idealair
group

ABB

Drives for hvac

ACH580-01-02A7-4+B056
ACH580-01-03A4-4+B056
ACH580-01-04A1-4+B056
ACH580-01-05A7-4+B056
ACH580-01-07A3-4+B056
ACH580-01-09A5-4+B056
ACH580-01-12A7-4+B056
ACH580-01-018A-4+B056
ACH580-01-026A-4+B056
ACH580-01-033A-4+B056
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ACH580-01-046A-4+B056
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ACH580-01-246A-4+B056
ACH580-01-293A-4+B056
ACH580-01-363A-4+B056
ACH580-01-430A-4+B056

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WARRANTY

DRIVES FOR HVAC

Overview

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.

ACH580

ACH580 Remote

Product Specifications

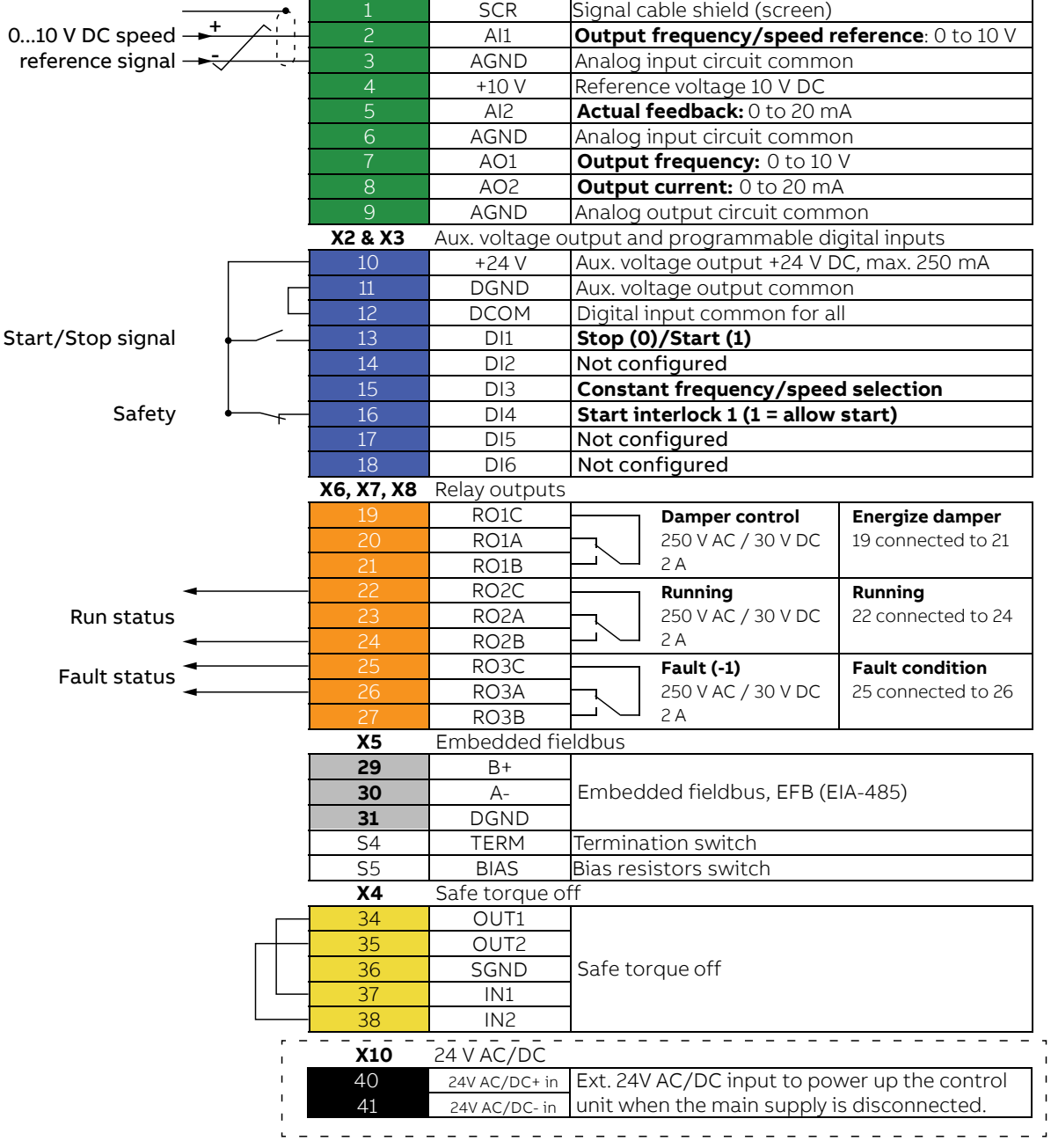
Inputs and Outputs

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.

