

Quotation Bill of Material

| Item | Qty | Product Information |
|------|-----|---------------------|
|------|-----|---------------------|

| | | |
|---|---|---|
| 1 | 1 | ACH580-01-017A-2 <i>ACH580 6-Pulse base drive rated UL (NEMA) Type 1. Rated for 16.7 amps (5 HP) at 240 VAC three phase.</i> |
|---|---|---|

Terms:

- *FOB ABB Factory*
- *Proposal valid for 30 days from quotation date*
- *ABB Inc. Standard Terms and Conditions of Sale apply*
- *Proposal based upon acceptance of Clarifications and Exceptions to Specifications and Terms provide later in this quotation*

Submittal Schedule

This schedule includes the products supplied as part of this submittal.

| Schedule | | | Motor Data ¹ | | | Drive Data | | | |
|--|-----|-----|-------------------------|------|------------|------------------|----|------|------------|
| Item | Qty | Tag | HP | FLA | Volts | Product ID | HP | Amps | Volts |
| 1 | 1 | | 5 | 16.7 | 208 VAC | ACH580-01-017A-2 | 5 | 16.7 | 240 VAC |
| Notes: <ol style="list-style-type: none"> AC motor data is per National Electrical Code Table 430.250 for typical motors used in most applications. It is provided as typical data only. DC motor data is per typical industry standards. Actual motor data may vary | | | | | | | | | |

Submittal Schedule Details for

| Item | Tag / Equipment ID | Product ID |
|------|--------------------|------------------|
| 1 | | ACH580-01-017A-2 |

| Item Description |
|---|
| <p>Input Voltage: 240 VAC Three Phase Rated Output Current: 16.7A Enclosure: UL (NEMA) Type 1 Nominal Horsepower: 5 HP Frame Size: R1 Input Disconnecting Means: None Bypass: None Input Impedance: 5% equivalent impedance Short Circuit Current Rating: 100 kA with fusing Communication Protocols: Johnson Controls N2, Modbus RTU, BACnet (MS/TP) Other Options:</p> |

| Drive Input Fuse Ratings | |
|--------------------------|--------------|
| Fuse Class | Amps (600 V) |
| Class CC or T | 30 |

| Wire Size Capacities of Power Terminals | | |
|---|-------------------------|--------------------------|
| Input Wiring | Output Wiring | Ground Wiring |
| #24 ... #10 1 lbf-ft | #24 ... #10 1 lbf-ft | #18 ... #6 1.1 lbf-ft |

| Dimensions and Weights | | | |
|--------------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|
| Height <i>in</i> (<i>mm</i>) | Width <i>in</i> (<i>mm</i>) | Depth <i>in</i> (<i>mm</i>) | Weight <i>lbs</i> (<i>kg</i>) |
| 14.7 (373) | 4.8 (123) | 8.8 (223) | 10 (4.6) |

| Heat Dissipation & Airflow Requirements | | | |
|---|-------|---------|-------|
| Power Losses | | Airflow | |
| BTU/Hr | Watts | CFM | CM/Hr |
| 454 | 133 | 25 | 42.5 |

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ACH580-01/-31

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.

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 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 400 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.

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 be 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, are available with optional fieldbus adapters.

Technical specifications

Product compliance (complete list on following page)

ACH580-01/-31 CE, UL, cUL, and EAC

Supply connection

| | |
|--------------------------------------|---|
| Input voltage (U ₁) | |
| ACH580-xx-xxxA-2 | 208/240V |
| ACH580-xx-xxxA-4 | 480V |
| ACH580-xx-xxxA-6 | 600V |
| Input voltage tolerance | +10% / -15% |
| Phase | 3-phase (1-phase, 240 V) |
| Frequency | 48 to 63 Hz |
| Line Limitations | Max ±3% of nominal phase to phase input voltage |
| Power Factor (cos φ) at nominal load | |
| ACH580-01 | 0.98 |
| ACH580-31 | 1.0 |
| Efficiency at rated power | |
| ACH580-01 | 98.0% |
| ACH580-31 | 96.5% |
| Power Loss | Approximately 2% of rated power |

