU Machinery Directive 2006/42/EC. It has passed TUV Nord certification and meet the highest level of SIL3/PL e standard.



CE certification

The product meets the requirements of Low Voltage Directive, Machinery Directive, EMC Directive, RoHS III Directive and Eco Directive, and complies with CE regulations.

Standard configuration with HVAC basic control panel

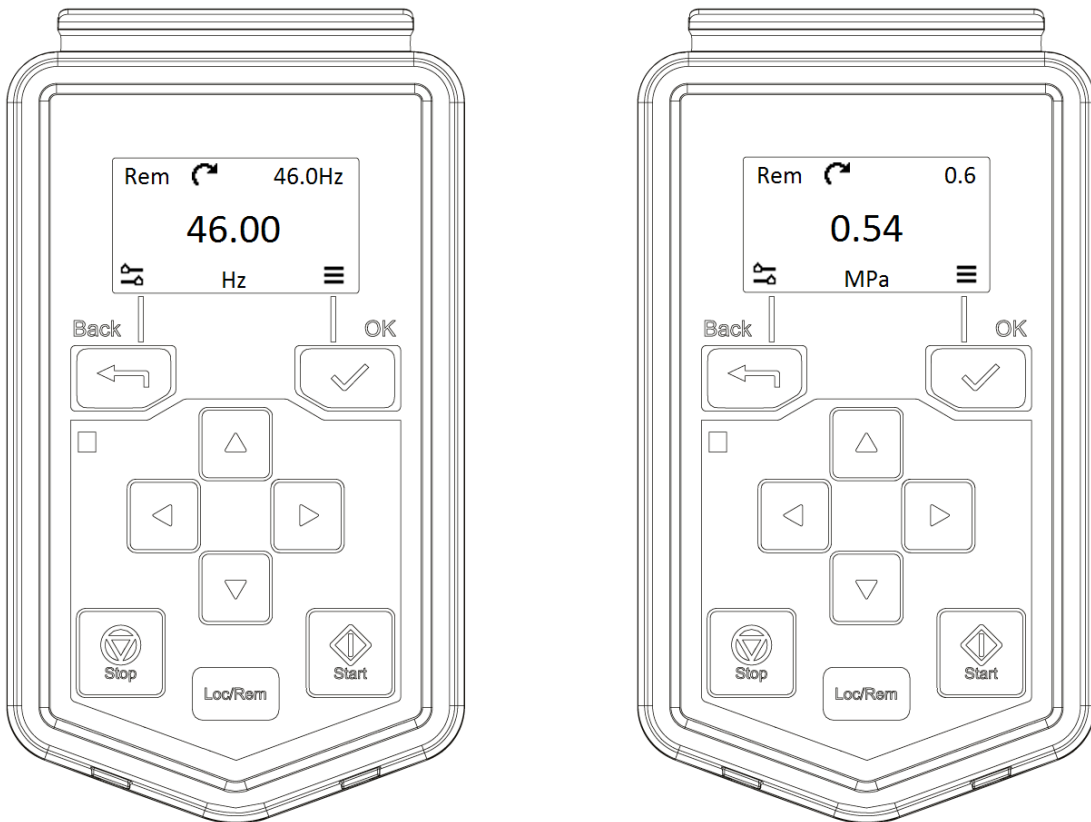


Control panel interface setting and automatic switching

When the traditional direct speed governing control is used, the drive panel displays the output frequency (Hz), motor current (A) and the given frequency (Hz). When PID or PFC / SPFC is used for the process control, the panel automatically switches to display the controlled process variables, showing the actual pressure (MPa), motor current (A) and given pressure (MPa).

