OKALOOSA COUNTY WATER & SEWER ADMINISTRATION

Contract # C23-3360-WS
MORROW WATER TECHNOLOGIES, INC.
Maintenance & Emergency Repair of Okaloosa County Water Wells, Water Booster Pump Stations, Wastewater Effluent Pump Staions & Storewater Pump Stations
Expires: 07/18/2026 W/ 2 1 YR RENEWALS

January 11, 2024

Mr. Sam Howard
Morrow Water Technologies
5465-2 Business Parkway
Theodore, AL 36582

RE: Notice to Proceed – Purchase and Delivery of Materials
County Contract #C23-3360-WS

Dear Mr. Howard:

Please consider this letter as notice to proceed with the purchase and delivery of materials, as outlined in your quote dated January 8, 2024 (attached). We expect the work performed to not exceed the price quoted in that correspondence. Your total estimate is $31,015.16 for the scope of services described. Work is per the terms and conditions of the above-mentioned contract and the attached scope of work.

Please note that any work that may be charged in excess of your estimate will require prior written approval from Okaloosa County. When this work is invoiced, please make sure to include proper backup for the additional services listed in Line Item 18 (showing documentation of the cost, plus 25% markup).

Should you need any further information or have any questions, don't hesitate to contact your primary point of contact at Okaloosa County Water & Sewer.

Sincerely,

Robert Bass Digitally signed by Robert Bass Date: 2024.01.11 09:29:56 -06'00'

Robert "Clay" Bass
Okaloosa County Water Operations Manager

MORROW
WATER TECHNOLOGIES, INC.

Pumping Solutions for Municipal Water & Waste Water

7440 Cahaba Valley Rd. I Birmingham, AL 35242
P 205.408.6680 I F 205.408.6690 I morrowwater.com

PROPOSAL NO.: 010424-84-67 Okaloosa
PAGE 1 OF 1

YOUR INQUIRY:	DATE OF INQUIRY	DATE OF REVISION	PROPOSAL VALID FOR:
010424-84-67	January 8, 2024		Thirty (14) Days

TO: Okaloosa County Water

Attention: Chris Pelfrey

Customer Phone:
Customer Fax:
E-Mail

Quote Prepared by: Sam Howard
showard@morrowwater.com

QUANTITY	DESCRIPTION	MWT COST	UNIT PRICE	EXTENDED
	ABB ACQ580 150HP Drive			
2	**3AUA0000222424** ABB ACQ580-01-260A-4 ACQ580 Water/Wastewater drive - supply voltage at 480 VAC Three Phase. 240 Rated Output Amps (150 HP), UL (NEMA) Type 1, Frame size - R8 ***Heavy Duty***	$ 10,975.34	$ 13,720.00	$ 27,440.00
	Lead Time: 6-8 weeks ARO			
6	**A6T400** JJS-400 (600V 400A) Type T fuses	$ 249.95	$ 312.43	$ 1,874.58
6	**64031T** 1 POLE FUSE BLOCK	$ 226.75	$ 283.43	$ 1,700.58
	TOTAL PRICE WITH FREIGHT AND TAXES			31,015.16

A Brownlee-Morrow Enterprises Company

The safe application and use of equipment supplied by Morrow Water Technologies, Inc is the responsibility of the installer, user, and employer. To evaluate the safe application of this equipment, the following should be considered: the location of the installation, accessibility of employees and other persons to the equipment, and adjacent equipment, applicable building and safety codes, and requirements of OSHA.

Equipment sold by Morrow Water Technologies is subject to the individual manufacturer's warranty terms and conditions

TERMS:	Net 30 Days	**Freight:**	**Not Included**
FOB:	Shipping Point	**Delivery:**	**6-8 weeks ARO**

Agreement:
Sign and date to purchase

Signature _____ **Date** _____

Quotation Bill of Material

Item	Qty	Product Information
1	1	ACQ580-01-260A-4 *ACQ580 Water/Wastewater drive - supply voltage at 480 VAC Three Phase. 240 Rated Output Amps (150 HP), UL (NEMA) Type 1, Frame size - R8*

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		150	180	460 VAC	ACQ580-01-260A-4	150	240	

Notes:

1. 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		ACQ580-01-260A-4

Item Description
Input Voltage: 480 VAC Three Phase **Rated Output Current:** 240A **Enclosure:** UL (NEMA) Type 1 **Nominal Horsepower:** 150 HP **Frame Size:** R8 **Input Disconnecting Means:** **Input Impedance:** 5% **Short Circuit Current Rating:** 100 kA with fuses **Communication Protocols:** Modbus RTU **Other Options:**

Drive Input Fuse Ratings	
Fuse Class	**Amps (600 V)**
JJS-400	400

Wire Size Capacities of Power Terminals		
Input Wiring	**Output Wiring**	**Ground Wiring**
2*1/0 AWG (2*50 mm^2) 29.5 lbf-ft (40 Nm)	2*1/0 AWG (2*50 mm^2) 29.5 ft-lb (40 N-m)	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)*
38.0 (965)	11.8 (300)	15.5 (393)	152 (69)

Heat Dissipation & Airflow Requirements			
Power Losses		**Airflow**	
BTU/Hr	**Watts**	**CFM**	**CM/Hr**
13,422	3936	324	550

ACQ580 Product overview

The ACQ580 is the latest addition to the ABB drives portfolio. This robust, compact and energy efficient drive is designed for securing the flow of water and wastewater in your pumping system.

Connection to power and motors is simple. Embedded water and wastewater application features create an intuitive environment for users with dedicated pumping features that enhance the performance of the pumping system.

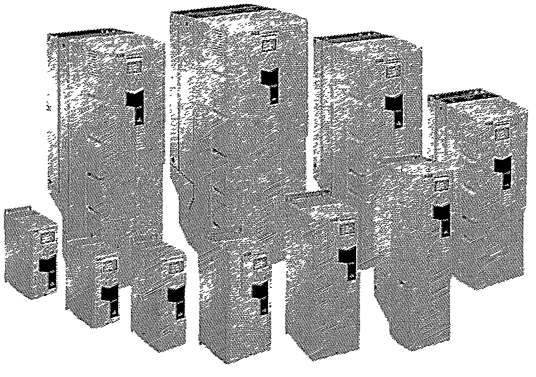
Secure the flow
The ACQ580 variable frequency drive (VFD) delivers innovative pumping features for the water and wastewater industry. Primary Setting menu and assistants simplify commissioning, setup, and daily control. Embedded water and wastewater application features create an intuitive environment for users and dedicated pumping features enhance the performance of the pumping system.

Speak the language
Leveraging clear water-industry terminology, the control panel enables operators to efficiently interface with the drives in terms they use every day. The optional Bluetoothcontrol panel allows for wireless commissioning and monitoring.

Feel the Power
ACQ580 drives are designed for customers who value reliability, high quality, and robustness. The embedded pump functionality, the ACQ580 keeps the pump system operating optimally and efficiently. Product features, such as coated boards and optional compact UL Type 12 enclosures,make the ACQ580 suitable for harsh conditions.

All ACQ580 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 ACQ580 is available in both normal and heavy-duty ratings. Normal duty ratings provide a 110% short term overload rating for one minute every ten minutes. Heavy duty ratings provide a 150% short term overload rating for one minute every ten minutes. All ACQ580 drives and their protective functions are thoroughly tested for optimal performance.



ACQ580 Software (Firmware) feature overview

Built in pump application control software

Intelligent multi-pump control
Pump cleaning
Level control
Sensorless flow calculations
Min/max flow and pressure protection
Dry pump protection
Quick ramps
Cavitation detection and control
Soft pipe filling
Motor disconnect detection
Communication fail functionality
Adaptive programming

Application features

Sleep boost
Auto change
Flow protection
Pressure protection
Inlet pressure protection
Maximum pressure protection
Minimum pressure protection
Pump priority
Two independent adjustable accel/decel ramp
Two or three wire start/stop control
Motor preheating
PID controllers for motor and process
Motor flying start Process PID control
Coast to stop Ramp to stop
Real-time clock (scheduling)
Run permissives
Start interlock delayed start
PID controller parameters
PID sleep / wake-up
Set point controllers (process and external)
Dry run protection

Startup assistants

Primary settings for ease of use
Sophisticated process control
Energy optimizer and calculator
Diagnostic assistant
Built-in and stand-alone process control
PID loop
Load profile

Motor control features

Scaler (V/HZ) and vector control Motor
ID run
U/F ratio
- Linear
- Squared

Energy optimization IR compensation
Slip compensation
Critical frequency lockout bands
Flux braking

