



**INDUSTRIAL
CONTROL DIRECT**

A B&D Industrial Company

**DRIVES
WIZARD**

Irrigation variable frequency drives (VFDs) have been around for many years. The engineers at Industrial Control Direct (ICD) have spent the last six years refining the design to something that we are very proud of. We have taken user information as well as empirical data associated with mean time before failure (MTBF) rates and created something that no one else has. In most cases, these other designs (non-ICD) are made at the factory where there is no account for some of the peculiar challenges present at farming locations. Most of the farms have harsh environments, extreme heat, cold, wet-weather, as well as power network issues such as being ungrounded. The non-ICD systems tend to be noisy and interrupt GPS and other signals running pivots as well as disturbances with pressure and control loops. In our designs we present the following standard features that alleviate the issues:

ABB ACS580 drives -- <https://new.abb.com/drives/low-voltage-ac/general-purpose/acs580/>

- N3R Aluminum Enclosures with feet and shrouded fans
- 2 contactor full voltage bypass and OL (on 50 -125HP units only)
- 2 x Auxiliary 3P 30A UL489 MCBs
- Main Breaker with flange handle disconnect
- Citel Power surge protective device (SPD)
- EMI Filter
- Citel Analog SPD
- External control relays (VFD run, SP1, SP2 for PID loops)
- HAO and Pilot arrangement
- Keypad on the outside with N4X cover
- Input reactors
- Output sine filters
- Pressure sensor
- UL508A
- Drawings

The ICD drive is configured so that the internal ABB filters are disabled for any type of power network as well as the way we add back an external parallel EMI filter. The output sine filter is the most important part of this design based on data. In most cases, farmers as well as electrical companies associated with agricultural work use general purpose wire and cable like THHN. In the industrial world, this is a problem. The sine filter makes the design more robust where we really do not care about the type of wire and cable used, furthermore, the motor does not have to be inverter rated. The distance from this drive to the motor can be up to 1,000 feet away. It works well with OEM submersible pumps in addition to other problematic systems.

Feel free to contact us about your application and we can adjust and modify the design accordingly based on your needs. We can add heaters, additional cooling, additional starters and breakers for whatever the application requires.

sales@industrialcontroldirect.com

770-274-3088

Base Drives used in Irrigation Designs

Schedule			Motor Data ¹			Base Drive Data			
Item	Qty	Equipment ID	HP	FLA	Voltage	Base Drive Product ID	Output		
							HP	Amps	Voltage
1	1		50	65	480	ACS580-01-065A-4	50	65	
2	1		60	77	480	ACS580-01-078A-4	60	77	
3	1		75	96	480	ACS580-01-096A-4	75	96	
4	1		100	124	480	ACS580-01-124A-4	100	124	
5	1		125	156	480	ACS580-01-156A-4	125	156	
6	1		150	180	480	ACS580-01-180A-4	150	180	
7	1		200	240	480	ACS580-01-240A-4	200	240	
8	1		250	302	480	ACS580-01-302A-4	250	302	

Notes: 1. AC Motor Data is per National Electrical Code Table 430.250 for typical motors used in most applications and is provided as typical data only. DC motor data is per typical industry standards. Actual motor data may vary.

Clarifications and Exceptions to Specification and Terms

The comments and clarifications that follow are offered in response to the specification items identified below. Please refer to the specification section and paragraph indicated. Any contract executed based on this proposal is done based acceptance of the exceptions noted herein.

Item ID	Title	Clarifications and Exceptions
A	Warranty	Designs have a standard one-year warranty unless an authorized commissioning is performed by an agent of ABB. Contact ICD for details.

Submittal Schedule Details for

Item	Tag / Equipment ID	Product ID
1		ACS580-01-065A-4

Item Description
Input Voltage: 480 VAC Rated Output Current: 65 Construction: 01 Enclosure: IP21 (UL Type 1) Nominal Horsepower: 50 Frame Size: R4 Input Disconnecting Means: None Input Impedance: 0.05 Short Circuit Current Rating: 100 kA with fuses Communication Protocols: Embedded Modbus RTU adapter Other Options: Standard control panel, Recommended Spare Parts Package : /

Drive Input Fuse Ratings	
Amps (600 V)	Bussmann Type
90 @ 600	JJS-90

Wire Size Capacities of Power Terminals				
Circuit Breaker	Disconnect Switch	Terminal Block	Overload Relay	Ground Lug
N/A N/A	N/A N/A	20 AWG (0,5/0,5 mm ²) 3 ft-lb (4 N-m)	N/A N/A	12 AWG (4 mm ²) 2.1 ft-lb (2.9 N-m)

Dimensions and Weights				
Height in / mm	Width in / mm	Depth in / mm	Weight lbs / kg	Dimension Drawing
23.6 / 600	8 / 203	10.2 / 258	43 / 19	3AXD50000017022

Heat Dissipation & Airflow Requirements			
Power Losses		Airflow	
Watts	BTU/Hr	CFM	CM/Hr
1024	3497	79	134

Reference Drawings		
Power Wiring	Connection Diagram	Dimension Detail
	3AXD10000404024_s2	3AXD50000017022

Submittal Schedule Details for

Item	Tag / Equipment ID	Product ID
2		ACS580-01-078A-4

Item Description
Input Voltage: 480 VAC Rated Output Current: 77 Construction: 01 Enclosure: IP21 (UL Type 1) Nominal Horsepower: 60