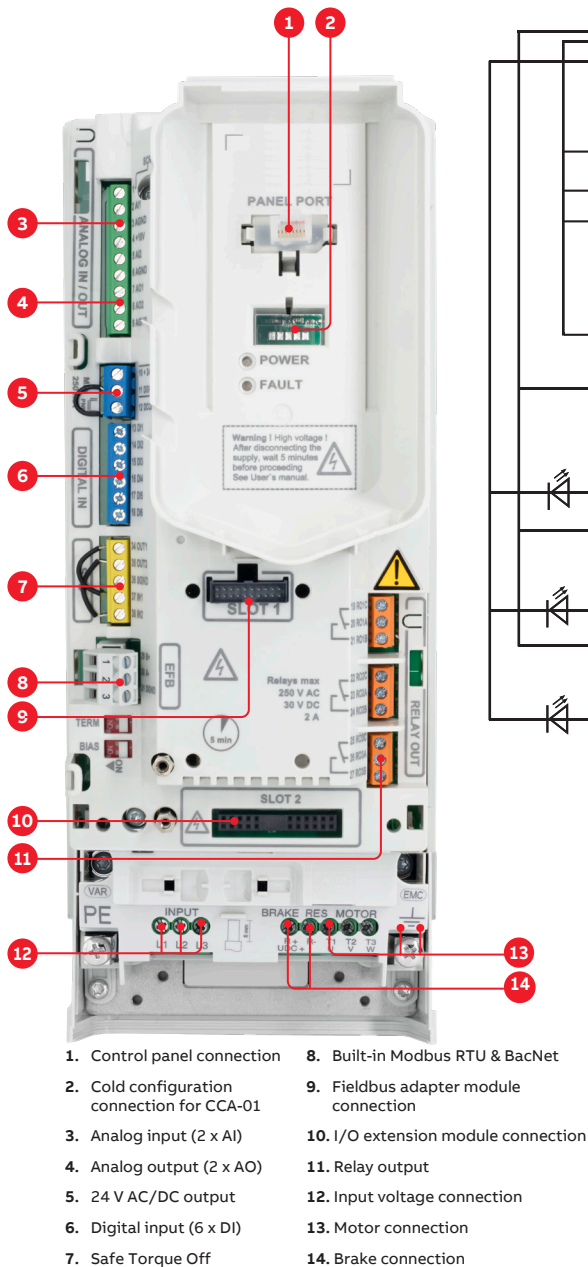
This function is switched based on the external 1/ external 2 activated state of control locations.

Users can set the display contents of the control panel at different control locations by themselves.

