ACS880-01 Product Overview

Description

Wall-mounted single drives, ACS880-01

Our wall-mounted drives are designed on ABB's common drives architecture. They are customized to the precise needs of industries such as oil and gas, mining, metals, chemicals, cement, power plants, material handling, pulp and paper, sawmills and marine. They are designed to control a wide range of applications including cranes, extruders, winches, winders, conveyors, mixers, compressors, pumps and fans. The drive comes in nine different frame sizes (R1 to R9) for easy installment and commissioning.

These single drives are customized to the precise needs of industries such as oil and gas, mining, metals, chemicals, cement, power plants, material handling, pulp and paper, woodworking and marine. Typical applications include cranes, extruders, winches, conveyors, mixers, compressors, pumps and fans. The drive configuration contains a rectifier, DC link and an inverter, all in a compact wall mounted unit.

At the heart of the drive is direct torque control (DTC), ABB's premier motor control technology. The drive can control the motors in either open loop or closed loop. Induction motors, synchronous motors and induction servo motors are all supported as standard without the need for additional software.

Main features include

- Enclosure class UL Type 1
- Compact design for easy installation, commissioning and maintenance
- Incoming air temperature measurement for protecting the drive from different temperature related failure mechanisms
- Integrated safety including safe torque-off (STO) as standard
- Supports various motor types, induction, synchronous, and induction servo motors
- Intuitive control panel with USB connection
- Removable memory unit for easy maintenance
- Drive composer PC tool for commissioning and configuration
- Primary control program - common software used throughout the ACS880 drive series
- Control unit supporting a wide range of fieldbuses, feedback devices and input/output options
- Coated boards as standard
- Controllable cooling fan
- Built-in braking chopper (for frame sizes R1 to R4)
- Built-in DC choke

Applications: Constant Torque, Variable Torque or Constant Horsepower applications. New installation, replacement and original equipment manufacturer (OEM) use.

Features: DTC or Scalar (V/Hz) control with peak overload of 150% for performance applications. ABB's all compatible keypad, programming structure and drive options. Designed for demanding applications with: high starting torque, speed and torque accuracy, flexible programming and certified safety options.

ACS880 Standard Features

Standard Features

UL and cUL
Graphical Multilingual Display
Graphical metering and trending on display
Intelligent Start-Up Assistant
Motor ID Run
Motor Control
Direct Torque Control (DTC)
Scalar Control
Two (2) programmable Analog Inputs
Six (6) Programmable Digital inputs
Two (2) Programmable Digital Inputs/Outputs
One (1) Digital Input InterLock (DIIL)
Two (2) programmable Analog Outputs
Three (3) Programmable Form C Relay Outputs
Dual input Safe Torque Off (STO)
Three (3) expansion slots for Fieldbus, communications, I/O and Motor feedback expansion modules
Adjustable filters on Analog inputs and outputs
Input Speed Signals
- Two (2) Voltage +/- 0 (2)- 10VDC / Current 0 (4) - 20 mA (Selectable via jumper)
- Increase/Decrease reference Contacts
- FieldBus adapters (communication modules)

Start/Stop
2 wire control (dry contact closure)
3 wire control (momentary dry contacts)
Adjustable Current Limit
Adjustable Torque Limit
Three (3) Supervision Functions
Electronic Reverse
Power Loss Ride- Through
DC Magnetizing Start (provides max starting torque)
DC Hold
Flux Braking
Energy (flux) Optimization
Seven (7) Preset Constant Speeds
Three (3) Critical Speed Lockout Bands
Automatic Reset Customer Selectable
Two (2) Independently Adjustable Accel and Decel Ramps
Linear or Adjustable “S” Curve Accel/Decel Ramps
Ramp to Stop or Coast to a Stop
Maximum Output Frequency Programmable up to 500 Hz
Two (2) Integral Programmable PID Setpoint Controller
Mathematical Functions on Analog Reference Signals
Reactor with ~3% impedance - DC (R1 through R9 Frame)
Integral Brake Chopper (R1 Through R4 Frames)
Optional Integral Brake Chopper (R4 through R9)
Reference Trim
Programmable Mechanical Brake Control
Master/Follower
Load Analyzer
Two (2) Jogging functions