Default I/O connections

This is the default configuration of control connections for HVAC applications.

Default control connections for the HVAC default



X1	Reference voltage and analog inputs and outputs			
1	SCR	Signal cable shield (screen)		
2	AI1	**Output frequency/speed reference**: 0 to 10 V		
3	AGND	Analog input circuit common		
4	+10 V	Reference voltage 10 V DC		
5	AI2	**Actual feedback:** 0 to 20 mA		
6	AGND	Analog input circuit common		
7	AO1	**Output frequency:** 0 to 10 V		
8	AO2	**Output current:** 0 to 20 mA		
9	AGND	Analog output circuit common		
X2 & X3	Aux. voltage output and programmable digital inputs			
10	+24 V	Aux. voltage output +24 V DC, max. 250 mA		
11	DGND	Aux. voltage output common		
12	DCOM	Digital input common for all		
13	DI1	**Stop (0)/Start (1)**		
14	DI2	Not configured		
15	DI3	**Constant frequency/speed selection**		
16	DI4	**Start interlock 1 (1 = allow start)**		
17	DI5	Not configured		
18	DI6	Not configured		
X6, X7, X8	Relay outputs			
19	RO1C		**Damper control** 250 V AC / 30 V DC 2 A	**Energize damper** 19 connected to 21
20	RO1A			
21	RO1B			
22	RO2C		**Running** 250 V AC / 30 V DC 2 A	**Running** 22 connected to 24
23	RO2A			
24	RO2B			
25	RO3C		**Fault (-1)** 250 V AC / 30 V DC 2 A	**Fault condition** 25 connected to 26
26	RO3A			
27	RO3B			
X5	Embedded fieldbus			
29	B+	Embedded fieldbus, EFB (EIA-485)		
30	A-			
31	DGND			
S4	TERM	Termination switch		
S5	BIAS	Bias resistors switch		
X4	Safe torque off			
34	OUT1	Safe torque off		
35	OUT2			
36	SGND			
37	IN1			
38	IN2			
X10	24 V AC/DC			
40	24V AC/DC+ in	Ext. 24V AC/DC input to power up the control unit when the main supply is disconnected.		
41	24V AC/DC- in			

X10 (24 V AC/DC) applicable to ACH580-01 R6-R9 and ACH580-31/34 only.

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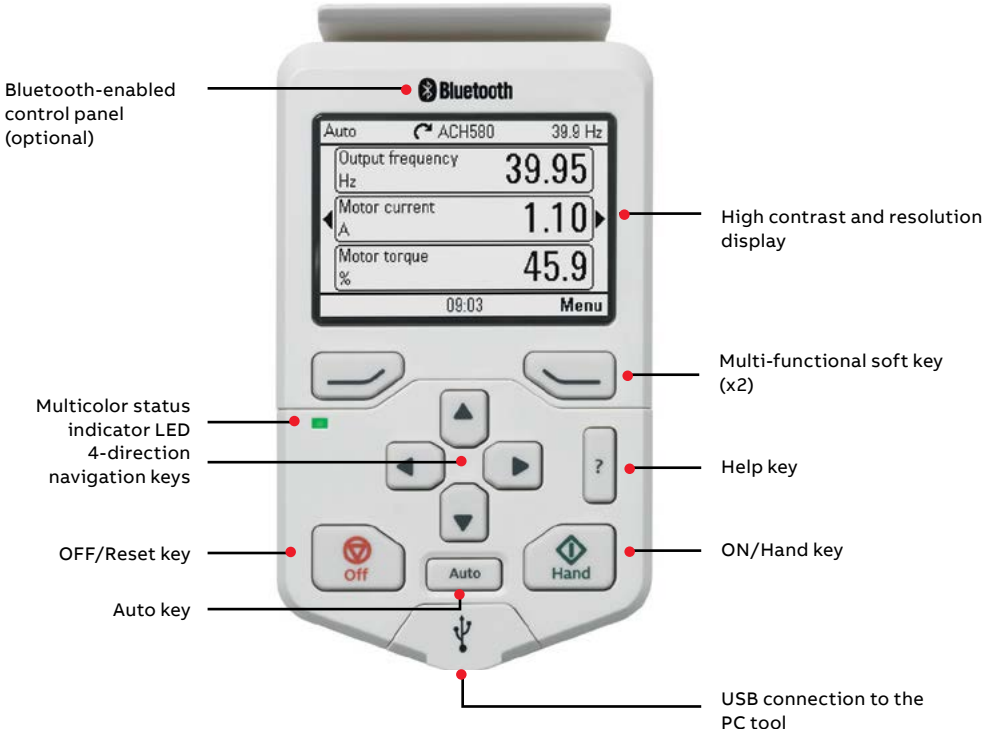
Product Specifications