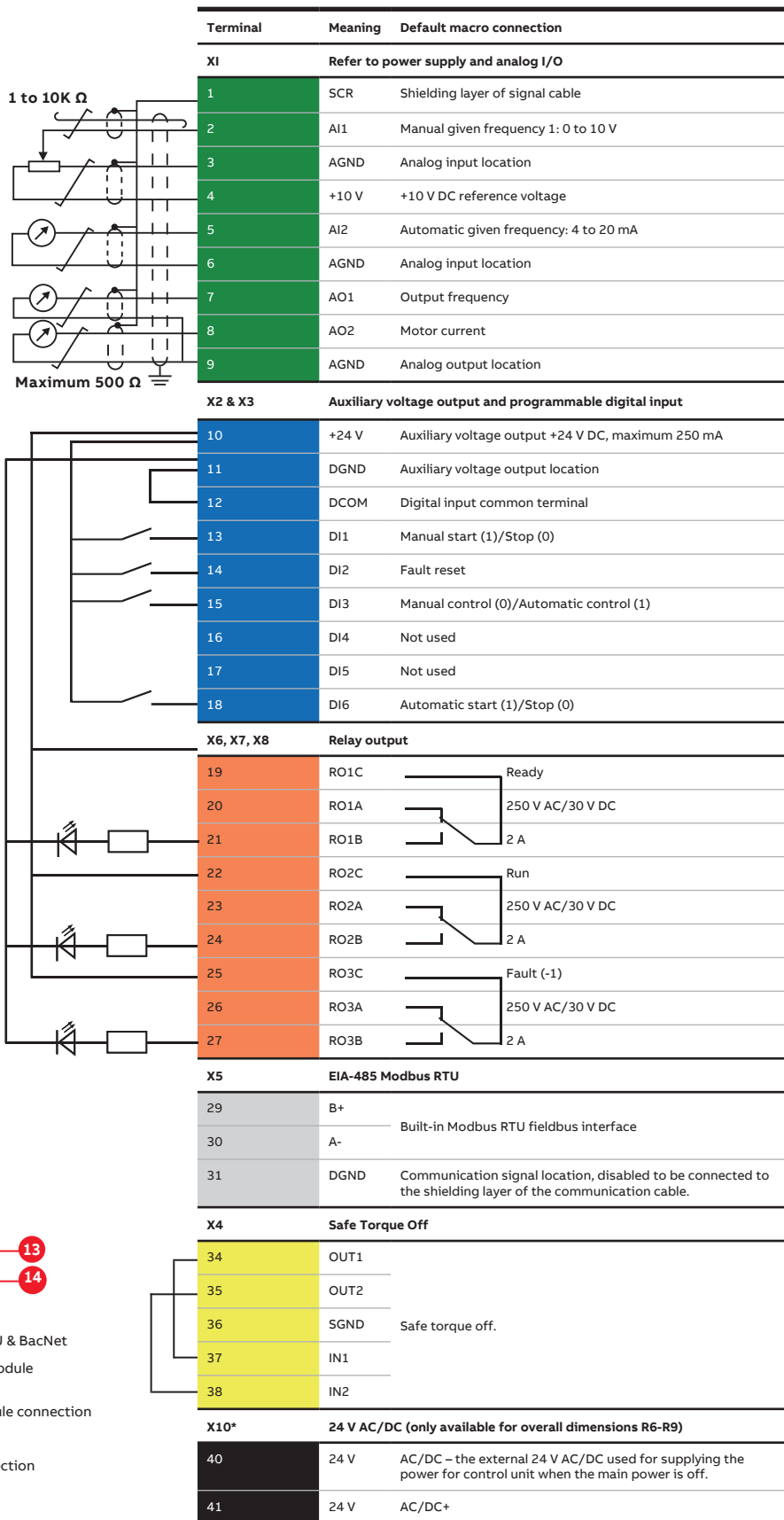


Standard interface and plug-in extended connection

ACH531 drive is provided with various standard interfaces. In addition, the drive is also equipped with two optional slots available for extension, including bus adapter and I/O extended modules with dimensions from R1 to R5, with external +24 V voltage is allowed to be used. For dimensions R6, the external + 24 V terminal has been already integrated into the control board. For detailed information, refer to the ACH531 user manual.



Default I/O Connection Diagram



* For overall dimensions R6, the terminal 40 to 41 is integrated. For dimensions R1-R5, an I/O option is required.

Technical Data

Power Supply Connection	
Voltage	Three-phase, U_N
Power range	380 to 480 V, +10%/-15% 0.75 to 75 kW
Frequency	50/60 Hz \pm 5%
Power factor	$\cos\phi = 0.98$
Efficiency (rated power)	98%
Motor Connection	
Voltage	0 to U_N , three phases
Frequency	0 to 500 Hz
Motor control	Scalar control Vector control
Product standard and certification	
CE	
Low Voltage Directive 2014/35/EU, EN 61800-5-1: 2007	
Mechanical Directive 2006/42/EC, EN 61800-5-2: 2007, EN 62061:2005 + AC:2010 + A1:2013 + A2:2015, EN ISO 13849-1:2015, EN ISO 13849-2:2012 and EN 60204-1:2018	
EMC Directive 2014/30/EU, EN 61800-3: 2004 + A1: 2012	
RoHS III Directive 2011/65/EU, EN50581: 2012	
Delegated directive(EU) 2015/863, EN IEC 63000:2018	
ECO Directive 2009/125/EC, standard EN 61800-9-2: 2017	
Quality Assurance System ISO 9001 and Environmental System ISO 14001	
Waste Electrical and Electronic Equipment (WEEE) 2002/96/EC	
TÜV Nord certification (safety features)	
EMC conforms to the standard EN 61800-3: 2004 + A1: 2012	
In the ACH531-01 cabinet, a wall-mounted drive is installed with a built-in C2 filter as the standard configuration	

