Power and productivity
for a better world™

ABB Ex motors and drives
The selection process flow

Motors are directly connected to the machines in the potentially explosive atmosphere. All products that are installed in potentially explosive atmosphere must be certified by an approved certification body.

Drives are always installed outside of the potentially explosive atmosphere. Hence drives are not Ex certified, but the safety functions in the drives are ATEX certified. The combination of ABB motor and ABB drive are certified as well (IECEx/ATEX).

www.abb.com/drives

Customer input

Globally, a “Zone” system is used to classify potentially explosive areas. The Worker Protection Directive 1999/92/EC and the international standards IEC 60079-10-x, EN 60079-10-x define these Zones. In all cases, Zone classification is the responsibility of the owner of the site where the potentially explosive atmosphere exists.

The correct Ex motor can be chosen based on the EPL/protection level or product category required using the table on the right.

Standard IEC 60079-0 EN 60079-0			Installation zone acc. to IEC 60079-10-x EN 60079-10-x	ATEX Directive 2014/34/EU (former directive 94/9/EC)		Main motor protection types
Group	EPL	Protection level	Zones	Equipment group	Equipment category	
I (Mines)	Ma	very high	The Zone classification is not used in mines.	I (Mines)	M1	Requirements according to EN 1127-2
	Mb	high			M2	
II (Gas)	Ga	very high	0	II (Surface)	1G	No electric motors allowed
	Gb	high	1		2G	Ex d/Ex de, Ex p, Ex e
	Gc	enhanced	2		3G	Ex nA
III (Dust)	Da	very high	20		1D	No electric motors allowed
	Db	high	21		2D	Ex tb IP 65
	Dc	enhanced	22		3D	Ex tc, IP 65/IP 55

Selection of motor and drive

ABB Ex motor

ABB drives tested with ABB Ex motors
ACS880, ACS800 and ACS550
Certifications available

Safety functions **not required** but available:
ACS880: +Q971
ACS880/ACS800 cabinet/multidrives:
+L513/L514 and +Q971

ABB drives not tested with ABB Ex motors

NON TESTED DRIVES

Motor thermal sensor (+813) and Certified PTC/Pt100 relay needed

Additional safety function needed

ABB Ex motor with Non ABB drive

ALL DRIVES

Motor thermal sensor (+813) and Certified PTC/Pt100 relay and Drives main contactor needed
The VSD must be able to limit the switching frequency

non-ABB Ex motor

Non-ABB Ex motor with ABB drive

ALL ABB DRIVES

Motor thermal sensor and Certified PTC/Pt100 relay and Additional safety needed
The ABB drives are able to limit the switching frequency

Dimensioning

DriveSize tool

The tool calculates correct drive and motor.

Manual sizing

Motor is selected by calculating the needed torque in duty point for applicable speed range and choosing the right drive accordingly.

Load capacity curves

Follow motor manufacturer’s instructions

Insulation and filters

Selection of motor winding insulation and converter output filters as well as elimination of bearing currents for ABB Ex motors and drives.

Supply voltage	Motor framesize	Winding insulation	Motor bearings	Drive filters
≤ 500 V	≤ IEC 250	ABB standard insulation	Standard bearing	No filter needed
	IEC 280 - 315	ABB standard insulation	Insulated non-drive end bearing	No filter needed
	IEC 355 - 450	ABB standard insulation	Insulated non-drive end bearing	Common mode filter
≤ 600 V	≤ IEC 250	ABB standard insulation	Standard bearing	du/dt filter
		ABB special insulation (variant code 405)	Standard bearing	No filter needed
	IEC 280 - 315	ABB standard insulation	Insulated non-drive end bearing	du/dt filter
		ABB special insulation (variant code 405)	Insulated non-drive end bearing	No filter needed
	IEC 355 - 450	ABB standard insulation	Insulated non-drive end bearing	du/dt filter, common mode filter
		ABB special insulation (variant code 405)	Insulated non-drive end bearing	Common mode filter
≤ 690 V	≤ IEC 250	ABB special insulation (variant code 405)	Standard bearing	du/dt filter
	IEC 280 - 315	ABB special insulation (variant code 405)	Insulated non-drive end bearing	du/dt filter
	IEC 355 - 450	ABB special insulation (variant code 405)	Insulated non-drive end bearing	du/dt filter, common mode filter
600 - 690 V with cable length over 150 m	<= IEC 250	ABB special insulation	Standard bearing	No filter needed
	IEC 280 - 315	ABB special insulation	Insulated bearing	No filter needed
	IEC 355 - 450	ABB special insulation	Insulated bearing	Common mode filter

Follow motor manufacturerer’s and ABB drives’ instructions

Cables and EMC

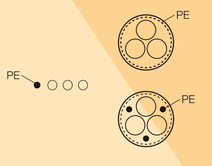
The maximum motor cable length for DTC control in ACS880 varies by frame size.

Frames R1 - R3 can have 150 m cable

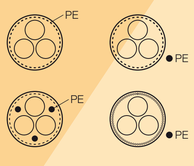
Frames R4 - R9 can have 300 m cable

Frames R10 → can have 500 m cable

Cable types for drive input



Cable types for motor



Follow ABB Motors and drive manufacturer’s cable and EMC recommendations

Follow motor manufacturer’s and ABB drives’ cable and EMC recommendations

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