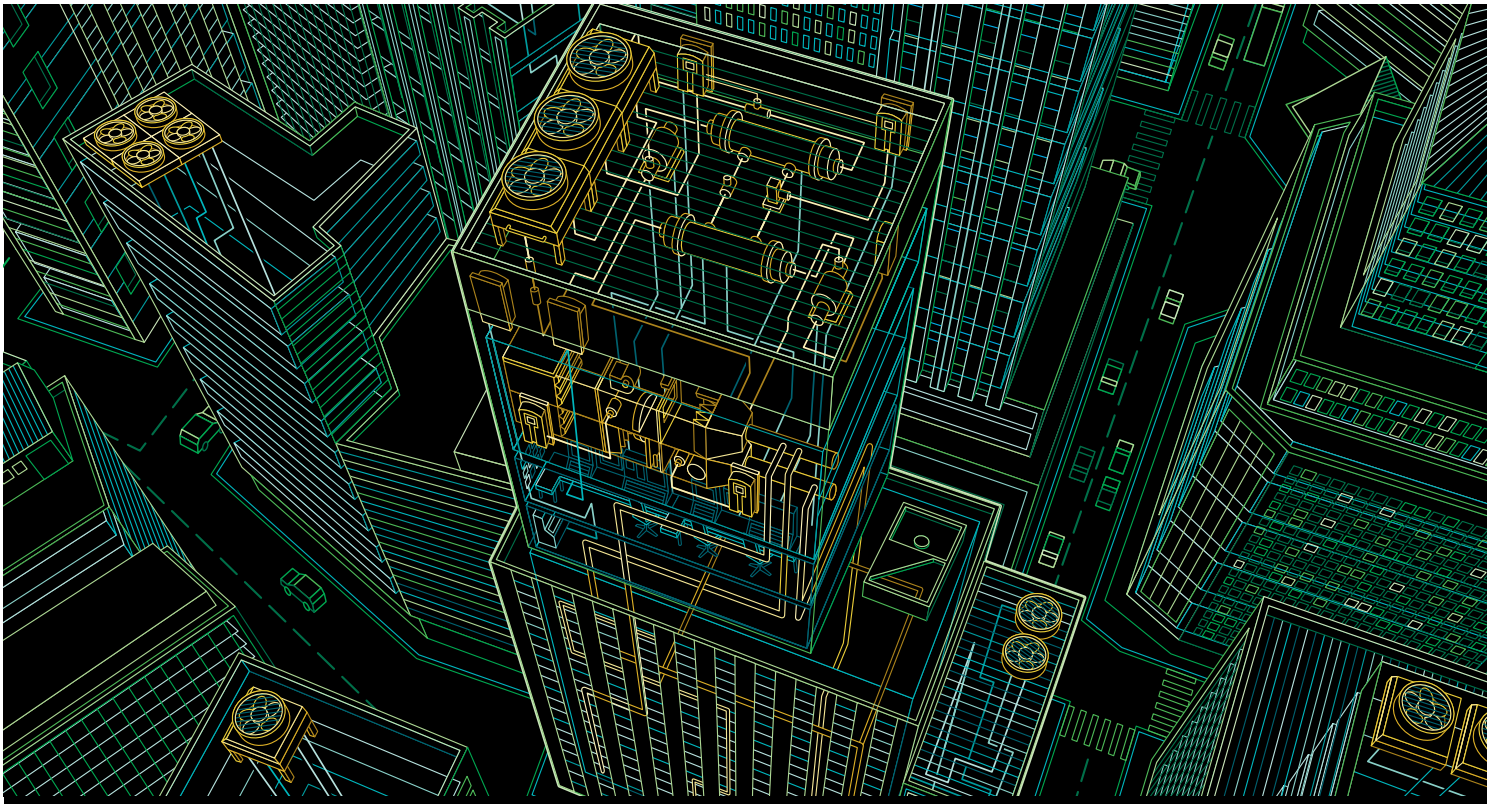
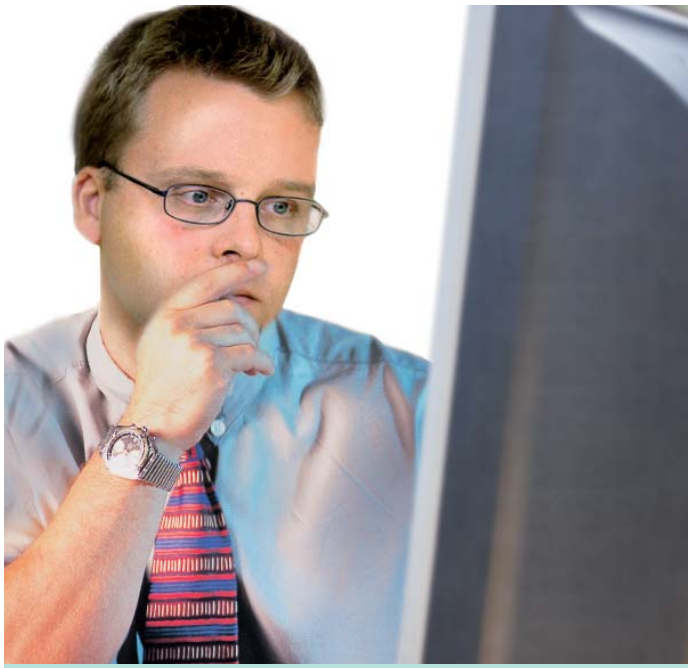