Environmental Restrictions	
Ambient temperature	
Transportation	-40 to +70 °C
Storage	-40 to +70 °C
Operation temperature	-15 to +40 °C, no de-rating required, condensation not allowed +40 to +50 °C, with de-rating
Cooling mode	Dry and clean air
Coating	Enhance coated circuit board
Altitude	0-1,000 m, not required to reduce capacity 1,000-4,000 m, capacity reduced by 1% per 100 m rise
Relative humidity	5-95%, condensation not allowed
Protection level	IP21
Safety features	Safe Torque Off (STO) EN 61800-5-2: SIL 3 IEC 61508 ed2: SIL 3 IEC 62061: SIL CL 3, ISO 13849-1, -2: PL e EN 60204-1
Pollution level	Conductive dust not allowed
Storage	IEC 60721-3-1, Class 1C2 (chemical gas), Class 1S2 (solid particles) *
Transportation	IEC 60721-3-2, Class 2C2 (chemical gas), Class 2S2 (solid particles) *
Operation	IEC 60721-3-3, Class 3C2 (chemical gas), Class 3S2 (solid particles) *

* C = chemically active substance
S = mechanically active substance

Dimensions

Dimensions, Weight and Space Requirements

Mechanical Dimensions of the Drive

IP21

Dimensions	Height	Width	Depth	Weight
	mm	mm	mm	kg
R1	331	125	223	4
R2	432	125	229	6
R3	490	203	229	14.5
R4	636	203	257	18.5
R5	596	203	295	26.5
R6	548	252	369	42.6



How to select a drive

The right drive is extremely easy to select. The following instructions show you how to order the right drive for your application.

Start by identifying your supply voltage.

Based on the supply voltage, check the rating table. See page 13.

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

Rating, types and voltages

Three phases, U_n = 380 V to 480 V. The power ratings are valid at nominal voltage 400 V (0.75 to 250 kW).

Drive type	Power rating	U _n [kV]	I _n [A]	I _n [A]	I _n [A]	I _n [A]	I _n [A]	Max. output current [A]
ACH531-01-0247-F	R1	0.75	2.6	0.75	2.5	3.2	3.2	3.2
ACH531-01-0248-F	R1	1.1	3.3	1.1	3.1	4.7	4.7	4.7
ACH531-01-0441-F	R1	1.5	4	1.5	3.8	5.9	5.9	5.9
ACH531-01-0547-F	R1	2.2	5.6	2.2	5.3	7.2	7.2	7.2
ACH531-01-0743-F	R1	3	7.2	3	6.8	10.1	10.1	10.1
ACH531-01-0941-F	R1	4	9.4	4	8.9	13	13	13
ACH531-01-0947-F	R1	5.5	12.6	5.5	12	16.9	16.9	16.9
ACH531-01-0948-F	R2	7.5	17	7.5	16.2	22.7	22.7	22.7
ACH531-01-0949-F	R2	11	25	11	23.8	32.6	32.6	32.6
ACH531-01-0934-F	R3	15	33	15	30.5	44.3	44.3	44.3
ACH531-01-0934-F	R3	18.5	38	18.5	36	50.9	50.9	50.9
ACH531-01-0942-F	R3	22	45	22	42.8	61.8	61.8	61.8
ACH531-01-0929-F	R4	30	62	30	58	78	78	78
ACH531-01-0714-F	R4	37	73	37	68.4	93.4	93.4	93.4
ACH531-01-0934-F	R5	45	88	45	82.7	112	112	112
ACH531-01-0954-F	R5	55	100	55	100	148	148	148
ACH531-01-0944-F	R6	75	145	75	138	218	218	218
ACH531-01-0954-F	R7	90	160	90	161	247	247	247
ACH531-01-0954-F	R7	110	200	110	196	287	287	287
ACH531-01-0944-F	R8	130	245	130	234	330	330	330
ACH531-01-0934-F	R8	160	290	160	278	418	418	418
ACH531-01-0934-F	R9	200	363	200	345	498	498	498
ACH531-01-0934-F	R9	250	450	250	430	627	627	627