Standard Controller

The ABB drive for HVAC has two independent PID controllers built in. One PID controller works with the drive to maintain the duct static pressure, the other PID controller can be used to control a separate external device.



Technical Data

Supply Connection	
Voltage and Power Range	3-phase U_N 380 to 480 V, +10/-15% ACH580-01: from 0.75 up to 250 kW ACH580-04: from 250 up to 500 kW ACH580-07: from 75 up to 500 kW ACH580-31: from 4 to 45 kW auto-identification of supply voltage
Frequency	48 to 63 Hz
Fundamental power factor ACH580-01, ACH580-04 and ACH580-07	0.98
Fundamental power factor ACH580-31	1.0
Efficiency at rated power	98%

Motor Connection	
Supported motor control	Scalar and vector
Supported motor types	Asynchronous motor, permanent magnet motor (vector), SynRM (vector)
Voltage	3-phase, from 0 to supply voltage
Frequency	0 to 500 Hz

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Environmental Limits	
Ambient temperature	
Transportation and storage	-40 to 70 °C
Air temperature/relative humidity (operation)	ACH580-01, ACH580-31: -15 to +50 °C; ACH580-07: 0 to +50 °C ACH580-04: -15 to +55 °C 5 to 95% no condensation allowed
Output current	Rated current available at 0 to 1000 m reduced by 1% per 100 m over 1000 m up to 4000 m
Degree of protection	ACH580-01 and ACH580-31: IP21 (UL type 1) or IP55 (UL type 12) ACH580-04: IP00, IP20 ACH580-07: IP21 as standard, IP42 or IP54 as option

Inputs and Outputs	
2 analog inputs	Selection of Current/Voltage input mode is user programmable.
Voltage signal	0 (2) to 10 V, R_{IN} > 200 kΩ
Current signal	0 (4) to 20 mA, R_{IN} = 100 Ω
Potentiometer reference value	10 V ±1% max. 20 mA
2 analog outputs	AO1 is user programmable for current or voltage. AO2 current
Voltage signal	0 to 10 V, R_{LOAD}: > 100 kΩ
Current signal	0 to 20 mA, R_{LOAD}: < 500 Ω
Internal auxiliary voltage	24 V DC ±10%, max. 250 mA
6 digital inputs	12 to 24 V DC, 24 V AC, Connectivity of PTC sensors supported by a single digital input. PNP or NPN connection (5 DIs with NPN connection).
3 relay outputs	Maximum switching voltage 250 V AC/30 V DC. Maximum continuous current 2 A rms.
PTC, PT100 and PT1000	Any of the analog inputs, or digital input 6, are configurable for PTC with up to 6 sensors. Both analog outputs can be used to feed the PT100 and PT1000 sensor and KTY83, KTY84 or Ni1000 sensors.