Frame Size: R5 Input Disconnecting Means: None Input Impedance: 0.05 Short Circuit Current Rating: 100 kA with fuses Communication Protocols: Embedded Modbus RTU adapter Other Options: Standard control panel, Recommended Spare Parts Package : /

Drive Input Fuse Ratings	
Amps (600 V)	Bussmann Type
110 @ 600	JJS-110

Wire Size Capacities of Power Terminals				
Circuit Breaker	Disconnect Switch	Terminal Block	Overload Relay	Ground Lug
N/A N/A	N/A N/A	10 AWG (6 mm ²) 4.1 ft-lb (5.6 N-m)	N/A N/A	19 AWG (0.75 mm ²) 1.6 ft-lb (2.2 N-m)

Dimensions and Weights				
Height in / mm	Width in / mm	Depth in / mm	Weight lbs / kg	Dimension Drawing
28.8 / 732	8 / 203	11.6 / 295	62.4 / 28.5	3AXD50000025387

Heat Dissipation & Airflow Requirements			
Power Losses		Airflow	
Watts	BTU/Hr	CFM	CM/Hr
1240	4235	82	139

Reference Drawings		
Power Wiring	Connection Diagram	Dimension Detail
	3AXD10000404024_s2	3AXD50000025387

Submittal Schedule Details for

Item	Tag / Equipment ID	Product ID
3		ACS580-01-096A-4

Item Description
Input Voltage: 480 VAC Rated Output Current: 96 Construction: 01 Enclosure: IP21 (UL Type 1) Nominal Horsepower: 75 Frame Size: R5 Input Disconnecting Means: None Input Impedance: 0.05 Short Circuit Current Rating: 100 kA with fuses Communication Protocols: Embedded Modbus RTU adapter Other Options: Standard control panel, Recommended Spare Parts Package : /

Drive Input Fuse Ratings	
Amps (600 V)	Bussmann Type
150 @ 600	JJS-150

Wire Size Capacities of Power Terminals				
Circuit Breaker	Disconnect Switch	Terminal Block	Overload Relay	Ground Lug
N/A N/A	N/A N/A	10 AWG (6 mm ²) 4.1 ft-lb (5.6 N-m)	N/A N/A	19 AWG (0.75 mm ²) 1.6 ft-lb (2.2 N-m)

Dimensions and Weights				
Height in / mm	Width in / mm	Depth in / mm	Weight lbs / kg	Dimension Drawing
28.8 / 732	8 / 203	11.6 / 295	62.4 / 28.5	3AXD50000025387

Heat Dissipation & Airflow Requirements			
Power Losses		Airflow	
Watts	BTU/Hr	CFM	CM/Hr
1510	5157	82	139

Reference Drawings		
Power Wiring	Connection Diagram	Dimension Detail
	3AXD10000404024_s2	3AXD50000025387

Submittal Schedule Details for

Item	Tag / Equipment ID	Product ID
4		ACS580-01-124A-4

Item Description
Input Voltage: 480 VAC Rated Output Current: 124 Construction: 01 Enclosure: IP21 (UL Type 1) Nominal Horsepower: 100 Frame Size: R6 Input Disconnecting Means: None Input Impedance: 0.05 Short Circuit Current Rating: 100 kA with fuses Communication Protocols: Embedded Modbus RTU adapter Other Options: Standard control panel, Recommended Spare Parts Package : /

Drive Input Fuse Ratings	
Amps (600 V)	Bussmann Type
200 @ 600	JJS-200

Wire Size Capacities of Power Terminals				
Circuit Breaker	Disconnect Switch	Terminal Block	Overload Relay	Ground Lug
N/A N/A	N/A N/A	4 AWG (25 mm ²) 22.1 ft-lb (30 N-m)	N/A N/A	350 MCM (185 mm ²) 7.2 ft-lb (9.8 N-m)

Dimensions and Weights				
Height in / mm	Width in / mm	Depth in / mm	Weight lbs / kg	Dimension Drawing
28.6 / 727	9.9 / 252	14.5 / 369	99.2 / 45	3AXD50000009111

Heat Dissipation & Airflow Requirements			
Power Losses		Airflow	
Watts	BTU/Hr	CFM	CM/Hr
1476	5041	256	435

Reference Drawings		
Power Wiring	Connection Diagram	Dimension Detail
	3AXD10000404024_s3	3AXD50000009111

Submittal Schedule Details for

Item	Tag / Equipment ID	Product ID
5		ACS580-01-156A-4

Item Description
Input Voltage: 480 VAC Rated Output Current: 156 Construction: 01 Enclosure: IP21 (UL Type 1) Nominal Horsepower: 125 Frame Size: R7 Input Disconnecting Means: None Input Impedance: 0.05 Short Circuit Current Rating: 100 kA with fuses Communication Protocols: Embedded Modbus RTU adapter Other Options: Standard control panel, Recommended Spare Parts Package : /

Drive Input Fuse Ratings	
Amps (600 V)	Bussmann Type
225 @ 600	JJS-225

Wire Size Capacities of Power Terminals				
Circuit Breaker	Disconnect Switch	Terminal Block	Overload Relay	Ground Lug
N/A N/A	N/A N/A	3/0 AWG (95 mm ²) 29.5 ft-lb (40 N-m)	N/A N/A	350 MCM (185 mm ²) 7.2 ft-lb (9.8 N-m)