Notes:
 1. Rated current available continuously without overheating at 40 °C.
 2. Typical motor power to be connected.
 3. Continuous current allowing 110% I_n for 1 minute every 10 minutes at 40 °C.
 4. Typical motor power to be connected.
 5. Maximum output current. Available for 2 seconds at start, then as long as allowed by drive temperature.

Page 13

Choose the motor power and current rating from the rating table on page 13.

Rating, types and voltages

Three phases, U_n = 380 V to 480 V. The power ratings are valid at nominal voltage 400 V (0.75 to 250 kW).

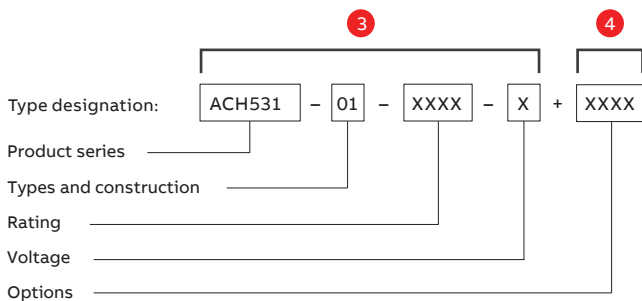
Drive type	Power rating	U _n [kV]	I _n [A]	I _n [A]	I _n [A]	I _n [A]	I _n [A]	Max. output current [A]
ACH531-01-0247-F	R1	0.75	2.6	0.75	2.5	3.2	3.2	3.2
ACH531-01-0248-F	R1	1.1	3.3	1.1	3.1	4.7	4.7	4.7
ACH531-01-0441-F	R1	1.5	4	1.5	3.8	5.9	5.9	5.9
ACH531-01-0547-F	R1	2.2	5.6	2.2	5.3	7.2	7.2	7.2
ACH531-01-0743-F	R1	3	7.2	3	6.8	10.1	10.1	10.1
ACH531-01-0941-F	R1	4	9.4	4	8.9	13	13	13
ACH531-01-0947-F	R1	5.5	12.6	5.5	12	16.9	16.9	16.9
ACH531-01-0948-F	R2	7.5	17	7.5	16.2	22.7	22.7	22.7
ACH531-01-0949-F	R2	11	25	11	23.8	32.6	32.6	32.6
ACH531-01-0934-F	R3	15	33	15	30.5	44.3	44.3	44.3
ACH531-01-0934-F	R3	18.5	38	18.5	36	50.9	50.9	50.9
ACH531-01-0942-F	R3	22	45	22	42.8	61.8	61.8	61.8
ACH531-01-0929-F	R4	30	62	30	58	78	78	78
ACH531-01-0714-F	R4	37	73	37	68.4	93.4	93.4	93.4
ACH531-01-0934-F	R5	45	88	45	82.7	112	112	112
ACH531-01-0954-F	R5	55	100	55	100	148	148	148
ACH531-01-0944-F	R6	75	145	75	138	218	218	218
ACH531-01-0954-F	R7	90	160	90	161	247	247	247
ACH531-01-0954-F	R7	110	200	110	196	287	287	287
ACH531-01-0944-F	R8	130	245	130	234	330	330	330
ACH531-01-0934-F	R8	160	290	160	278	418	418	418
ACH531-01-0934-F	R9	200	363	200	345	498	498	498
ACH531-01-0934-F	R9	250	450	250	430	627	627	627

Notes:
 1. Rated current available continuously without overheating at 40 °C.
 2. Typical motor power to be connected.
 3. Continuous current allowing 110% I_n for 1 minute every 10 minutes at 40 °C.
 4. Typical motor power to be connected.
 5. Maximum output current. Available for 2 seconds at start, then as long as allowed by drive temperature.