Programmable Fault Functions

AI<Min
Panel Loss
Four (4) External Fault
Motor Thermal Protection
Motor Stall
Under load
Motor Phase Loss
Ground Fault
Communications Fault
Supervision of optional I/O
Cross Connection (Input/Output Power Wiring)
External measure temperature
Preprogrammed Protections:
- Over current
- Short Circuit
- Over voltage (Intermediate Circuit)
- Under voltage (Intermediate Circuit)
- Input Phase Loss
- Ambient temperature
- Drive over temperature
- Internal fault
- Over Speed
- Brake Resistor

Available options

I/O Options
- DDCS Communications Card FDCO-01/02
- Analog I/O Extension Card FIO-11
- Digital I/O Extension Card FIO-01
- HTL Pulse Encoder Interface FEN-31
- TTL Pulse Encoder Interface FEN-01
- Resolver Interface FEN-21
- Absolute Encoder Interface FEN-11

Fieldbus Adapter Modules
- DeviceNet™
- ProfiBus-DP™
- ModBus™ Adapter
- Ethernet (EIP,PROFINET,MB/TCP)
- CANOpen

Dynamic Braking Choppers (R5 Frame and Up)
CE EMC Filters (1st and 2nd Environments)
Drive Composer PC Tool (available for download)
Drive Composer Pro PC Tool

Application Software options

Primary Control Program

ACS880 Specifications

Input Connection

Input Voltage	380-500Vac 3-phase +10%...-15% (-01) -+/-10% (-07)
Input Frequency	47 to 63 Hz, maximum rate of change 17%/s
Line Imbalance	Max +/-3% of nominal phase to phase input voltage
Fundamental Power Factor (cos j)	0.98 (at nominal load)
Connection	Terminals U1, V1, W1

Output Connection

Output Voltage	0 to U1, 3-phase symmetrical, Umax at the field weakening Point
Output Frequency	0 ..500Hz
Continuous Current	1.0 * I2Ld (light duty use)
	1.0* I2hd (heavy-duty use)
Short Term Overload Capacity	I2Ldmax = 1.1 * I2Ld (1 min / 5 minutes @ 40°C), typical Ihdmax = 1.5 * I2hd (at least 1 min / 5 min @ 40°C)
Peak Overload Capacity	Imax (400 Vac and 500 Vac) (at least 10 seconds at start)
Field Weakening Point	8 to 500 Hz
Switching Frequency	2.7 kHz (average), DTC dynamically varies from 1 to 12kHz
Efficiency	98% at nominal power level
Short circuit withstand rating	100,000 AIC (UL) R1-R9 when protected by fuses given in the hardware manual
Connection	U2, V2, W2

Ambient Conditions, Operation

Air Temperature	0° to 40°C (104°F), above 40°C the maximum output Current is de-rated 1% for every additional 1°C (up to 55°C) (131°F) maximum for -01 drives
Relative Humidity	5 to 95%, no condensation allowed, maximum relative humidity is 60% in the presence of corrosive gasses
Contamination Levels	
IEC	60721-3-1, 60721-3-2 and 60721-3-3
Chemical Gasses	Class 3C2
Solid Particles	Class 3S2
Installation Site Altitude	0 to 1000m (3281ft) above sea level. At sites over 1000m (3281ft) above sea level, the maximum power is de-rated 1% for every additional 100m (330ft). Maximum altitude 4000m (13123 ft) above sea level.
Vibration Max	1mm (0.04") 5 to 13.2 Hz, Max 7 m/s2 (23 ft/s2) 13.2 to 100 Hz Sinusoidal

Ambient Conditions, Storage & Transportation (in Protective Shipping Package)

Air Temperature	-40° to 70°C (-40° to 158°F)
Relative Humidity	5 to 95%, no condensation allowed
Atmospheric Pressure	70 to 106 kPa (10.2 to 15.4 PSI)
Vibration Max	1mm (0.04") 5 to 13.2 Hz, Max 7 m/s2 (23 ft/s2) 13.2 to 100 Hz
Shock (IEC 60068-2-29)	Max 100 m/s2 (330 ft/s2) 11 ms
Free Fall	100mm (4 in.) for weight greater than 100Kg (220lbs)