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 |
| Short Term Overload Capacity Variable Torque | 110% for 1 min/10min |
| Peak Overload Capacity Variable Torque | 1.35 for 2 second (2 sec / 10 min) |
| Switching Frequency | 2, 4, 8 or 12 kHz Automatic fold back in case of overload |
| Acceleration/Deceleration Time | 0 to 1800 s |
| Short Circuit Current Rating (SCCR) | 100 ka with fusing |

Inputs and outputs (drive)

| | |
|-------------------------------|---|
| 2 analog inputs | Selection of Current/Voltage input mode is user programmable. |
| Voltage reference | 0 (2) to 10 V, R _{in} > 200 kΩ |
| Current reference | 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 reference | 0 to 10 V, R _{load} : > 100 kΩ |
| Current reference | 0 to 20 mA, R _{load} : < 500 Ω |
| Applicable potentiometer | 1 kΩ to 10 kΩ |
| Internal auxiliary voltage | 24 V DC ±10%, max. 250 mA |
| Accuracy | +/- 1% full scale range at 25°C (77°F) |
| Output updating time | 2 ms |
| 6 digital inputs | 12 to 24 V DC, 10 to 24 V AC, Connectivity of PTC sensors supported by a single digital input. |

| | |
|---|--|
| | PNP or NPN connection (5 DI's with NPN connection). Programmable |
| Input Updating Time | 2 ms |
| 3 relay outputs | Maximum switching voltage 250 V AC/30 V DC. Maximum continuous current 2 A rms. Programmable, Form C |
| Adjustable filters on analog inputs and outputs | |
| All control inputs isolated from ground and power | |
| Operation | |
| Air temperature | 0 to -15 °C (32 to 5 °F). -15 to +50 °C (5 to 122 °F): No frost allowed. Output derated above +40 °C (104 °F) |
| Installation site altitude | 0 to 4000 m (13123 ft) above sea level Output derated above 1000 m (3281 ft) |
| Relative humidity | 5 to 95% No condensation allowed Maximum relative humidity is 60% in the presence of corrosive gasses |
| Atmospheric pressure | 70 to 106 kPa (10.2 to 15.4 PSI) 0.7 to 1.05 atmospheres |
| Vibration | Risk category IV Certified (IBC 2018) |
| Environmental protections | |
| Chemical Gasses | Class 3C2 |
| Solid Particles | Class 3S2 No conductive dust allowed |
| Pollution degree (IEC/EN 61800-5-1) | Pollution degree 2 |
| Product compliance | |
| Standards and directives | Low Voltage Directive 2006/95/EC EMC Directive 2004/108/EC 60721-3-3: 2002 60721-3-1:1997 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) BACnet Testing Laboratory (BTL) Seismic (IBC, OSHPD) Plenum (ACH580-01 only) |
| EMC (according to EN61800-3) | ACH580-01 and ACH580-31 class C2 (1st environment restricted distribution) |

Storage (in Protective Shipping Package)

| | |
|--|--|
| Air Temperature | -40 to +70 °C (-40 to +158 °F) |
| Relative Humidity | Less than 95% No condensation allowed Maximum relative humidity is 60% in the presence of corrosive gasses |
| Chemical Gasses | Class 1C2 |
| Solid Particles | Class 1S2 Contact ABB regarding Class 1S3 |
| Atmospheric pressure | 70 to 106 kPa 0.7 to 1.05 atmospheres |
| Vibration (ISTA) R1...R4 R5...R9 | In accordance with ISTA 1A In accordance with ISTA 3E |