Protective Functions

AI Supervision
Overvoltage
Undervoltage
Drive temperature
Earth (ground) fault detection
Emergency stop
Local control loss detection
Motor phase loss detection
Overcurrent protection
Overspeed protection
Safe Torque Off detection
Short circuit
Stall protection
Supply phase loss detection
Swapped supply and motor cabling
Motor overtemperature protection (UL508C)
Input and Output switch supervision
Underload supervision
Overload supervision
Loss of reference
Panel loss
External events
Current limit regulator
Transient/ surge protections (MOV and Choke)

Communication Protocols

Standard Modbus RTU (EIA-485)
Available optional protocols:
- Ethernet I/P
- DeviceNet
- Modbus TCP
- Profibus-DP
- PROFINET

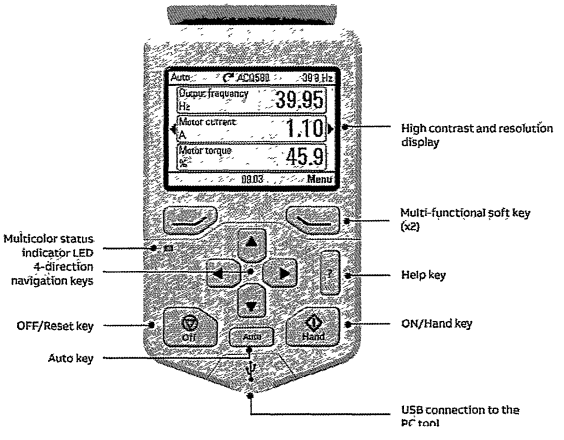
Control panel features

The ACQ580 Assistant Control Panel features:

- Intuitive to operate interface
- Hand-Off-Auto operation
- First start assistant
- 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
- Supports 14 languages as standard
- Dedicated help key
- Four user sets
- Parameters stored in control panel memory for later transfer to other drives or for backup of a particular system.
- Backup/restore (read/write) of parameters and motor data
- Automatic back-up 2 hours after parameter change
- Modified parameter display
- Creates unique short menu
- Shows parameters that differ from default

Operating data display:

Output frequency (Hz)
Speed (RPM)
Motor current (A)
Calculated % motor torque
Calculated motor power (kW)
DC bus voltage (V)
Output voltage (V)
Heatsink temperature
Elapsed time meter (resettable)
kWh (resettable)
Input / Output terminal monitor
PID actual value (feedback)
Error fault text
Warning text
Three scalable process variable displays
Real-time clock
User-definable engineering units
Modified parameter display
Create unique short menu
Show parameters that differ from default

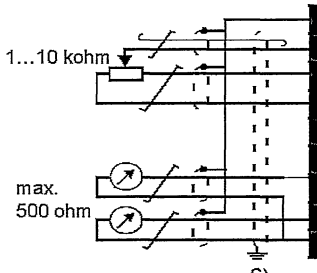


Standard Control Panel

Bluetooth Control Panel

Control terminals

Default I/O connections
This is the default configuration of control connections for water and wastewater applications.



X1		Reference voltage and analog inputs and outputs	
1	SCR	Signal cable shield (screen)	
2	AI1	**Output frequency/speed reference**: 0...10 V[1)]	
3	AGND	Analog input circuit common	
4	+10V	Reference voltage 10 V DC	
5	AI2	**Actual feedback:** 0...10 V[1)]	
6	AGND	Analog input circuit common	
7	AO1	**Output frequency:** 0...10 V	
8	AO2	**Output current:** 0...20 mA	
9	AGND	Analog output circuit common	
X2 & X3		Aux. voltage output and programmable digital inputs	
10	+24V	Aux. voltage output +24 V DC, max. 250 mA[2)]	
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**[3)]	
16	DI4	Not configured	
17	DI5	Not configured	
18	DI6	Not configured	
X6, X7, X8		Relay outputs	
19	RO1C	**Ready run** 250 V AC / 30 V DC 2 A	
20	RO1A		
21	RO1B		
22	RO2C	**Running** 250 V AC / 30 V DC 2 A	
23	RO2A		
24	RO2B		
25	RO3C	**Fault (-1)** 250 V AC / 30 V DC 2 A	
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. Factory connection. Both circuits must be closed for the drive to start. See chapter *The Safe torque off function* on page *197*.	
35	OUT2		
36	SGND		
37	IN1		
38	IN2		
X10		24 V AC/DC	
40	24 V AC/DC+ in	Ext. 24V AC/DC input to power up the control unit when the main supply is disconnected.	
41	24 V AC/DC- in		