Cooling Information

Cooling Method	Internal Fan
Power Loss	Approximately 2% of rated power

Auxiliary Power Supply (XD 24:2 and XD 24:4)

Voltage	24 Vdc, +/- 10%
Maximum Current	200 mA – minus load taken by DIO1 and DIO2
Protection	Short Circuit Protection

Control Terminal Blocks

	Size 0.5 … 2.5 mm2 (24…12 AWG) - All control terminal blocks
	Tightening torques: 0.5 N•m (5 lbf•in) for both stranded and solid wiring

Analog Inputs

Two (2) Programmable Differential Inputs	
Two (2) Current or Voltage Signals	0 (4) to 20 mA, Input Resistance RI => 100 ohms or
	-10Vdc / 0(2) to +10Vdc, Input Resistance RI =>200 k-ohms
Common Mode Voltage	+/-15 Vdc, max.
Common Mode Rejection Ratio	> 60 dB at 50 Hz
Resolution	0.025% (12 bit) (11 bit + Sign bit)
Accuracy	+/-0.5% of Full Scale Range
Input Updating Time	1 ms (Primary Control Program)
Optional Isolation	Available through optional external module

ACS880 Specifications (cont.)

Reference Power Supply

Voltage	+10Vdc, 0, -10Vdc +/- 0.5% at 25° C (77° F)
Maximum Load	10 mA
Applicable Potentiometer	1 k-ohm to 10 k-ohm

Analog Outputs

Two (2) Programmable Current Outputs

Signal Level	0 (4) to 20 mA
Resolution	0.025% (12 bit) (11bit +Sign Bit)
Accuracy	+/-1% Full Scale Range
Maximum Load Impedance	500 ohms
Output Updating Time	1 ms (Primary Control Program)
Frequency Range	0 ... 300Hz

Digital Inputs

Six (6) Programmable Digital Inputs (Common Ground), plus One (1) Start Interlock

Isolation	Isolated
Isolation Test Voltage	500 VAC, 1 minute
Input Type	NPN/PNP (DI1…DI5), NPN (DI6)
Signal Level	24Vdc
Rin	2.0 kohm
Logical switch thresholds	< 5Vdc at “0”, >15Vdc at “1”
Input Current	15 mA, Digital Input 1 to Digital Input 5, 5 mA Digital Input 6
Filtering Time Constant	Hardware Filter .04 ms
Input Updating Time	Digital Filtering up to 8 ms (Primary Control Program)
Frequency Range	0 ... 300Hz

Digital Inputs/Output

Two (2) Programmable Digital Inputs/Outputs

Isolation	Isolated
Input Configuration	DIO1 frequency input (0 … 16KHz with 4 microsecond hardware filtering)
Output Configuration	DIO2 frequency output (0 … 16KHz with 4 microsecond hardware filtering)
Signal Level	24Vdc
Rin	2.0 kohm
Logical input switch thresholds	< 5Vdc at “0”, >15Vdc at “1”
Filtering Time Constant	0.25 ms
As output	Total output current from +24VD is limited to 200 ma

Safe Torque Off Connection

Input Voltage Range	-3 … 30 V DC
Logical input switch thresholds	< 5Vdc at “0”, >17Vdc at “1”
	Both input connection must be closed for the drive to start
Current Consumption	55 mA (continuous)
EMC Immunity	according to IEC 61326-3-1

Internal 24 Vdc Supply for Digital Inputs

Voltage	24Vdc
Maximum Current	200 mA
Connector	XD24:2 and XD24:4
Protection	Short Circuit Proof

An external 24 Vdc supply may be used instead of the internal supply

Relay Outputs

Three (3) Programmable Relay Outputs

Switching Capacity	2 A at 30Vdc or 250Vac
Protection	Varistors (250 V)
Maximum Continuous Current	IC = 2 Amps RMS
Output Updating Time	1 ms (Primary Control Program)