Transportation (in Protective Shipping Package)

| | |
|--|--|
| Air Temperature | -40° to 70°C (-40° to 158°F) |
| Relative Humidity | Less than 95% No condensation allowed Maximum relative humidity is 60% in the presence of corrosive gasses |
| Atmospheric Pressure | 60 to 106 kPa (8.7 to 15.4 PSI) 0.6 to 1.05 atmospheres |
| Free Fall | R1: 76 cm (30 in) R2: 61 cm (24 in) R3: 46 cm (18 in) R4: 31 cm (12 in) R5: 25 cm (10 in) |
| Chemical Gasses | Class 2C2 |
| Solid Particles | Class 2S2 |
| Shock/ Drop (ISTA) R1...R4 R5...R9 | In accordance with ISTA 1A In accordance with ISTA 3E |
| Vibration (ISTA) R1...R4 R5...R9 | In accordance with ISTA 1A In accordance with ISTA 3E |

Feature overview

Communication

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

Available as plug-in options: BACnet/IP, Modbus TCP, PROFIBUS-DP, DeviceNet, EtherNet/IP, LonWorks (coming 2019)

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

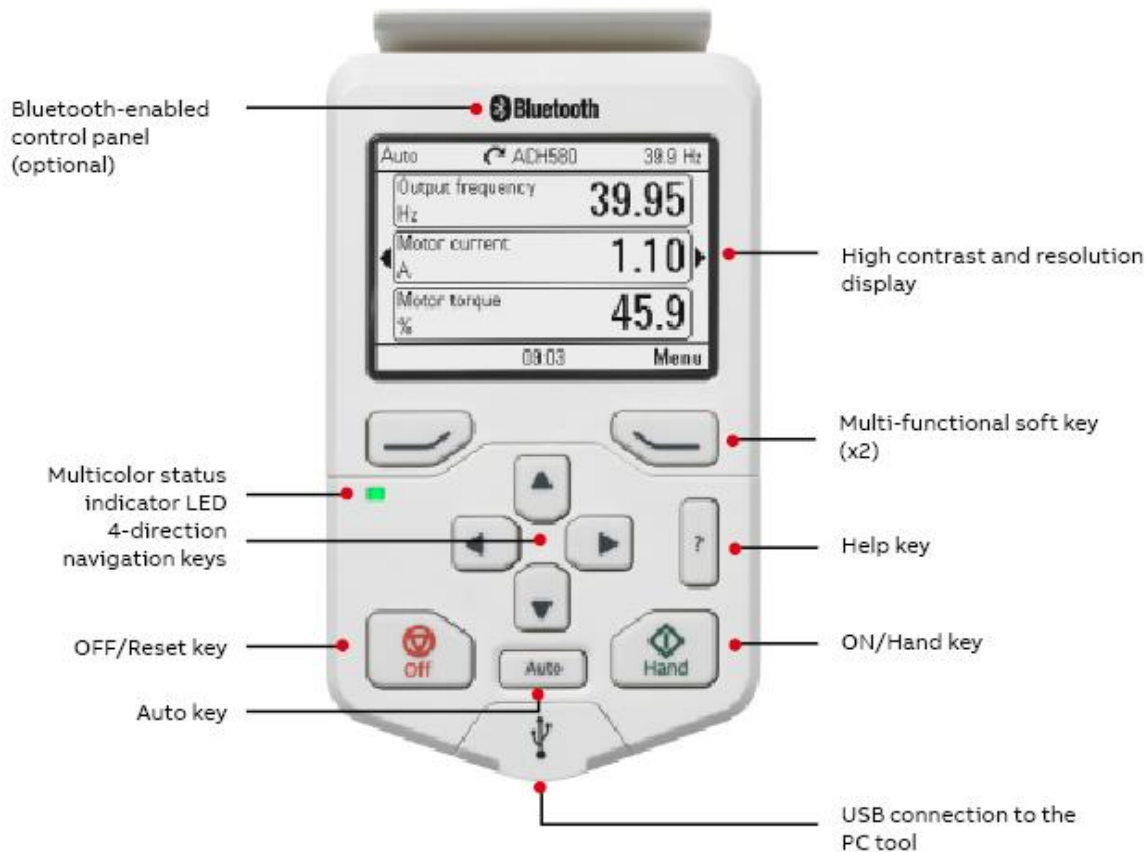
PID Controller Parameters

PID Sleep/Wake-Up

Control panel features

The ACH580 Assistant Control Panel features:

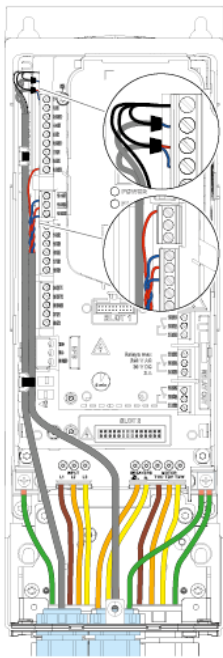
- Intuitive to operate
- Primary Setting menu to ease drive commissioning
- Real-time clock
- Diagnostic and maintenance functions
- Full-graphic display, including chart, graph, and meter options
- 21 editable home views
- USB interface for PC and tool connection as standard
- Parameters are alpha-numeric
- 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)



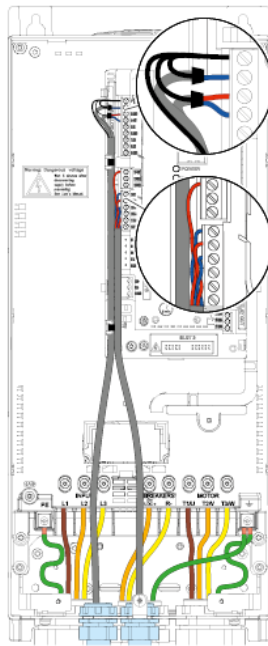
Cable connections

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.

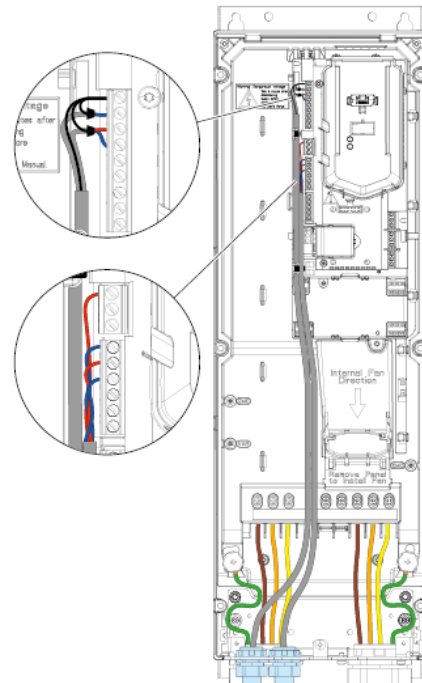
ACH580 drives are configured for wiring access from the bottom only. At least three separate metallic conduits are required, one for input power, one for output power to the motor and one for control signals.



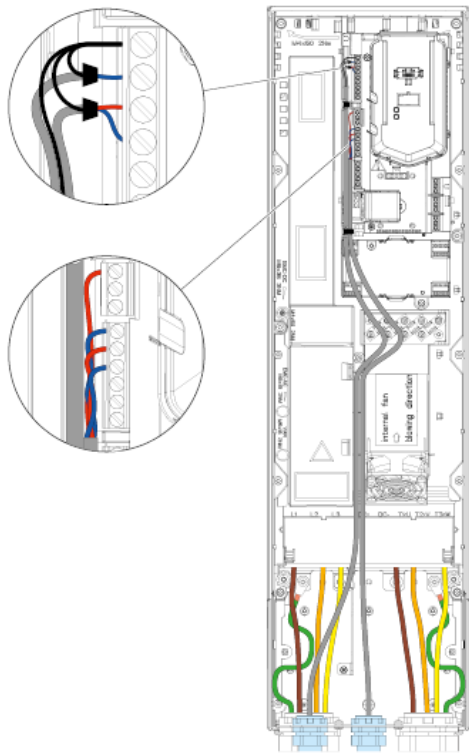
ACH580-01, R1-R2, UL (NEMA) Type 1 and 12



