ACH580-01, wall-mounted base drives
The ACH580-01 wall-mounted drives are available from 1 to 100 HP at 208/240 V, 1 to 350 HP at 480 V, and 2 to 250 HP at 575 V. The ACH580-01 drives are available in UL (NEMA) Type 1 and 12 configurations. In standard installations, the drive is mounted directly onto a wall and uses the provided conduit box. Conduit openings are provided for bottom conduit entry & exit. For mounting in a customer-supplied cabinet, the conduit box may be removed. The ACH580-01 is a six-pulse drive that includes a 5% equivalent impedance for harmonic mitigation. The drive has a 100 kA SCCR rating when paired with appropriately sized upstream fuses.

ACH580-31, ultra low harmonic wall-mounted base drives
The ACH580-31 wall-mounted drives are available from 5 to 150 HP at 480 V. The ACH580-31 are available in UL (NEMA) Type 1 and 12 configurations. In standard installations, the drive is mounted directly onto a wall and uses the provided conduit box. Conduit openings are provided for bottom conduit entry and exit. For mounting in a customer-supplied cabinet, the conduit plate may be removed.

The ACH580 drive sets new standards in both simplicity and reliability, and ensures smooth, energy-efficient operation of your HVAC systems in normal and mission-critical situations.

Features for HVAC
The ACH580 comes standard with an intuitive control panel used to configure, control, and monitor the drive. An optional Bluetooth control panel allows the drive to configured via the control panel or the DriveTune app.

A robust HVAC firmware package provides drive, motor, and application protection features. Examples of drive protection features include undervoltage, overvoltage, overcurrent, and ground fault protection. The ACH580 also has a variety of motor protection features including overload and stall protections.

Application specific features, such as accepting four separate start interlocks (safeties), along with broken belt detection, are also included. The drive includes BACnet MS/TP, Modbus RTU, and Johnson N2 as standard. Additional protocols, such as BACnet/IP and LonWorks (coming 2019), are available with optional fieldbus adapters.
## Feature overview

### Communication

- Protocols as standard (EIA-485): BACnet MS/TP, Modbus RTU, Johnson Controls N2

### Application functions

- Start interlock
- 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
- Timer
- 2 or 3 wire start/stop
- Ramp to stop
- 2 independent adjustable accel/decel ramp

### 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 (UL508C)
- Phase-loss detection (both motor and supply)
- Under load supervision (belt loss detection)
- Overload supervision
- Stall protection
- Loss of reference
- Panel loss
- Ground fault
- External events
- Overcurrent
- Current limit regulator
- Transient/Surge protection (MOV and choke)

### Panel functions

- First start assistant
- Primary settings for HVAC applications
- Hand-Off-Auto operation mode
- HVAC quick set-up
- Includes Day, Date and Time
- Operator Panel Parameter Backup (read/write)
- Full Graphic and Multilingual Display for Operator Control, Parameter Set-Up and Operating Data Display:
  - Output Frequency (Hz)
  - Speed (RPM)
  - Motor Current
  - Calculated % Motor Torque
  - Calculated Motor Power (kW)
  - DC Bus Voltage
  - Output Voltage
  - Heatsink Temperature
  - Elapsed Time Meter (resettable)
  - kWh (resettable)
  - Input / Output Terminal Monitor
  - PID Actual Value (Feedback) & Error Fault Text
  - Warning Text
  - Three (3) Scalable Process Variable Displays
  - User-Definable Engineering Units

### Motor control features

- Scalar (V/Hz) and vector modes of motor control
- V/Hz shapes
  - Linear
  - Squared
- Energy optimization
- IR compensation
- Slip compensation
- Three (3) Critical Frequency Lockout Bands

### PID control

- One (1) Process PID
- Four (4) Integral Independent Programmable PID
- Setpoint Controllers (Process and External)
- External Selection between Two (2) Sets of Process PID Controller Parameters
- PID Sleep/Wake-Up
The ACH580 Assistant Control Panel features:

- Intuitive to operate
- Primary Setting menu to ease drive commissioning
- Real-time clock
- Diagnostic and maintenance functions
- Full-graphic display, including chart, graph, and meter options
- 21 editable home views
- USB interface for PC and tool connection as standard
- Parameters are alpha-numeric
- North American version supports 14 languages as standard
- Dedicated “Help” key
- 4 user sets
- Parameters are stored in control panel memory for later transfer to other drives or for backup of a particular system
- Back-up and restore parameters and/or motor data
- Automatic back-up 2 hours after parameter change
- Modified parameter display
- Creates unique short menu
- Shows parameters that differ from the default
- Bluetooth connectivity for use with mobile device (requires +J429 option)
Cable connections

The following illustrations show the ACH580-01 and ACH580-31 cable connection points for the base drive. The illustrations indicate the location of input and output power connections as well as equipment and motor grounding connection points.