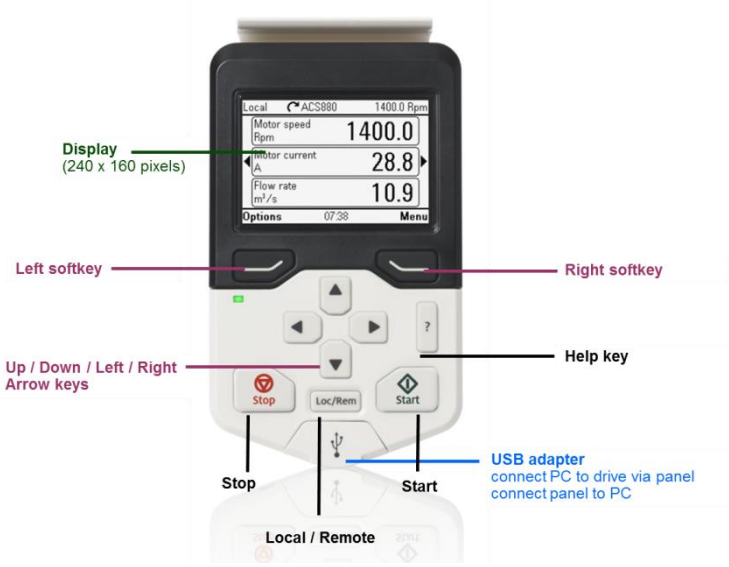
Protections

Single Phase	Protected (input & output)
Over Voltage Trip Limit	1.3 * U1max
Under Voltage Trip Limit	0.65 * U1min
Over Temperature	Protected
Auxiliary Voltage	Short Circuit Protected
Ground Fault	Protected
Motor Stall Protection	Protected
Motor Over Temperature	Protected (I2t)
Cross Cable Connection	Protected

ACS880 control Panel

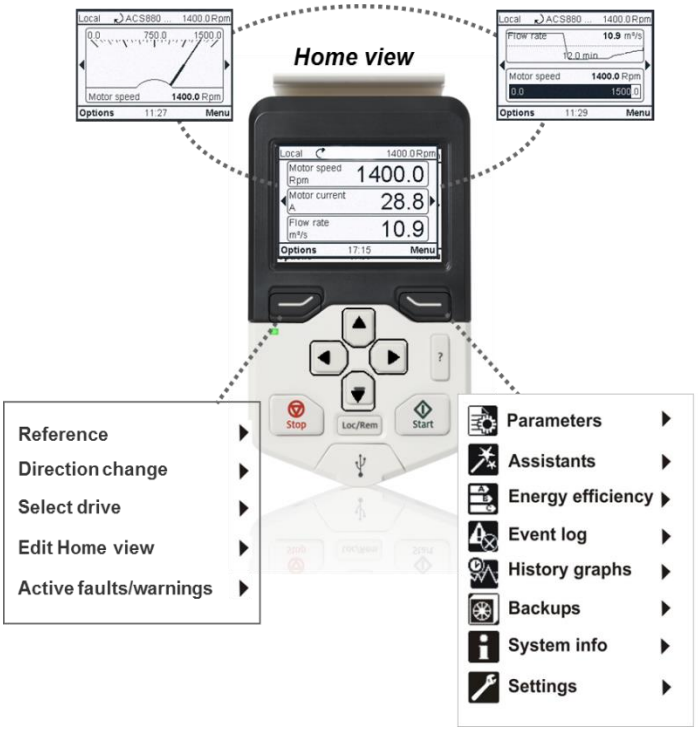
The ACS880 assistant control panel features a graphical display for easy drive configuration. The LCD type display has a monochrome 240 x 160 pixel resolution with a white backlight. The language is selected at start-up (parameter 96.01).
It is an ideal tool for users and service technicians that provides the following features:

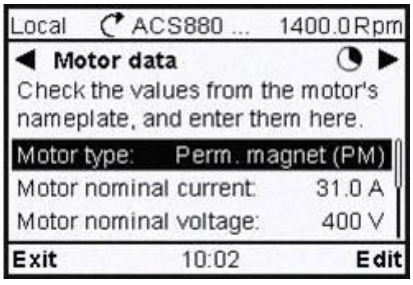
- Large Graphical Display
- Easy navigation
- Familiar set of keys, including
  - Up, down, left, and right arrows
  - Start and Stop Keys
  - Two soft keys
  - Help key
  - Local/ Remote
- Graphical monitoring
- Parameter back up
- Real time clock
- USB Connector for PC connection



Ease of Navigation and Start Up

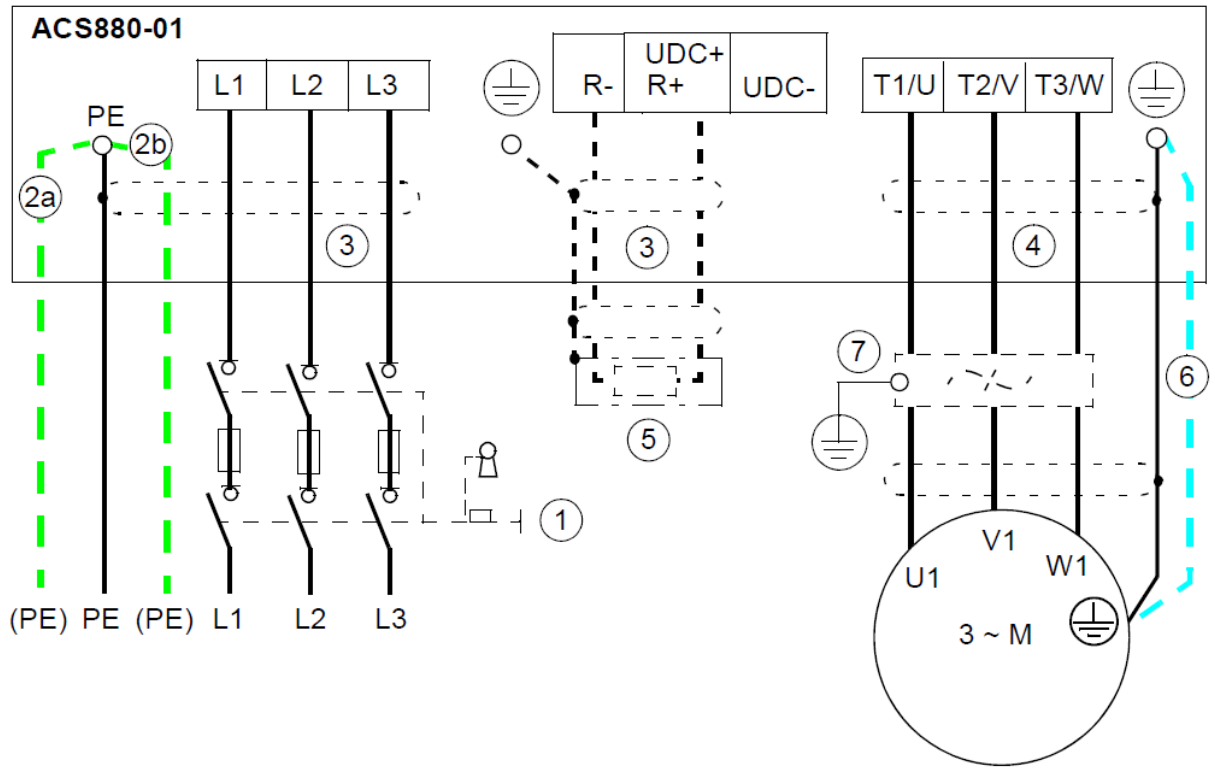
The control panel is intuitive to use and includes multiple home views with graphical displays for quick visual feedback of the motor and drive status. The soft keys allow for easy navigation through the drive's menu system.





The ACS880 control panel features a set-up assistant that prompts the user through the commissioning process. It navigates thorough the parameters that pertain to initial set up and allows easy entry of motor and line settings. It then allows the selection of different ID run procedures, including normal rotation, reduced rotation, and without rotation, and to customize selections based on the existing conditions.