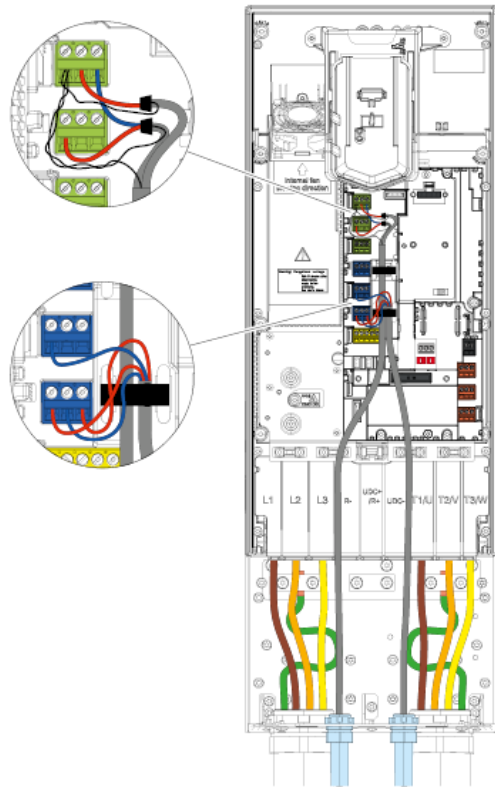
ACH580-01, R3, UL (NEMA) Type 1 and 12



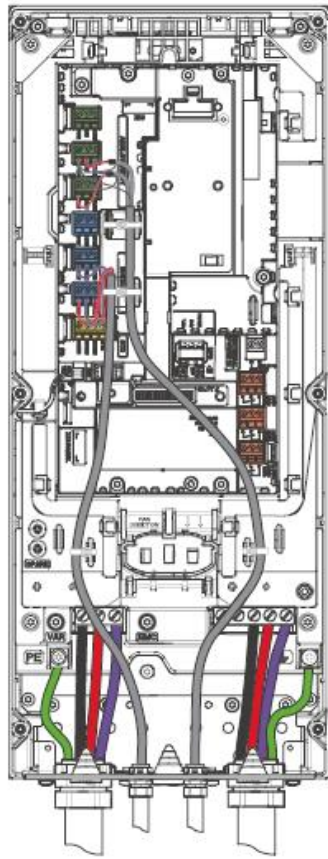
ACH580-01, R4, UL (NEMA) Type 1 and 12



ACH580-01, R5, UL (NEMA) Type 1 and 12



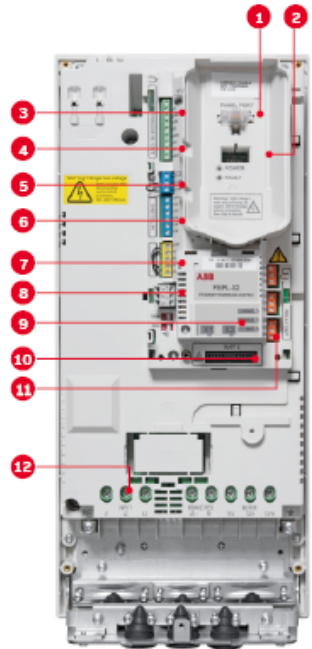
ACH580-01, R6-9, UL (NEMA) Type 1 and 12



ACH580-31, R3, UL (NEMA) Type 1 and 12

Control connections

Default control connections



1. Panel port (PC tools, control panel)
2. ABB drive customizer port for programming the drive without mains
3. Analog inputs (2 × AI)
4. Analog outputs (2 × AO)
5. 24 V DC output
6. Digital inputs (6 × DI)
7. Safe torque off (STO)
8. Embedded fieldbus
9. Communication options (fieldbuses)
10. Analog and digital I/O extensions
11. Relay outputs (3 × RO)
12. Mains connection