Dimensions and Weights				
Height in / mm	Width in / mm	Depth in / mm	Weight lbs / kg	Dimension Drawing
34.6 / 880	11.2 / 284	14.6 / 370	119.1 / 54	3AXD50000009133

Heat Dissipation & Airflow Requirements			
Power Losses		Airflow	
Watts	BTU/Hr	CFM	CM/Hr
1976	6748	265	450

Reference Drawings		
Power Wiring	Connection Diagram	Dimension Detail
	3AXD10000404024_s3	3AXD50000009133

Submittal Schedule Details for

Item	Tag / Equipment ID	Product ID
6		ACS580-01-180A-4

Item Description
Input Voltage: 480 VAC Rated Output Current: 180 Construction: 01 Enclosure: IP21 (UL Type 1) Nominal Horsepower: 150 Frame Size: R7 Input Disconnecting Means: None Input Impedance: 0.05 Short Circuit Current Rating: 100 kA with fuses Communication Protocols: Embedded Modbus RTU adapter Other Options: Standard control panel, Recommended Spare Parts Package : /

Drive Input Fuse Ratings	
Amps (600 V)	Bussmann Type
300 @ 600	JJS-300

Wire Size Capacities of Power Terminals				
Circuit Breaker	Disconnect Switch	Terminal Block	Overload Relay	Ground Lug
N/A N/A	N/A N/A	3/0 AWG (95 mm ²) 29.5 ft-lb (40 N-m)	N/A N/A	350 MCM (185 mm ²) 7.2 ft-lb (9.8 N-m)

Dimensions and Weights				
Height in / mm	Width in / mm	Depth in / mm	Weight lbs / kg	Dimension Drawing
34.6 / 880	11.2 / 284	14.6 / 370	119.1 / 54	3AXD50000009133

Heat Dissipation & Airflow Requirements			
Power Losses		Airflow	
Watts	BTU/Hr	CFM	CM/Hr
2346	8012	265	450

Reference Drawings		
Power Wiring	Connection Diagram	Dimension Detail
	3AXD10000404024_s3	3AXD50000009133

Submittal Schedule Details for

Item	Tag / Equipment ID	Product ID
7		ACS580-01-240A-4

Item Description
Input Voltage: 480 VAC Rated Output Current: 240 Construction: 01 Enclosure: IP21 (UL Type 1) Nominal Horsepower: 200 Frame Size: R8

Input Disconnecting Means: None
Input Impedance: 0.05
Short Circuit Current Rating: 100 kA with fuses
Communication Protocols:
 Embedded Modbus RTU adapter
Other Options:
 Standard control panel,
Recommended Spare Parts Package : /

Drive Input Fuse Ratings	
Amps (600 V)	Bussmann Type
350 @ 600	JJS-350

Wire Size Capacities of Power Terminals				
Circuit Breaker	Disconnect Switch	Terminal Block	Overload Relay	Ground Lug
N/A N/A	N/A N/A	2*1/0 AWG (2*50 mm ²) 29.5 ft-lb (40 N-m)	N/A N/A	2*350 MCM (2x185 mm ²) 7.2 ft-lb (9.8 N-m)

Dimensions and Weights				
Height in / mm	Width in / mm	Depth in / mm	Weight lbs / kg	Dimension Drawing
38 / 965	11.8 / 300	15.5 / 393	152.2 / 69	3AXD50000021243

Heat Dissipation & Airflow Requirements			
Power Losses		Airflow	
Watts	BTU/Hr	CFM	CM/Hr
3336	11393	324	550

Reference Drawings		
Power Wiring	Connection Diagram	Dimension Detail
	3AXD10000404024_s3	3AXD50000021243

Submittal Schedule Details for

Item	Tag / Equipment ID	Product ID
8		ACS580-01-302A-4

Item Description
Input Voltage: 480 VAC Rated Output Current: 302 Construction: 01 Enclosure: IP21 (UL Type 1) Nominal Horsepower: 250 Frame Size: R9 Input Disconnecting Means: None Input Impedance: 0.05 Short Circuit Current Rating: 100 kA with fuses Communication Protocols: Embedded Modbus RTU adapter Other Options: Standard control panel, Recommended Spare Parts Package : /

Drive Input Fuse Ratings	
Amps (600 V)	Bussmann Type
500 @ 600	JJS-500

Wire Size Capacities of Power Terminals				
Circuit Breaker	Disconnect Switch	Terminal Block	Overload Relay	Ground Lug
N/A N/A	N/A N/A	2*3/0 AWG (2*95 mm ²) 51.63 ft-lb (70 N-m)	N/A N/A	2*350 MCM (2x185 mm ²) 7.2 ft-lb (9.8 N-m)

Dimensions and Weights				
Height in / mm	Width in / mm	Depth in / mm	Weight lbs / kg	Dimension Drawing
37.6 / 955	15 / 380	16.5 / 418	213.9 / 97	3AXD50000020646

Heat Dissipation & Airflow Requirements			
Power Losses		Airflow	
Watts	BTU/Hr	CFM	CM/Hr
4836	16516	677	1150

Reference Drawings		
Power Wiring	Connection Diagram	Dimension Detail
	3AXD10000404024_s3	3AXD50000020646

ACS580 Product Overview

Description

Save time and money

The ACS580 is simple to install, commission, use, expand, and even upgrade, when the time comes. A compact design makes handling the units easy and with all the essential features built-in, commissioning and setup time is greatly reduced by leveraging the Primary Settings menus and assistants. The assistant control panel, which provides 16 different language options, can be upgraded to an optional Bluetooth control panel to enable wireless commissioning and monitoring.