ACH580 drives are configured for wiring access from the bottom only. At least three separate metallic conduits are required, one for input power, one for output power to the motor and one for control signals.
Cable connections

ACH580-3L, R3, UL (NEMA) Type 1 and 12
### Default I/O connections

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

#### Default control connections for the HVAC default

<table>
<thead>
<tr>
<th>Connection</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
<td>Reference voltage and analog inputs and outputs</td>
</tr>
<tr>
<td>1</td>
<td>SCR Signal cable shield (screen)</td>
</tr>
<tr>
<td>2</td>
<td>AII1 Output frequency/speed reference: 0 to 10 V</td>
</tr>
<tr>
<td>3</td>
<td>AGND Analog input circuit common</td>
</tr>
<tr>
<td>4</td>
<td>+10 V Reference voltage 10 V DC</td>
</tr>
<tr>
<td>5</td>
<td>AI2 Actual feedback: 0 to 20 mA</td>
</tr>
<tr>
<td>6</td>
<td>AGND Analog input circuit common</td>
</tr>
<tr>
<td>7</td>
<td>AO1 Output frequency: 0 to 10 V</td>
</tr>
<tr>
<td>8</td>
<td>AO2 Output current: 0 to 20 mA</td>
</tr>
<tr>
<td>9</td>
<td>AGND Analog output circuit common</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Connection</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>X2 &amp; X3</td>
<td>Aux. voltage output and programmable digital inputs</td>
</tr>
<tr>
<td>10</td>
<td>+24 V Aux. voltage output +24 V DC, max. 250 mA</td>
</tr>
<tr>
<td>11</td>
<td>DGND Aux. voltage output common</td>
</tr>
<tr>
<td>12</td>
<td>DCOM Digital input common for all</td>
</tr>
<tr>
<td>13</td>
<td>DI1 Stop (0)/Start (1)</td>
</tr>
<tr>
<td>14</td>
<td>DI2 Not configured</td>
</tr>
<tr>
<td>15</td>
<td>DI3 Constant frequency/speed selection</td>
</tr>
<tr>
<td>16</td>
<td>DI4 Start interlock 1 (1 = allow start)</td>
</tr>
<tr>
<td>17</td>
<td>DI5 Not configured</td>
</tr>
<tr>
<td>18</td>
<td>DI6 Not configured</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Connection</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>X6, X7, X8</td>
<td>Relay outputs</td>
</tr>
<tr>
<td>19</td>
<td>RO1C Damper control 250 V AC / 30 V DC 2 A</td>
</tr>
<tr>
<td>20</td>
<td>RO1A Energize damper 19 connected to 21</td>
</tr>
<tr>
<td>21</td>
<td>RO1B Running 250 V AC / 30 V DC 2 A</td>
</tr>
<tr>
<td>22</td>
<td>RO2C Running 22 connected to 24</td>
</tr>
<tr>
<td>23</td>
<td>RO2A Fault (-1) 250 V AC / 30 V DC 2 A</td>
</tr>
<tr>
<td>24</td>
<td>RO2B Fault condition 25 connected to 26</td>
</tr>
<tr>
<td>25</td>
<td>RO3C</td>
</tr>
<tr>
<td>26</td>
<td>RO3A</td>
</tr>
<tr>
<td>27</td>
<td>RO3B</td>
</tr>
<tr>
<td>X5</td>
<td>Embedded fieldbus</td>
</tr>
<tr>
<td>29</td>
<td>B+ Embedded fieldbus, EFB (EIA-485)</td>
</tr>
<tr>
<td>30</td>
<td>A-</td>
</tr>
<tr>
<td>31</td>
<td>DGND</td>
</tr>
<tr>
<td>34</td>
<td>OUT1</td>
</tr>
<tr>
<td>35</td>
<td>OUT2</td>
</tr>
<tr>
<td>36</td>
<td>SGND</td>
</tr>
<tr>
<td>37</td>
<td>IN1</td>
</tr>
<tr>
<td>38</td>
<td>IN2</td>
</tr>
</tbody>
</table>

### X10

24 V AC/DC Ext. 24 V AC/DC input to power up the control unit when the main supply is disconnected.

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