Cable Connections



1	For alternatives, see section *Selecting the supply disconnecting device* on page *53*.
2	Use a separate grounding PE cable (2a) or a cable with a separate PE conductor (2b) if the conductivity of the shield does not meet the requirements for the PE conductor (see page *63*).
3	360-degree grounding is recommended if shielded cable is used. Ground the other end of the input cable shield or PE conductor at the distribution board.
4	360-degree grounding is required.
5	External brake resistor
6	Use a separate grounding cable if the shield does not meet the requirements of IEC 61439-1 (see page *63*) and there is no symmetrically constructed grounding conductor in the cable (see page *68*).
7	du/dt filter or sine filter (optional, see page *221*).

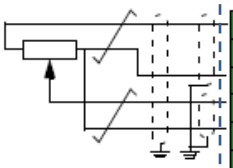
Note:

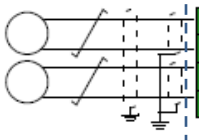
If there is a symmetrically constructed grounding conductor on the motor cable in addition to the conductive shield, connect the grounding conductor to the grounding terminal at the drive and motor ends.

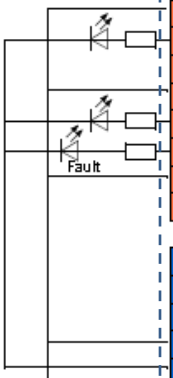
Do not use an asymmetrically constructed motor cable for motors above 30 kW (see page *63*). Connecting its fourth conductor at the motor end increases bearing currents and causes extra wear.

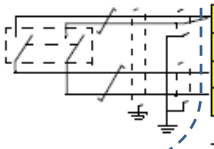
Default I/O connection diagram (Factory Macro) of frames R1 to R9

Typical External Devices
Not Included









XPOW External power input

1	+24VI	24 V DC, 2 A
2	GND	

XAI Reference voltage and analog inputs

1	+VREF	10 V DC, R_L 1…10 kohm
2	-VREF	-10 V DC, R_L 1…10 kohm
3	AGND	Ground
4	AI1+	**Speed reference** 0(2)…10 V, R_{in} > 200 kohm [1]
5	AI1-	
6	AI2+	By default not in use. 0(4)…20 mA, R_{in} > 100 ohm [2]
7	AI2-	
J1	J1	AI1 current/voltage selection jumper
J2	J2	AI2 current/voltage selection jumper

XAO Analog outputs

1	AO1	**Motor speed rpm** 0…20 mA, R_L < 500 ohm
2	AGND	
3	AO2	**Motor current** 0…20 mA, R_L < 500 ohm
4	AGND	

XD2D Drive-to-drive link

1	B	Drive-to-drive link
2	A	
3	BGND	
J3	J3	Drive-to-drive link termination switch

XRO1, XRO2, XRO3 Relay outputs

1	NC	**Ready** 250 V AC / 30 V DC 2 A
2	COM	
3	NO	
1	NC	**Running** 250 V AC / 30 V DC 2 A
2	COM	
3	NO	
1	NC	**Faulted(-1)** 250 V AC / 30 V DC 2 A
2	COM	
3	NO	

XD24 Digital interlock

1	DIIL	Digital start interlock
2	+24VD	+24 V DC 200 mA [3]
3	DICOM	Digital input ground
4	+24VD	+24 V DC 200 mA [3]
5	DIOGN	Digital input/output ground
J6		Ground selection switch

XDIO Digital input/outputs

1	DIO1	Output: Ready
2	DIO2	Output: Running

XDI Digital inputs

1	DI1	Stop (0) / Start (1)
2	DI2	Forward (0) / Reverse (1)
3	DI3	Reset
4	DI4	Acceleration & deceleration select [4]
5	DI5	Constant speed 1 (1 = On) [5]
6	DI6	By default not in use.

XSTO Safe torque off

1	OUT1	Safe torque off. Both circuits must be closed for the drive to start.
2	SGND	
3	IN1	
4	IN2	

X12 Safety functions module connection

X13 Control panel connection

X205 Memory unit connection

Control unit terminal wire sizes: 0.5 … 2.5 mm^2 (24…12 AWG). Tightening torques: 0.5 N·m (5 lbf·in) for both stranded and solid wiring