| Terminal | Meaning | Default macro connections | |
|--|----------------|--|---------------------------------------|
| 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 | Motor 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 | Running 250 V AC/30 V DC 2 A | Running 22 connected to 24 |
| 22 | RO2C | | |
| 23 | RO2A | Fault (-1) 250 V AC/30 V DC 2 A | Fault condition 25 connected to 26 |
| 24 | RO2B | | |
| 25 | RO3C | Fault status | |
| 26 | RO3A | | |
| 27 | RO3B | | |
| X5 Embedded fieldbus | | | |
| 29 | B+ | Embedded fieldbus, EFB (EIA-485) | |
| 30 | A- | | |
| 31 | DGND | | |
| 54 | TERM | Termination switch | |
| 55 | BIAS | Bias resistors switch | |
| X4 Safe torque off | | | |
| 34 | OUT1 | Safe torque off. Factory connection. Both circuits must be closed for the drive to start. See chapter <i>The Safe torque off function</i> in the <i>hardware manual</i> of the drive. | |
| 35 | OUT2 | | |
| 36 | SGND | | |
| 37 | IN1 | | |
| 38 | IN2 | | |
| X10 24 V AC/DC | | | |
| 40 | 24 V AC/DC+ in | R6-R11 only: Ext. 24V AC/DC input to power up the control unit when the main supply is disconnected. | |
| 41 | 24 V AC/DC- in | | |

Notes:

- Connected with jumpers at the factory.
- Only frames R6-R11 have terminals 40 and 41 for external 24 V AC/DC input.

Engineering Data Summary

Replacement Fuses

Drive input fuses are recommended to disconnect the drive from power in the event that a component fails in the drive's power circuitry. Recommended drive input fuse specifications are listed in the *Submittal Schedule Details* and in the *Fuse Ratings Table*. Fuse rating information is provided for customer reference.

| Item | Catalog Number | Drive Input Fuse Ratings | |
|------|------------------|--------------------------|---------------|
| | | Amps (600V) | Bussmann Type |
| 1 | ACH580-01-017A-2 | 30 | Class CC or T |

Terminal Sizes / Cable Connection Requirements

Power and motor cable terminal sizes and connection requirements are shown in the *Submittal Schedule Details* and in the *Terminal Sizes / Cable Connection Requirements Table*. The information provided below is for connections to input power and motor cables. These connections may be made to an input circuit breaker or disconnect switch, a motor terminal block, overload relay, and/or directly to bus bars and ground lugs. The table also lists torque that should be applied when tightening terminals and spacing requirements where multiple mounting holes are provided in the bus bar.

| Item | Catalog Number | Input Wiring | Output Wiring | Ground Wiring |
|------|------------------|-------------------------|-------------------------|--------------------------|
| 1 | ACH580-01-017A-2 | #24 ... #10 1 lbf-ft | #24 ... #10 1 lbf-ft | #18 ... #6 1.1 lbf-ft |

Heat Dissipation Requirements

The cooling air entering the drive must be clean and free from corrosive materials. The *Submittal Schedule Details* and the *Heat Dissipation Requirements table* below give the heat dissipated into the hot air exhausted from the drives. If the drives are installed in a confined space, the heat must be removed from the area by ventilation or air conditioning equipment.

| Item | Catalog Number | Watts | BTU/Hr |
|------|------------------|-------|--------|
| 1 | ACH580-01-017A-2 | 133 | 454 |

Dimensions and Weights

Dimensions and weights of the drives provided are given in the *Submittal Schedule Details* and in the *Dimensions and Weights Table*. The table also lists the applicable dimension drawings that include additional detail. Dimension drawings may be provided in the back of this submittal.