4) 4) 4) 5)

Technical specifications

Supply connection	
Voltage and power range	
Input voltage (U_1)	
ACQ580-01-xxxA-2	208-240 V
ACQ580-01-xxxA-4	440-480 V
ACQ580-01-xxxA-6	525-600 V
ACQ580-04-xxxA-4	440-480 V
Input voltage tolerance	10% / -15%
Line Limitations	Max ±3% of nominal phase to phase input voltage
Power Factor (cos Φ) at nominal load	
ACQ580-01/04	0.98
Efficiency at rated power	
ACQ580-01/04	98%
Power Loss	Approximately 2-3% 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 / 1 minute)
Switching Frequency	2, 4, 8 or 12 kHz (Up to 150 Hp); 1 or 4 kHz (Over 150 Hp), Automatic fold back in case of overload
Acceleration/Deceleration Time	0 to 1800 s
Short Circuit Current Rating (-01/04)	100 kA (UL) with fusing
External power supply	
ACQ580-01, R6-R9: Standard	1.50 A at 24 V AC/DC ±10% / 36W
ACQ580-01, R1-R5: Optional card	1.04 A at 24 V AC/DC ±10% / 25W
Safety	
Safe Torque Off (STO)	
STO Standard Input	17...30 VDC, 55mA
Degree of Protection	
Degree of protection (IEC/EN 60529)	
ACQ580-01	IP21, IP55
ACQ580-04	IP00
Enclosure types (UL 508C/61800-5-1)	
ACQ580-01	UL (NEMA) Type 1 & 12
ACQ580-04	UL Type Open

Inputs and outputs	
2 analog inputs	Selection of Current/Voltage input mode is user programmable.
Voltage reference	0 (2) to 10 V, Rin > 200 kΩ
Current reference	0 (4) to 20 mA, Rin = 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 DIs 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
Contact material	Silver Tin Oxide ($AgSnO_2$)
PTC, PT100 and PT1000	Any of the analog inputs, or digital input 6, are configurable for PTC with up to 6 sensors.
Adjustable filters on analog inputs and outputs	
All control inputs isolated from ground and power	

Operation	
Air Temperature	-15 to +40 °C (5 to 104 °F) 50°C (122°F) available with derate 0 to -15 °C (32 to 5 °F) No Frost Allowed Output derated above +40°C (104°F)
Installation site Altitude	0 to 1000 m (3281 ft) above sea level Output derated above 1000m (3281 ft) up to 4000m (13123ft)
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)

Technical specifications

Environmental protections	
Chemical Gasses	Class 3C2 (UL Type 1 , IP21) Class 3C2 (UL Type 12 , IP55) Note: Conformal coated PCBs
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, CSA and EAC approvals Galvanic isolation according to PELV RoHS2 (Restriction of Hazardous Substances) EN 61800-5-1: 2007; IEC/EN 61000-3-12; EN 61800-3: 2017 + A1: 2012 Category C2 (1st environment restricted distribution); Safe torque off (EN 61800-5-2) Seismic (IBC, OSHPD) Ecodesign regulations EU 2019/1781

EMC (according to EN61800-3)	Class C2 (1st environment, restricted distribution)

Available Options	
External 24V AC/DC and digital I/O extension (2xRO and 1xDO) (CMOD-01)	
Additional 115/230 V Digital input (6xDI and 2xRO) (CHDI-01)	
Fieldbus Adapter Modules	EtherNet/IP, Modbus TCP, PROFIBUS-DP, PROFINET, DeviceNet
Operation, Programming and Diagnostic Tool	Drive Composer Pro / Entry
Cold configuration tool (CCA-01)	
Keypad Standard Optional	 Hand/Off/Auto Bluetooth

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

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	ACQ580-01-260A-4	400	JJS-400

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	ACQ580-01-260A-4	2*1/0 AWG (2*50 mm^2) 29.5 lbf-ft (40 Nm)	2*1/0 AWG (2*50 mm^2) 29.5 ft-lb (40 N-m)	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	Watts	BTU/Hr
1	ACQ580-01-260A-4	3936	13,422

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	ACQ580-01-260A-4	965 (38.00)	300 (11.82)	393 (15.48)	69 (152)

Free Space Requirements, Standalone

Free Space Requirements for standalone mounting.