Keep your system running smoothly

ACS580 drives are designed for customers who value reliability, high quality, and robustness in their applications. The product features, such as coated boards and compact IP55 enclosure, make the ACS580 suitable for harsh conditions. Additionally, all ACS580 drives and their protective functions are thoroughly tested for performance at maximum temperature with nominal loads.

All ACS580 drives are current rated devices. The HP ratings provided are for reference only and are based on typical 4-pole motors at nominal voltages (NEC Table 430.250). If full motor torque is required, ensure the drive has a continuous current rating equal to, or greater than the full load amp rating of the motor

The ACS580 is available in both "Light Duty" ratings and "Heavy Duty" ratings. The Light Duty rating provides a 10% short term overload rating for 1 minute of every 10 minutes. The Heavy Duty rating provides a 50% short term overload rating for 1 minute in ten minutes.



ACS580 Standard Features

Standard Features

- Enclosure class UL type 1 (IP21) or UL type 12 (IP55)
- Compact design for easy installation, and maintenance
- Incoming air temperature measurement for protecting the drive from temperature related failures
- Integrated safety including safe torque-off (STO) as standard
- Supports various motor types
- Intuitive control panel with USB connection
- Drive Composer PC tool for commissioning and configuration
- Primary control program - common software used throughout the ACS580 drive series
- Control unit supporting a wide range of fieldbuses and input/output options
- Coated boards as standard
- Speed controlled cooling fan
- Built-in braking chopper (for frame sizes R1 to R3)
- Built-in choke
- Adaptive programming
- Color coded connection terminals
- Motor ID Run
- Motor Control: Open Loop Vector and Scalar Control
- Two (2) programmable Analog Inputs
- Six (6) programmable Digital inputs
- Two (2) programmable Analog Outputs
- Three (3) Programmable Form C Relay Outputs
- Fieldbus adapters (communication modules)
- Start/Stop
 - 2 wire control (dry contact closure)
 - 3 wire control (momentary dry contacts)
- Adjustable Current Limit
- Adjustable Torque Limit
- Electronic Reverse
- Power Loss Ride-Through
- Maximum Frequency Programmable up to 500 Hz
- Two (2) Integral Programmable PID Setpoint Controllers
- Built-in Modbus RTU

Available options

I/O Options

- External 24V AC/DC Input, 2 RO, 1 DO Module CMOD-01
- 115/230V Digital Interface Module CHDI-01
- External 24V AC/DC Input, Isolated PTC interface CMOD-02

Fieldbus Adapter Modules

- DeviceNet adaptor FDNA-01
- Profibus-DP adaptor FPBA-01
- ControlNet adaptor FCNA-01
- CANopen adaptor FCAN-01
- Ethernet/IP adaptor FENA-11
- Ethernet/IP adaptor FENA-21
- Modbus adaptor FSCA-01
- Ethercat adaptor FECA-01
- EtherPOWERLINK adaptor FEPL-02

DriveComposer / DriveComposerPro Start-up & Programming

Control Panel Options

- All Compatible Industrial Panel ACS-AP-I
- Assistant Control Panel with Bluetooth ACS-AP-W
- Drive To Drive Link board CDPI-01
- Blank Control Panel Cover CDUM-01

NEMA 12 Flush or Surface Remote Panel Mounting Kit

Flange Mounting Kits (R1 – R9)