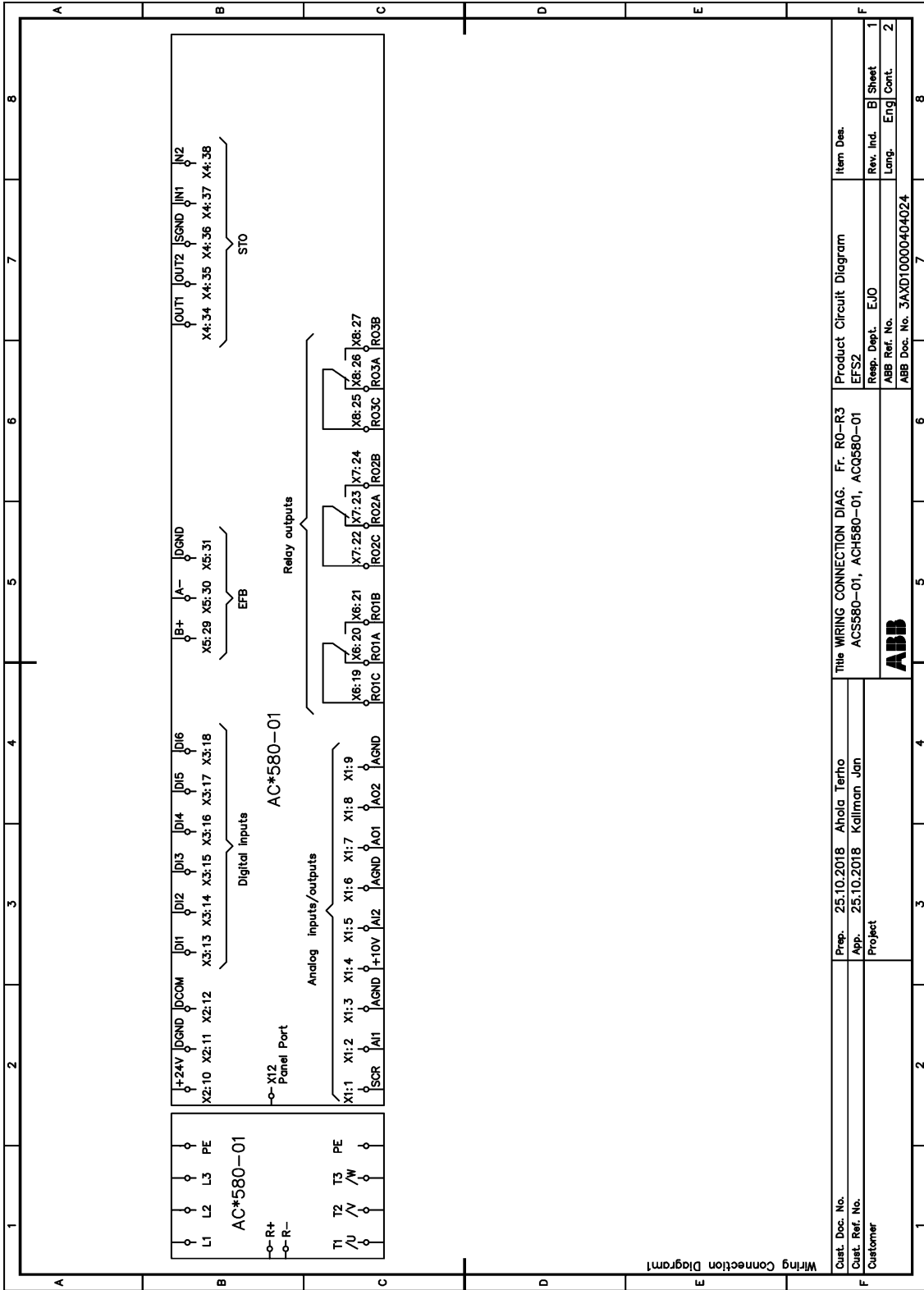
| Item | Catalog Number | Height mm (in) | Width mm (in) | Depth mm (in) | Weight kg (lbs) |
|------|------------------|----------------------|---------------------|---------------------|-----------------------|
| 1 | ACH580-01-017A-2 | 373 (14.69) | 123 (4.85) | 223 (8.78) | 4.6 (11) |

Product Short Circuit Current Rating

Short circuit ratings shown below are as show on the device rating label.

| Item | Catalog Number | Short Circuit Current Rating |
|------|------------------|------------------------------|
| 1 | ACH580-01-017A-2 | 100 kA with fusing |

| | | |
|------------------|--|-----------------------------|
| Item 1 | Part Number ACH580-01-017A-2 | Customer Designation |
|------------------|--|-----------------------------|



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