Low voltage AC drives

ABB drives for HVAC
Committed to your comfort zone

Power and productivity
for a better world™

Peace of mind as standard



Design engineer

“We specify ABB drives and have them running in more than 3,000 buildings. Their simplicity and reliability allow me to concentrate on my job without having to worry about the HVAC installation.”

“When I call ABB, I know I get the right answer.”

“With ABB’s energy saving tools, I can prove that the money saved helps justify the investment. Some people like the general idea of saving energy, some people want to go into the smallest detail. Either is possible with the ABB drive for HVAC.”

“I don’t have to look for external components like timers and PID controllers and then worry about their compatibility.”

“The ABB drive for HVAC does precisely what it is engineered to do - when the building gets hot the drive delivers air flow to suit.”

“The documentation for the ABB drive for HVAC is simple and clear to understand. For the first time in a long while I never get calls from our personnel on site.”

“Once the ABB drive for HVAC is installed, that’s the last time I hear about it.”

“Override is an invaluable function that minimizes the number of components and facilitates my job.”

Keeps you out of trouble

- EMC filters for building sector, class C2 (1st environment).
- Meets mandatory harmonic current standard EN 61000-3-12.
- Coated electronic boards improve reliability and extend the life-time of the drive.
- Ambient temperature up to 50 ˚C.

Override

Override can be used, for example, during a fire for extracting fumes rapidly and efficiently from a building. When override is activated the drive operates in a pre-defined direction at a pre-set speed while ignoring the drive’s other control commands and internal protective functions.

Real-time clock and calendar

The built-in real-time clock and calendar function provides true time and date stamps to drive events and enables the use of timers. Information is displayed clearly on the control panel. Further, daylight saving times can be easily selected according to different time zones.

Built-in timers

External timer circuits are no longer needed. Built-in timers - utilizing the real-time clock - allow starting and stopping the drive or changing the speed, according to the time of day or night. Relay outputs can be operated with timers to control any auxiliary equipment on site.

BACnet MS/TP, N2, FLN and Modbus RTU embedded

Commonly used HVAC communication protocols are embedded into the drive, ensuring that they are always there if you need them. ABB has supplied, to building automation, tens of thousands of drives utilizing serial communications, including more than 30,000 BACnet installations.

Makes your life comfortable

- Multilingual control panel with HELP-button
- 14 HVAC application macros are preprogrammed and selectable without programming.
- A printed user's manual is delivered with each drive.
- Miniature circuit breakers can be used instead of fuses.

Swinging choke - up to 25% less harmonics

ABB's swinging choke lets the drive for HVAC deliver up to 25% less harmonics at partial loads, compared to a conventional choke of equal size.

Main switch as option for local safety

Integrated drive specific disconnect solution for

- easy installation
- easy serviceability
- space savings

Interactive startup assistants

Startup assistants help to commission the drive. Easy step-by-step assistants show how to use the PID controllers, timer functions and serial communications settings.

Tailor-made HVAC software

The ABB drive for HVAC delivers a complete solution with a tailor-made configuration that will save you time and money. For example, actual process values like differential pressure signals can be converted inside the drive and displayed in engineering units like bar, l/s and °C.

Contractor

"A great feature is the startup assistant. It guides me through the startup routine of the drive, very quickly and easily, enabling me to put a less experienced person on the job."

"The ABB drive for HVAC speaks my language - even in full sentences! I save time and money."

"Thanks to smart design, control and power cables are extremely easy to connect."