Page 13

Choose your options (on page 14) and add the option codes to the drive's order code. Remember to use a "+" mark before each option code or order them as loose items.

For more information, see page 14.



Simple drive commissioning and use of control panel

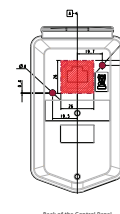
The drive module is provided with a basic control panel. Customers who want to use other control panels, can order these products by "*" codes or separate order codes.

Ordering code	Description	Type designation
3ABD0000000000000000	Without control panel	ACH531
3ABD0000000000000000	Auxiliary control panel	ACH531-AP
3ABD0000000000000000	Control panel with Bluetooth function	ACH531-AP-BT
3ABD0000000000000000	Control panel assembly (embedded installation, the control panel connector connection tool BDCP-01 is required)	DIMP-01
3ABD0000000000000000	Control panel assembly (surface installation, the control panel connector connection tool BDCP-01 is required)	DIMP-02
3ABD0000000000000000	Control panel connector connection tool	BDCP-01
3ABD0000000000000000	Cabinet door installation kit (including a BDCP-01 and a BDCP-02)	DIMP-EXT

If you order an auxiliary control panel, then the new control panel instead of the basic control panel will be delivered together with the drive.
 If a ordering code is used to order a control panel, then the control panel will be delivered separately.

Cabinet door opening size of basic control panel

The ACS-8P-4 basic control panel can be installed on the cabinet door directly. Only one screw hole and two screw holes need to be drilled on the cabinet door. Please refer to the figure on the right for the opening size (this figure shows the back side of the control panel).



Page 14

Ratings, types and voltages

Three phases, $U_N = 380 \text{ V to } 480 \text{ V}$. The power ratings are valid at nominal voltage 400 V (0.75 to 75 kW).							
Drive type	Frame size	Nominal ratings		Light-duty use		Max. output current	
		P_N kW	I_N A	P_{Ld} kW	I_{Ld} A	I_{max} A	
ACH531-01-02A7-4	R1	0.75	2.6	0.75	2.5	3.2	
ACH531-01-03A4-4	R1	1.1	3.3	1.1	3.1	4.7	
ACH531-01-04A1-4	R1	1.5	4	1.5	3.8	5.9	
ACH531-01-05A7-4	R1	2.2	5.6	2.2	5.3	7.2	
ACH531-01-07A3-4	R1	3	7.2	3	6.8	10.1	
ACH531-01-09A5-4	R1	4	9.4	4	8.9	13	
ACH531-01-12A7-4	R1	5.5	12.6	5.5	12	16.9	
ACH531-01-018A-4	R2	7.5	17	7.5	16.2	22.7	
ACH531-01-026A-4	R2	11	25	11	23.8	30.6	
ACH531-01-033A-4	R3	15	33	15	30.5	44.3	
ACH531-01-039A-4	R3	18.5	39	18.5	36	56.9	
ACH531-01-046A-4	R3	22	46	22	42.8	67.8	
ACH531-01-062A-4	R4	30	62	30	58	76	
ACH531-01-073A-4	R4	37	73	37	68.4	104	
ACH531-01-088A-4	R5	45	88	45	82.7	122	
ACH531-01-106A-4	R5	55	106	55	100	148	
ACH531-01-145A-4	R6	75	145	75	138	178	

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

Light-duty 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-duty use.

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

Simple drive commissioning and use of control panel

The drive module is provided with a basic control panel. Customers who want to use other control panels, can order these products by “+” codes or separate order codes.