External Power Supply	
Standard:	
ACH580-01 frames R6-R9	1.5 A at 24 V AC/DC ±10%
ACH580-04 all frames	1.5 A at 24 V AC/DC ±10%
ACH580-07 all frames	1.5 A at 24 V AC/DC ±10%
ACH580-31 all frames	1.5 A at 24 V AC/DC ±10%
Optional:	
ACH580-01 frames R1-R5	1.04 A at 24 V AC/DC ±10%

Communication
Protocols as standard (EIA-485): BACnet MS/TP, Modbus RTU Available as plug-in options: BACnet/IP, Modbus TCP, PROFIBUS-DP, PROFINET, CANopen, DeviceNet, EtherNet/IP, EtherCAT, EtherNet POWERLINK Available as an external option: 2-port EtherNet adapter for remote monitoring

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Application Functions
First start assistant Primary settings for HVAC applications Hand-Off-Auto operation mode Start interlock (de-frost) Delayed start Run permissive (damper monitoring) Override operation mode Real-time clock (scheduling) PID controllers for motor and process Motor flying start Motor preheating Energy optimizer and calculators

Protection Functions
Overvoltage controller Undervoltage controller Motor earth-leakage monitoring Motor short-circuit protection Motor overtemperature protection Output and input switch supervision Motor overload protection Phase-loss detection (both motor and supply) Under load supervision (belt loss detection) Overload supervision Stall protection Loss of AI signal monitoring

Product Compliance	
Standards and directives	Low Voltage Directive 2006/95/EC EMC Directive 2004/108/EC Quality assurance system ISO 9001 and Environmental system ISO 14001 CE, UL, cUL, and EAC approvals Galvanic isolation according to PELV RoHS2 (Restriction of Hazardous Substances) EN 61800-5-1: 2007; IEC/EN 61000-3-12; EN61800-3: 2017 + A1: 2012 Category C2 (1st environment restricted distribution); Safe torque off (EN 61800-5-2)
EMC (according to EN61800-3)	ACH580-01, ACH580-07 75-250 kW and ACH580-31 class C2 (1st environment restricted distribution) ACH580-04 and ACH580-07 250-500 kW class C3 (2nd environment restricted distribution)
Harmonics	IEC/EN 61000-3-12 With ACH580-31 also IEEE519 G5/5

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Types and Ratings

U_N = 380 to 480 V (380, 400, 415, 440, 460, 480 V). HVAC control panel and EMC filter are included.

Product Compliance	Frame Size	P_N kW	I_{2N} A	IP Rating
ACH580-01-02A7-4+B056	**R1**	0.75	2.6	IP55
ACH580-01-03A4-4+B056	**R1**	1.1	3.3	IP55
ACH580-01-04A1-4+B056	**R1**	1.5	4	IP55
ACH580-01-05A7-4+B056	**R1**	2.2	5.6	IP55
ACH580-01-07A3-4+B056	**R1**	3	7.2	IP55
ACH580-01-09A5-4+B056	**R1**	4	9.4	IP55
ACH580-01-12A7-4+B056	**R1**	5.5	12.6	IP55
ACH580-01-018A-4+B056	**R2**	7.5	17	IP55
ACH580-01-026A-4+B056	**R2**	11	25	IP55
ACH580-01-033A-4+B056	**R3**	15	32	IP55
ACH580-01-039A-4+B056	**R3**	18.5	38	IP55
ACH580-01-046A-4+B056	**R3**	22	45	IP55
ACH580-01-062A-4+B056	**R4**	30	62	IP55
ACH580-01-073A-4+B056	**R4**	37	73	IP55
ACH580-01-088A-4+B056	**R5**	45	88	IP55
ACH580-01-106A-4+B056	**R5**	55	106	IP55
ACH580-01-145A-4+B056	**R6**	75	145	IP55
ACH580-01-169A-4+B056	**R7**	90	169	IP55
ACH580-01-206A-4+B056	**R7**	110	206	IP55
ACH580-01-246A-4+B056	**R8**	132	246	IP55
ACH580-01-293A-4+B056	**R8**	160	293	IP55
ACH580-01-363A-4+B056	**R9**	200	363	IP55
ACH580-01-430A-4+B056	**R9**	250	430	IP55

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	Height		Width	Depth	Weight
	H1* (mm)	H2** (mm)	mm	mm	kg
R1	403	331	128	233	5.1
R2	503	432	128	239	6.7
R3	490	490	206	237	13
R4	636	636	203	265	20
R5	732	596	203	320	29
R6	727	548	252	380	43
R7	880	600	284	381	56
R8	965	680	300	452	77
R9	955	680	380	477	103

H1 = Height with cable connection box
H2 = Height without cable connection box
W = Width
D = Depth
* Front height of the drive with glandbox
** Front height of the drive without glandbox

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