"The ABB drive for HVAC has all the functionality I need, built-in. So I don't have to check for the order handling to see if all add-ons have been included. One less thing to worry about."

"With the timer function I can leave out building management system (BMS) automation completely on smaller jobs."

"ABB's no-quibble warranty means just that - no questions are asked, so paperwork is kept to a minimum."

Intelligent and intuitive AC drives for improved energy efficiency

ABB drives for HVAC make maintaining a building's comfort zone easy, quick and energy efficient. The drives control the speed of pump, fan and compressor motors used in air handling units, cooling towers, chillers and other heating, ventilation and air conditioning (HVAC) applications. They help reduce the HVAC system's energy consumption by up to 70 percent, and quite often have payback times of less than a year. With more than 500,000 drives for HVAC installed globally, these highly reliable drives with built-in BACnet easily integrate into building management systems. The drives are stocked globally for quick delivery.

The user interface, designed with the simplicity and intuitiveness of a mobile phone, helps make drive startup quick and easy. Configuring the drive to control HVAC applications takes only seconds using the drive's built-in application macros, that come as standard with the drive. The drive's seamless connectivity to building management systems through embedded communication protocols along with the drive's wide range of inputs and outputs make integration into HVAC systems cost efficient and easily adaptable to future upgrades.

The drive is programmed with several HVAC applications, including supply and return fans, cooling tower fans, booster pumps and condensers. The intelligence within the HVAC control panel means that the user is given direct and understandable instructions in clear text at all times.

Harmonics and RFI emissions are major concerns within many HVAC installations. The ABB drive for HVAC fulfils demanding requirements for electromagnetic compatibility. A swinging choke cuts harmonics emissions by up to 25 percent.

Smaller carbon footprint through improved energy efficiency

One of the biggest benefits of using ABB drives for HVAC applications is the energy saving opportunity over fixed speed motors or conventional flow control methods. Rather than have an electric motor running continuously at full speed, an AC drive allows the user to steplessly control the motor speed, depending on the demand.

In HVAC applications, the most of which being pumps and fans, AC drives can cut energy bill as much as 70 percent. As such ABB is a world leader in assessing the energy saving potential within the HVAC sector.

ABB offers energy appraisals coupled with a series of energy saving tools and calculators built-in within drives. Energy appraisals can rapidly determine just where and how much energy can be saved. By reducing the motor speed by 20 percent, power required can be lowered by up to 50 percent. In addition, ABB drives for HVAC offer a return on investment usually within months on the basis of energy savings alone.

For over 30 years ABB has delivered millions of AC drives worldwide. In 2010 these drives cut electricity consumption by 260 TWh (260 000 000 000 kWh). This is equivalent to the average annual consumption of electricity of more than 65 million European households. This corresponds to an average CO_2 emission reduction of 220 million tonne.

A clean standard against dirty electricity - IEC/EN 61000-3-12

The ABB drive for HVAC fulfils IEC/EN 61000-3-12 and carries manufacturer's written statement of compliance. This means security and simplicity for specifying engineers and facility managers.

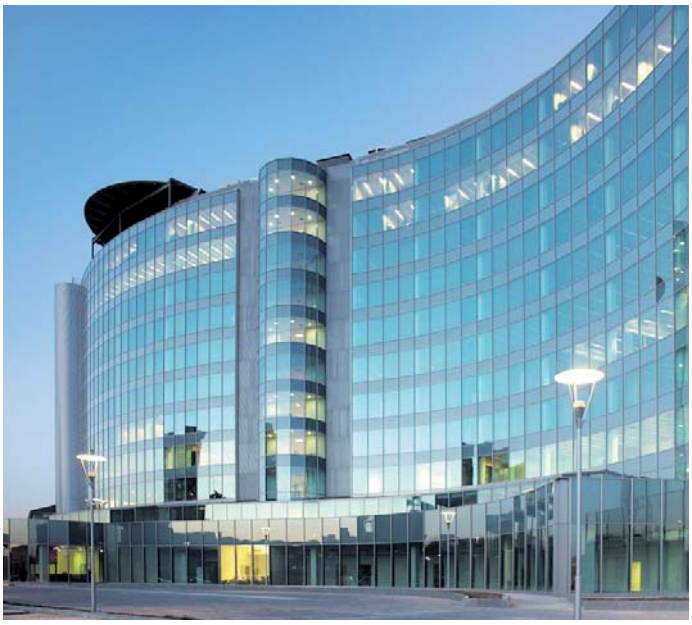
This European standard sets strict limits for harmonic currents produced by products connected to the electrical network.