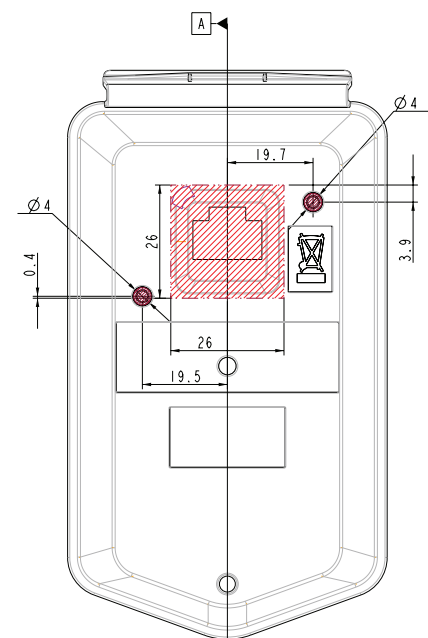
Plus code	Ordering code	Description	Type designation
+0J404		Without control panel	
-	3ABD0000108878	Control panel assembly (embedded installation; the control panel connector conversion tool RDUM-01 is required)	DPMP-01
-	3ABD50000009374	Control panel assembly (surface installation; the control panel connector conversion tool RDUM-01 is required)	DPMP-02
-	3ABD50000040008	Control panel connector conversion tool	RDUM-01
-	3AXD50000048730	Cabinet door installation kit (including a DPMP-02 and a RDUM-01)	DPMP-EXT2

If plus code is used to order a control panel, then the new control panel instead of the basic control panel will be delivered together with the drive.

If a ordering code is used to order a control panel, then the control panel will be delivered separately.

Cabinet door opening size of basic control panel

The ACS-BP-S basic control panel can be installed on the cabinet door directly. Only one wiring hole and two screw holes need to be drilled on the cabinet door. Please refer to the figure on the right for the opening size (this figure shows the back side of the control panel):



Back of the Control Panel

Flexible fieldbus options for easy connection

ACH531 is integrated with built-in Modbus RTU and BacNet interface as the standard configuration. Other fieldbus options in the following table can also be ordered.

Fieldbus adapter

Ordering code	Fieldbus protocol	Adapter
3ABD68469341	DeviceNet™	FDNA-01
3ABD68469325	PROFIBUS DP, DPV0/DPV1	FPBA-01
3ABD68469376	CANopen®	FCAN-01
3ABD0000031336	Modbus RTU	FSCA-01
3ABD0000094512	ControlNet	FCNA-01
3ABD0000072120	POWERLINK	FEPL-02
3ABD0000089109	Dual-port EtherNet/IP™, Modbus TCP and PROFINET IO	FENA-21
3ABD50000192786	Dual-port Ethernet/IP	FEIP-21
3ABD50000049964	Dual-port Modbus/TCP	FMBT-21
3ABD50000192779	Dual-port PROFINET IO	FPNO-21



Option codes

Code	Description
L501	CMOD-01 External 24 V AC/DC and digital I/O extension (2×RO and 1×DO)
L523	CMOD-02 External 24 V and isolated PTC interface
L512	CHDI-01 115/230 V digital input module (six digital inputs and two relay outputs)
L537	CPTC-02 ATEX-certified thermistor protection module

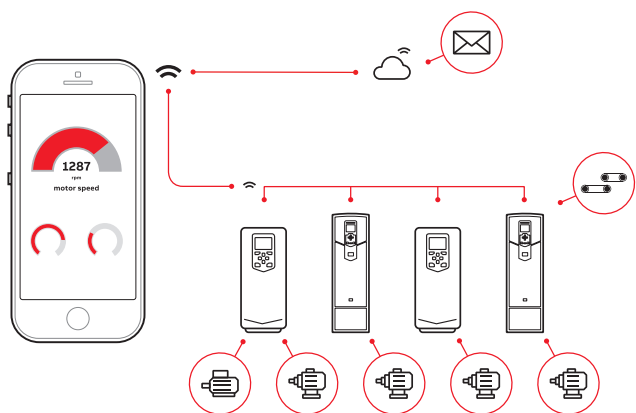
Industry specific, fast commissioning

The new generation of climate control features ensure smooth and reliable operation. With its inbuilt application functions, the drive helps to maintain a high level of comfort regardless of season or external conditions and also helps to make the system efficient.