CCA-01 Cold Configuration Tool



ACS580 Specifications

Input ratings	Input voltage range	208-240 V; 380-500 V; 525-600 V	
	Input voltage tolerance	+10%/-15%	
	Phase	Three phase	
	Frequency	47 to 63 Hz	
Output ratings	Short circuit rating (UL 508c)	100,000 rms symmetrical amperes up to 600 V when input cables protected by class T or similar type fuses	
	Horsepower	0.75 - 100 HP @ 230 VAC 0.75 - 350 HP @ 480 VAC 1.5 - 300 HP @ 575/600 VAC	
	Overload capacity	Heavy duty = 150% for 60 seconds every 5 minutes Light duty = 110% for 60 seconds every 5 minutes	
	Frequency	0-500 Hz	
	Voltage	0 to maximum input voltage (RMS)	
	Motor types	Asynchronous AC induction, permanent magnet synchronous, and synchronous reluctance motor types	
	Protective features	Overcurrent	Excessive output current
DC overvoltage		High DC bus	
Overtemp		Drive heatsink above operating temperature, max ambient temperature exceeded	
Short circuit		Short on motor output terminals	
Undervoltage		Low voltage on drive input	
Loss of reference		Analog input programmed for 4-20 ma but signal less than 4 ma Motor	
Overtemp		Excessive estimated motor temperature	
Loss of keypad		Drive will trip if under keypad control and keypad communication is lost Motor	
Stall		Motor cannot achieve commanded speed due to excessive load	
Ground fault		Ground fault detected in motor or motor cabling	
Motor phase fault		Loss at one of the motor phases	
Environmental		Temperature	-15 to +40°C. No frost allowed. R1 to R9 from +40 to +50°C with derating
		Cooling	Forced air
	Enclosure	UL type 1 (IP21), UL type 12 (IP55)	
	Altitude	Sea level to 3300 ft. (1000 m) De-rate 1% per 330 ft. (100 m) up to 13,128 ft. (4000 m)	
	Humidity	0 to 95% RH non-condensing	
	Vibration	Max. 1 mm (0.04 in.) (5 to 13.2 Hz), max. 7 m/s ² (23 ft/s ²) (13.2 to 100 Hz) sinusoidal	
Keypad display	Display	LCD graphical	
	Keys	8 key keypad with tactile response	
	Functions	Output status monitoring, digital speed control, parameter setting and display, diagnostic and fault log display, motor run, local/remote toggle, graphical monitoring	
	Remote mount	Keypad may be mounted up to 9 ft. using appropriate cable (see Options for kit)	
Control specifications	Trip	Last three faults stored in fault history	
	Switching frequency	1, 4, 8, 12 kHz (up to 150hp): 1 or 4 kHz (over 150hp)	
	Accel/decel	0-1800 seconds	
	Speed control accuracy	20% of motor slip	
	Skip frequencies	Three configurable bands 0-max speed	
	PC setup software	Drive composer, drive composer pro	
	Maximum output frequency	500 Hz	
Analog inputs	Selectable operating modes	2-Wire, 3-Wire, Motor Potentiometer, Hand/Auto, PID	
	Two single ended	0 (2) to 10 V, Rin > 312kΩ single-ended 0 (4) to 20mA, Rin = 100 Ω single-ended	
Analog outputs	Resolution	± 1%	
	Two current outputs	0 to 20 mA, load < 500 Ω	
Digital inputs	Resolution	± 3%	
	Six digital inputs	15 V...24 VDC with internal or external supply	
	Input impedance	Pull-up or pull-down (PNP or NPN) (DI1 to DI5); NPN (DI6) 2.4 kΩ	
Digital outputs	Three relay outputs	Form C	
	Maximum switching voltage	250 VAC/30 VDC	
	Maximum continuous current	2 A/30 VDC or 250 VAC	
	Safety	Safe torque off (STO)	STO standard input; 17...30 VDC, 55 mA

ACS580 carries the following third party certifications

Product	Certification
ACS580-01, 480V	UL 508C 3 rd edition, NEMA 250:2008, CE, EN, IEC

ACS580 Control Panel

Assistant Control Panel Features

The ACS580 Assistant Control Panel features:

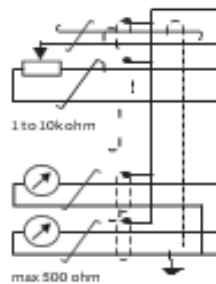
- Intuitive to operate
- Primary Settings menu to ease drive commissioning
- Real Time Clock
- Diagnostic and Maintenance functions
- Full Graphic Display, including Chart, Graph, Meter options
- 21 editable home views
- USB interface for PC and tool connection as standard
- Parameters are Alpha-numeric
- N. A. version supports 14 languages as standard
- Dedicated Help key
- 4 User Sets
- Parameters 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 default



ACS580 Control Terminals

Default factory I/O connection diagram

Terminal	Meaning	Default macro connections
X1 Reference voltage and analog inputs and outputs		
1	SCR	Signal cable shield (screen)
2	AI1	External frequency reference 1: 0 to 10 V
3	AGND	Analog input circuit common
4	+10 V	Output reference voltage 10 V DC
5	AI2	Not used
6	AGND	Analog input circuit common
7	AO1	Output frequency: 0 to 20 mA
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	Auxiliary voltage output +24 V DC
11	DGND	Auxiliary voltage output common
12	DCOM	Digital input common for all DI
13	DI1	Start/Stop: Activate to start
14	DI2	Fwd./Rev.: Activate to reverse rotation direction
15	DI3	Constant speed selection
16	DI4	Constant speed selection
17	DI5	Ramp pair selection: Activate to select second pair
18	DI6	Not used
X6, X7 X8 Relay outputs		
	RO1C	Ready
	RO1A	250 V AC/30 V DC
	RO1B	2 A
	RO2C	Running
	RO2A	250 V AC/30 V DC
	RO2B	2 A
	RO3C	Fault (-I)
	RO3A	250 V AC/30 V DC
	RO3B	2 A
X5 EIA-485 Modbus RTU		
29	B+	
30	A-	Built-in Modbus RTU fieldbus interface
31	DGND	
X4 Safe torque off		
34	OUT1	
35	OUT2	
36	SGND	Safe torque off. Both circuits must be closed for the drive to start. The circuits are closed with jumper wires in the standard delivery.
37	IN1	
38	IN2	
X10* 24 V AC/DC		
40	24 V	AC/DC-In. Ext. 24 V AC/DC input to power up the control unit when the main supply is disconnected
41	24 V	AC/DC-In.

* The terminals 40-41 are integrated in the frame sizes R6-R11. For the frame sizes R1-R5 I/O options (+L) are needed.