Harmonic currents are forms of pollution on the electrical network. The harmonics can cause several undesired effects - flickering lights, failing computers and overheating of electrical equipment.

Ambient temperature up to 50 °C in 24/7/365

Ambient temperatures affect the output performance of each drive. The hotter it is outside - or inside the cabinet in which the drive is installed - the less current the drive can deliver. This means that the designer has to select the drive according to the peak temperature.

To make the selection easier, the identical output current values for both IP21 and IP54 units are available at different ambient temperatures.



Facility managers

“The energy saving capability of the ABB drive for HVAC means it pays back in less than two years. After that the drive provides profit straight to my bottom line. Using ABB’s remote access and diagnostics tools gives me real-time proof on the energy savings”

“With the swinging choke taking care of harmonics, I only pay for the electricity that works for me and not for the electricity that just causes losses.”

“My system delivers the output I require, when I need it, and especially when it is hot outside.”

“Reaction to load change is fast and I only pay for the peak capacity when it is needed.”

“I love the HELP button. I call it my panic button - it is always there to guide me.”

“The silence of the ABB drive for HVAC is music to my ears.”

“In case of an alarm or fault situation, the diagnostic assistant automatically tells me in clear language what to do.”

“With built-in and snap-on fieldbusses I’m flexible for all future automation needs.”

“The maintenance assistant is another great feature of the ABB drive for HVAC. I simply do not have to worry about when to service the equipment. The drive tells me when it is time to send people to do maintenance.”

“ABB will be here in 10 years time and beyond. That is the biggest guarantee you can give me.”

Interactive maintenance assistant

Maintenance scheduling no longer requires guesswork. The drive alerts you when maintenance is required based on your individual requirements.

Interactive diagnostic assistant

Should a fault occur, the diagnostic assistant displays, in plain language, possible causes and potential solutions.

Fault logger

The fault logger of the ABB drive for HVAC is especially useful in tracking down drive failures through its use of the real-time clock.
In addition to recording both time and date, the fault logger also takes a snapshot of 7 diagnostic values - like motor speed and output current. You know what happened and when.

Tools for

- calculating energy savings and payback times
- commissioning
- remote access and diagnostics

Noise smoothing

Software function to reduce the audible noise.

Tailor-made control panel for HVAC applications

- Interactive assistants advise on the use of PID (incl. air flow calculation), timers, fieldbus and facilitate commissioning
- HELP button always available
- Up- and downloading of parameters from one drive to another
- Easily detachable by hand (both IP21 and IP54)
- Built-in real-time clock
- 18 languages available in one single panel, including Russian, Turkish, Czech, Polish and Chinese

Energy efficiency

– Advanced motor control features, such as flux optimization, help lower energy use. With flux optimization, the magnitude of the flux is controlled according to the actual load. This results in reduced energy consumption and lower noise.
– Built-in calculators monitor energy used and saved in kilowatt-hours and megawatt-hours, as well as show the saving as a monetary value in local currency and as reduced carbon dioxide (CO_2) emissions.

Flange mounting

The drive can be flange-mounted to the side of an air duct or integrated with an air handling unit (AHU). By placing the heat sink of the drive in the air flow, additional cooling is achieved efficiently.

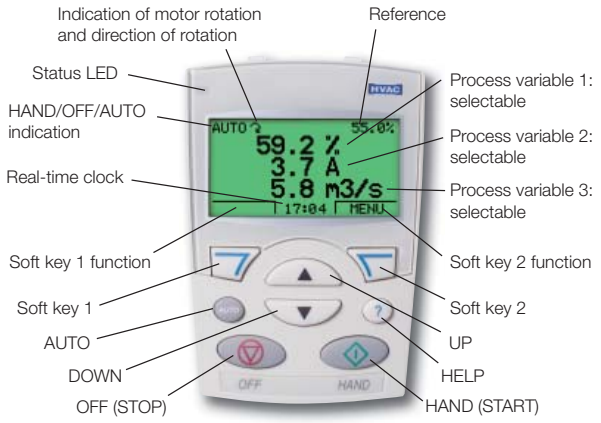
Two PID controllers as standard

The ABB drive for HVAC has two independent PID controllers built in. As an example: one PID controller works with the drive to maintain the duct static pressure. Simultaneously, the other PID controller can be used to control a separate external device, eg, a chilled water valve. All of this can, of course, be monitored and controlled through serial communications.