ABB Ability™ smartphone apps

Better connectivity and user experience with Drivetune



Easy and fast access to product information and support



Start up, commission and tune your drive and application



Instantly access drive status and configuration with simplified user guidance

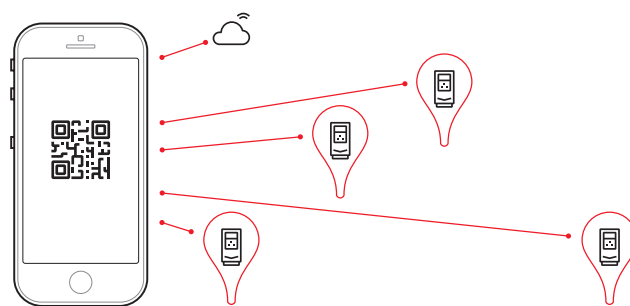


Optimize performance via drive troubleshooting features



Create and share backups and support packages

Services and support on the go with Drivebase



Search for support documents and contacts



Access your product and service information in the cloud from anywhere



View your drive's installed base and plan service activities



Use dynamic QR code to troubleshoot your drive



Report service events

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

We keep your world turning

Whatever your needs, we offer the most extensive service offering for drives, motors and generators, from spare parts and technical support to cloud-based condition monitoring solutions to keep your equipment running.

The global ABB service units complemented by external Value Providers form a service network on your doorstep. Maximize performance, uptime and efficiency throughout the life cycle of your assets.

With you every step of the way

Even before you buy a generator, drive, motor, bearing or softstarter, ABB's experts are on hand to offer technical advice, from dimensioning through to potential energy saving.

When you've decided on the right product, ABB and its global network of Value Providers can help with installation and commissioning. They are also on hand to support you throughout the operation and maintenance phases of the product's life cycle, providing maintenance programs tailored to your facility's needs.

ABB will ensure you are aware of any service opportunities. If you've registered your drives and motors with ABB, its engineers will proactively contact you to advise on your most effective service options. All this helps maximize performance, uptime and efficiency throughout the lifetime of your powertrain.



Replacements
Fast and efficient replacement services to minimize production downtime.



End-of-life services
Responsible dismantling, recycling and reusing of products, in accordance with local laws and industrial standards.



Maintenance
Systematic and organized maintenance and support over the life cycle of your assets.





Advanced services
Gain the unique ABB Ability™ digital advantage through data collection and analytics with advanced services.



Extensions, upgrades & retrofits
Up-to-date systems and devices with the best possible performance level.



Engineering & consulting
Ways to identify and improve the reliability, usability, maintainability and safety of your production processes.



Spares & consumables
Authentic, high-quality ABB spares and consumables with quick delivery.



Technical support & repairs
Quick and accurate response during emergencies, and efficient support during planned production breaks.



Installation & commissioning
Highly-trained and reliable installation and commissioning experts at your service.



Training
Comprehensive and professional training either at ABB's premises or your own.



Agreements
Comprehensive bundling of relevant services into one contract to suit your needs.

Global service network 24/7

—
“I need operational excellence, rapid response, improved performance and life cycle management.”

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:



Full range of life cycle services and support

Limited range of life cycle services and support

Replacement and end-of-life services

Product	Product is in active sales and manufacturing phase.	Serial production has ceased. Product may be available for plant extensions, as a spare part or for installed base renewal.	Product is no longer available.	Product is no longer available.
	Services	Full range of life cycle services is available. Product enhancements may be available through upgrade and retrofit solutions.	Limited range of life cycle services is available. Spare parts availability is limited to available stock.	Replacement and end-of-life services are available.

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

new.abb.com/drives
new.abb.com/drives/drivespartners
new.abb.com/motors-generators

Online manuals
for the ACH531 drives.