Engineering Data and Ratings Tables

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	ACS580-01-065A-4	90 @ 600	JJS-90
2	ACS580-01-078A-4	110 @ 600	JJS-110
3	ACS580-01-096A-4	150 @ 600	JJS-150
4	ACS580-01-124A-4	200 @ 600	JJS-200
5	ACS580-01-156A-4	225 @ 600	JJS-225
6	ACS580-01-180A-4	300 @ 600	JJS-300
7	ACS580-01-240A-4	350 @ 600	JJS-350
8	ACS580-01-302A-4	500 @ 600	JJS-500

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	Circuit Breaker	Disconnect Switch	Terminal Block	Overload Relay	Ground Lug
1	ACS580-01-065A-4	N/A N/A	N/A N/A	20 AWG (0,5/0,5 mm ²) 3 ft-lb (4 N-m)	N/A N/A	12 AWG (4 mm ²) 2.1 ft-lb (2.9 N-m)
2	ACS580-01-078A-4	N/A N/A	N/A N/A	10 AWG (6 mm ²) 4.1 ft-lb (5.6 N-m)	N/A N/A	19 AWG (0.75 mm ²) 1.6 ft-lb (2.2 N-m)
3	ACS580-01-096A-4	N/A N/A	N/A N/A	10 AWG (6 mm ²) 4.1 ft-lb (5.6 N-m)	N/A N/A	19 AWG (0.75 mm ²) 1.6 ft-lb (2.2 N-m)
4	ACS580-01-124A-4	N/A N/A	N/A N/A	4 AWG (25 mm ²) 22.1 ft-lb (30 N-m)	N/A N/A	350 MCM (185 mm ²) 7.2 ft-lb (9.8 N-m)
5	ACS580-01-156A-4	N/A N/A	N/A N/A	3/0 AWG (95 mm ²) 29.5 ft-lb (40 N-m)	N/A N/A	350 MCM (185 mm ²) 7.2 ft-lb (9.8 N-m)

Item	Catalog Number	Circuit Breaker	Disconnect Switch	Terminal Block	Overload Relay	Ground Lug
6	ACS580-01-180A-4	N/A N/A	N/A N/A	3/0 AWG (95 mm ²) 29.5 ft-lb (40 N-m)	N/A N/A	350 MCM (185 mm ²) 7.2 ft-lb (9.8 N-m)
7	ACS580-01-240A-4	N/A N/A	N/A N/A	2*1/0 AWG (2*50 mm ²) 29.5 ft-lb (40 N-m)	N/A N/A	2*350 MCM (2x185 mm ²) 7.2 ft-lb (9.8 N-m)
8	ACS580-01-302A-4	N/A N/A	N/A N/A	2*3/0 AWG (2*95 mm ²) 51.63 ft-lb (70 N-m)	N/A N/A	2*350 MCM (2x185 mm ²) 7.2 ft-lb (9.8 N-m)

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	Power Losses		Airflow	
		Watts	BTU/Hr	CFM	CM/Hr
1	ACS580-01-065A-4	1024	3497	79	134
2	ACS580-01-078A-4	1240	4235	82	139
3	ACS580-01-096A-4	1510	5157	82	139
4	ACS580-01-124A-4	1476	5041	256	435
5	ACS580-01-156A-4	1976	6748	265	450
6	ACS580-01-180A-4	2346	8012	265	450
7	ACS580-01-240A-4	3336	11393	324	550
8	ACS580-01-302A-4	4836	16516	677	1150

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	Dimension Drawing
1	ACS580-01-065A-4	600 / 23.6	203 / 8	258 / 10.2	19 / 43	3AXD50000017022
2	ACS580-01-078A-4	732 / 28.8	203 / 8	295 / 11.6	28.5 / 62.4	3AXD50000025387
3	ACS580-01-096A-4	732 / 28.8	203 / 8	295 / 11.6	28.5 / 62.4	3AXD50000025387
4	ACS580-01-124A-4	727 / 28.6	252 / 9.9	369 / 14.5	45 / 99.2	3AXD50000009111
5	ACS580-01-156A-4	880 / 34.6	284 / 11.2	370 / 14.6	54 / 119.1	3AXD50000009133
6	ACS580-01-180A-4	880 / 34.6	284 / 11.2	370 / 14.6	54 / 119.1	3AXD50000009133
7	ACS580-01-240A-4	965 / 38	300 / 11.8	393 / 15.5	69 / 152.2	3AXD50000021243
8	ACS580-01-302A-4	955 / 37.6	380 / 15	418 / 16.5	97 / 213.9	3AXD50000020646

Schematics and Wire Diagrams

Detailed wiring diagrams and schematics may be included for the products covered in this submittal. Please reference the following ABB part numbers for the drawings included with this submittal:

Item	Catalog Number	Power Wiring	Connection Diagram	Dimension Detail
1	ACS580-01-065A-4		3AXD10000404024_s2	3AXD50000017022
2	ACS580-01-078A-4		3AXD10000404024_s2	3AXD50000025387
3	ACS580-01-096A-4		3AXD10000404024_s2	3AXD50000025387
4	ACS580-01-124A-4		3AXD10000404024_s3	3AXD50000009111
5	ACS580-01-156A-4		3AXD10000404024_s3	3AXD50000009133
6	ACS580-01-180A-4		3AXD10000404024_s3	3AXD50000009133
7	ACS580-01-240A-4		3AXD10000404024_s3	3AXD50000021243
8	ACS580-01-302A-4		3AXD10000404024_s3	3AXD50000020646