Mounting side by side

The ABB drive for HVAC is optimized for installing into cabinets: no space is needed between the units, whether IP21 or IP54, even with the covers on.

Motor protection with PTC or PT 100.

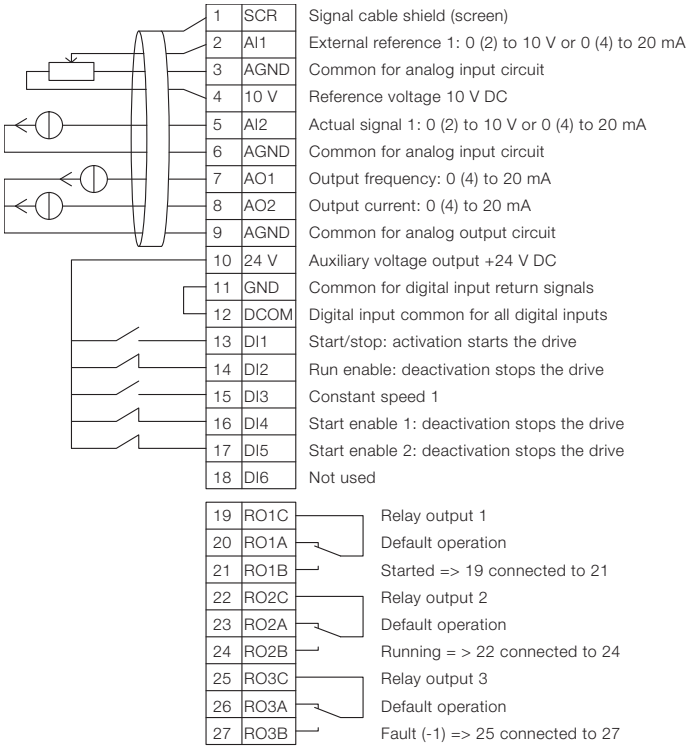


Options

– Relay extension module for three additional outputs (module fits under the cover of the drive)
– BACnet/IP router, LonWorks adapter (LonMark approved) or other option module. Modules fit under the cover of the drive
– Control panel mounting kit for cabinet door mounting
– Output filters, please contact ABB
– External module for remote access and diagnostics

Inputs and outputs

The diagram below shows the inputs and outputs of the ABB drive for HVAC. The sample connections are suitable for a number of HVAC applications like supply and return fans, condensers and booster pumps.



– All inputs and outputs are short-circuit protected.
– All connectors are individually numbered, reducing possible causes of misunderstandings and errors

Technical data

Supply connection	
Voltage and power range	3-phase, 380 to 480 V, +10/-15% (0.75 to 355 kW) 3-phase, 208 to 240 V, +10/-15% (0.75 to 75 kW) 1-phase, 208 to 240 V, +10/-15% (50% derating) auto-identification of input line
Frequency	48 to 63 Hz
Power factor	0.98
Efficiency at rated power	
	98%
Motor connection	
Voltage	3-phase, from 0 to U_N
Frequency	0 to 500 Hz
Rated currents (apply to both IP21 and IP54)	Current at ambient temperature of -15 to +40 °C: rated output current (I_{2N}), no derating needed Current at ambient temperature of +40 to +50 °C: derating of 1%/ °C above 40 °C
Switching frequency	Selectable 0.75 to 37 kW: 1 kHz, 4 kHz, 8 kHz or 12 kHz 45 to 110 kW: 1 kHz, 4 kHz or 8 kHz 132 to 355 kW: 1 kHz or 4 kHz
Environmental limits	
Ambient temperature **Transportation and storage** **Operation**	 -40 to 70 °C -15 to 50 °C (no frost allowed)
Altitude **Output current**	 Rated current available at 0 to 1000 m reduced by 1% per 100 m over 1000 to 2000 m 2000 to 4000 m, please consult ABB
Relative humidity	Lower than 95% (without condensation)
Protection classes	IP21 or IP54 IP21 for wall mounted and free standing units IP54 for wall mounted units
Inputs and outputs	
2 analog inputs **Voltage signal** **Current signal** **Potentiometer reference value**	Selectable both for current and voltage 0 (2) to 10 V, R_{in} > 312 kΩ single-ended 0 (4) to 20 mA, R_{in} = 100 Ω single-ended 10 V ±2% max. 10 mA, R < 10 kΩ
2 analog outputs **Internal auxiliary voltage**	0 (4) to 20 mA, load < 500 Ω 24 V DC ±10%, max. 250 mA
6 digital inputs	12 to 24 V DC with internal or external supply
3 relay outputs	Maximum switching voltage 250 V AC/30 V DC Maximum continuous current 2 A rms
PTC and PT 100	Any of the 6 digital inputs or analog inputs can be configured for PTC. Both analog outputs can be used to feed the PT 100 sensor.
Communication	Protocols as standard (RS 485): BACnet MS/TP, Modbus RTU, N2 and FLN Available as plug-in options: BACnet/IP router, LonWorks, Ethernet etc. Available as an external option: Ethernet adapter for remote monitoring
Protection functions	
	Overvoltage controller Undervoltage controller Earth-leakage supervision Motor short-circuit protection Output and input switch supervision Overcurrent protection Phase-loss detection (both motor and line) Underload supervision - can be used also for belt-loss detection Overload supervision Stall protection
Product compliance	
Harmonics	IEC/EN 61000-3-12
Standards and directives	Low Voltage Directive 2006/95/EC Machinery Directive 2006/42/EC EMC Directive 2004/108/EC Quality assurance system ISO 9001 and Environmental system ISO 14001 CE, UL, cUL, and GOST R approvals Galvanic isolation according to PELV RoHS (Restriction of Hazardous Substances)
EMC (according to EN61800-3)	Class C2 (1st environment restricted distribution) as standard