Item	Catalog Number	Standalone, Above *mm (in)*	Standalone, Below *mm (in)*	Standalone, Sides *mm (in)*
1	ACQ580-01-260A-4	155 (6.11)	300 (11.82)	150 (5.91)

Free Space Requirements, Side by Side

Free Space Requirements for side by side mounting.

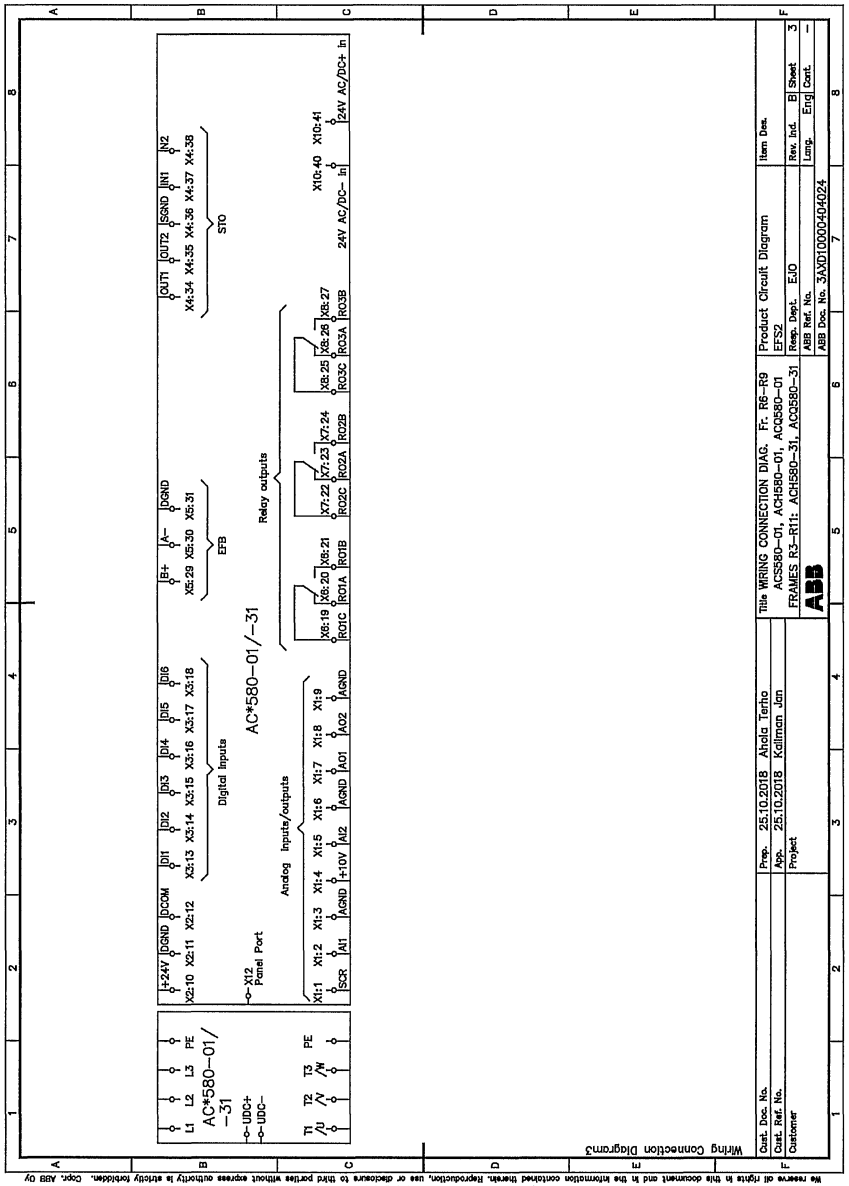
Item	Catalog Number	Side by Side, Above *mm (in)*	Side by Side, Below *mm (in)*	Side by Side, Sides *mm (in)*
1	ACQ580-01-260A-4	200 (7.88)	300 (11.82)	0 (0.01)

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	ACQ580-01-260A-4	100 kA with fuses

Item	Part Number	Customer Designation
1	ACQ580-01-260A-4	



{3AXD10000404024_3.PNG}

Item	Part Number	Customer Designation
1	ACQ580-01-260A-4	

{3AXD50000021243.PNG}