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	ACS580-01-065A-4	100 kA with fuses
2	ACS580-01-078A-4	100 kA with fuses
3	ACS580-01-096A-4	100 kA with fuses
4	ACS580-01-124A-4	100 kA with fuses
5	ACS580-01-156A-4	100 kA with fuses
6	ACS580-01-180A-4	100 kA with fuses
7	ACS580-01-240A-4	100 kA with fuses
8	ACS580-01-302A-4	100 kA with fuses

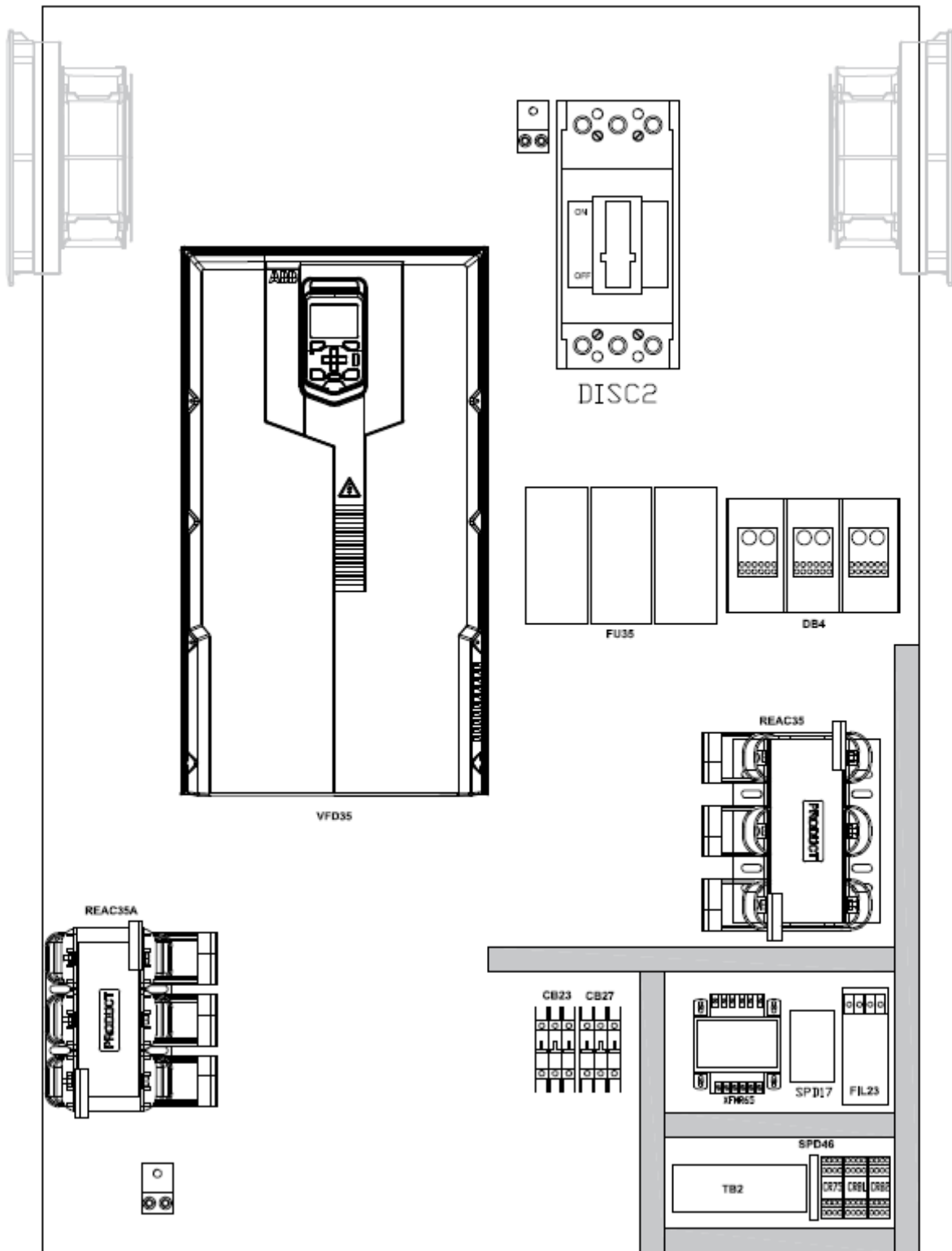


Figure 1 -- Basic Design



Figure 2 -- Picture of Finished Design

Notes –

- Additional Start-up assistance can be made available at published rates plus expenses.
- No installation or field wiring is provided unless stated.
- No machine enhancements.
- User pays for inbound and outbound freight and is not included with cost of design
- All ICD/B&D General Terms and Conditions of Sale apply with one exception. For quotes more than \$30,000.00, the following payment schedule applies:
 - a. 30% due upon receipt of order
 - b. 30% due upon confirmation of drawings
 - c. 30% due prior to shipment
 - d. 10% due 30 days after shipment
 - e. With approved credit