Types and ratings

P_N kW	I_{2N} A	Frame size	Type designation (order code)
U_N = 380 to 480 V (380, 400, 415, 440, 460, 480 V)			
HVAC control panel and EMC filter are included.			
0.75	2.4	R1	ACH550-01-02A4-4 [1]
1.1	3.3	R1	ACH550-01-03A3-4 [1]
1.5	4.1	R1	ACH550-01-04A1-4 [1]
2.2	5.4	R1	ACH550-01-05A4-4 [1]
3	6.9	R1	ACH550-01-06A9-4 [1]
4	8.8	R1	ACH550-01-08A8-4 [1]
5.5	11.9	R1	ACH550-01-012A-4 [1]
7.5	15.4	R2	ACH550-01-015A-4 [1]
11	23	R2	ACH550-01-023A-4 [1]
15	31	R3	ACH550-01-031A-4 [1]
18.5	38	R3	ACH550-01-038A-4 [1]
22	45	R3	ACH550-01-045A-4 [1]
30	59	R4	ACH550-01-059A-4 [1]
37	72	R4	ACH550-01-072A-4 [1]
45	87	R4	ACH550-01-087A-4 [1]
55	125	R5	ACH550-01-125A-4 [1]
75	157	R6	ACH550-01-157A-4 [1]
90	180	R6	ACH550-01-180A-4 [1]
110	205	R6	ACH550-01-195A-4 [1]
132	246	R6*	ACH550-01-246A-4 [1]
160	290	R6*	ACH550-01-290A-4 [1]
200	368	R8	ACH550-02-368A-4
250	486	R8	ACH550-02-486A-4
280	526	R8	ACH550-02-526A-4
315	602	R8	ACH550-02-602A-4
355	645	R8	ACH550-02-645A-4

[1] This type code is valid for the IP21 unit. For the IP54 unit, add +B055 at the end of the code.

I_{2N} = Nominal output current 1,1 x I_{2N} overload is allowed for 1 minute every 10 minutes through the entire speed range.

P_N = Typical motor power. The ABB drive for HVAC can deliver P_N continuously at an ambient temperature of 50 °C.

U_N = Nominal supply voltage

Dimensions

Wall mounted units

Frame size	Dimensions and weights								
	IP21 / UL type 1					IP54 / UL type 12			
	H1 mm	H2 mm	W mm	D mm	Weight kg	H mm	W mm	D mm	Weight kg
R1	369	330	125	212	6,5	449	213	234	8.2
R2	469	430	125	222	9	549	213	245	11.2
R3	583	490	203	231	16	611	257	253	18.5
R4	689	596	203	262	24	742	257	284	26.5
R5	739	602	265	286	34	776	369	309	38.5
R6	880	700	302	400	69	924	410	423	80
R6*	986	700	302	400	73	1119	410	423	84

Free standing units

Frame size	Dimensions and weights				
	H1 mm	H2 mm	W mm	D mm	Weight kg
R8	2024	N/A	347	617	230

N/A = not applicable

H1 = Height with cable connection box
H2 = Height without cable connection box
W = Width
D = Depth

Contact us

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

www.abb.com/drives
www.abb.com/drivespartners

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