ICD Custom Design Terms

PAYMENTS

1. The payments will be made in accordance with terms so stated on each invoice.
2. A past due amount reflected on the account could result in delays in processing orders and possibly suspension of the open account, even if the account is within the credit limit.
3. Cash discount, if offered, will be forfeited if account is past due.
4. Applicant contracts and agrees to pay a monthly service charge of 1.5% on invoices past due 30 or more days (18% ANNUAL PERCENTAGE RATE).
5. That in the event of non-payment and the institution of legal proceedings the person, firm, or corporation to whom open account was extended agrees to bear the expense of all legal proceedings plus an attorney fee.
6. That advance notice will be given to B&D Technologies of any change in business structure, in other words incorporation, changed ownership etc. that without such notice original principals to whom credit was extended shall remain liable. Notice to be given by certified or registered letter and acknowledged by return receipt.
7. Purchasers will be charged the current legal amount for returned checks.

DELIVERY

Seller's shipping dates are approximate and are based upon prompt receipt of all necessary information. Seller shall not be liable for delays in delivery which are due to causes beyond reasonable control, including, but not limited to, delays due to: (1) acts of God, Purchaser's acts, acts of civil or military authority, priorities, fires, strikes, floods, epidemics, wars, riots, terrorism, delays in transportation; (2) inability to obtain necessary materials, components, or outside manufacturing services; (3) changes in specifications, directions, or design requested by or agreed to by Purchaser, or (4) Purchaser's delay in approving documents. In the event of any such delay, the date of shipment shall be extended for a period equal to the time lost by reason of the delay.

Purchaser shall inspect all goods hereunder immediately upon delivery. Purchaser failure to give notice to any claim for cause within fifteen (15) days from the date of delivery shall constitute a waiver by Purchaser of all claims with respect hereto. No-goods may be returned without written consent.

TAXES

This quotation does not include any federal, state or local taxes that may apply. Taxes and permits are the responsibility of the purchaser.

WARRANTY

Manufactured goods will be free of defects in materials and workmanship for one (1) year from shipment for all new products. If during this period, goods are proven to seller to be defective, they shall be repaired or replaced at seller's option. Seller warrants only those parts manufactured or approved by seller. This action constitutes a fulfillment of all liabilities.

THE FOLLOWING ITEMS ARE EXCLUDED FROM THIS WARRANTY:

- a. Routine maintenance and adjustment as specified in the equipment instruction manual.

- b. Failure due to improper installation or inadequate maintenance by the Purchaser.
- c. Malfunctions that occur as a result of Purchaser-supplied interfacing.
- d. Physical damage resulting from an accident, misuse, or abnormal conditions of operation.
- e. Attempts to utilize goods under conditions that exceed designed capabilities.

NO OTHER WARRANTY IS EXPRESSED OR IMPLIED INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR ANY PARTICULAR PURPOSE. SELLER IS NOT LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGE SUCH AS, BUT NOT LIMITED TO, LOST PROFITS, LOSS OF USE OF OTHER EQUIPMENT, OR INCREASES IN OPERATING COSTS OR EXPENSES.

INDEMNITY OF SELLER

Purchaser agrees to indemnify and hold harmless the seller against any and all claims, demands, expenses, liabilities, or causes of action arising out of the injury or death of any person when such injury or death arises from or is connected with (1) any act or omission on the part of the Purchaser, its agents, servants or employees; or (2) any condition resulting from the installation of the machine on the Purchasers premises; or (3) the misuse or modification of the manufactured goods by the Purchaser, its agents, servants or employees.

PATENTS

Seller agrees to hold harmless and protect Purchaser against all losses or damages and lawsuits arising from actual or alleged infringement of US. Patent by products designed by seller, providing the Purchaser gives prompt notice in any such claim and cooperates with and permits seller to defend at seller's expense.

CANCELLATION

Any order placed with the seller can be canceled by the Purchaser only upon written consent from the seller and payment of reasonable cancellation charges (Minimum of 20%), that shall take into account expenses already incurred and commitments made by the seller.

Any goods returned must be in a first class, saleable condition, returned freight prepaid in its original container, subject to inspection by B&D Technologies. Goods failing to so confirm will not be subject to any refund, whatsoever.

Customized designs cannot be returned for refund.

REPAIRS

Repairs beyond listed warranty items will be performed on a time and material basis and billed upon completion.

PENALTY CLAUSE

Penalty clauses by the Purchaser are not effective unless approved in writing by an officer of the seller.

LEGAL OBLIGATION

An order by Purchaser shall constitute an acceptance of the terms and conditions stated herein. No order shall be binding until accepted by seller at its home office. Terms other than those set forth above or other than those noted by any seller's attachments hereto are subject to negotiation and separate written acceptance by the seller. Receipt of these terms by the Purchaser without written objection to seller within 30 days shall constitute acceptance of these terms by the Purchaser.

CONTROLLING LAW

The validity, construction and performance of these Terms & Conditions shall be governed by and construed in accordance with the laws of the State of Georgia, excluding that body of law applicable to choice of law. Each of the parties irrevocably consents to the exclusive jurisdiction and venue of the federal and Georgia State Courts in any action relating hereto or to the subject matter hereof. In the event any provision of these Terms & Conditions or the application of any such provision shall be held by a tribunal of competent jurisdiction to be contrary to law, the remaining provisions of these Terms & Conditions shall remain in full force and effect.