

# 3.6 Standard voltage ranges

ABB provides motors for markets worldwide. To be able to meet customers' requirements, motors are designed for operation over a wide range of voltages. The most common voltage codes are S, D, E, and F. These cover the most common voltages used worldwide. Other voltage ranges are available on request.

The following table covers the most common voltage ranges.

Direct-on-line start or, with  $\Delta$ -connection, also Y/ $\Delta$ -start

Motor size	S		D	
	50 Hz	60 Hz	50 Hz	60 Hz
56-100	220-240 V $\Delta$ 380-415 VY	- 440-480 VY	380-415 V $\Delta$ 660-690 VY	440-480 V $\Delta$ -
112-132	220-240 V $\Delta$ 380-415 VY	- 440-480VY	380-415 V $\Delta$ 660-690 VY	440-480 V $\Delta$ -
160-450 <sup>1)</sup>	220, 230 V $\Delta$ 380, 400, 415 VY	440 VY	380, 400, 415 Y $\Delta$ 660 VY	440-480 -

Motor size	E		F	
	50 Hz	60 Hz	50 Hz	60 Hz
56-100	500 V $\Delta$	<sup>2)</sup>	500 VY	<sup>2)</sup>
112-132	500 V $\Delta$	<sup>2)</sup>	500 VY	<sup>2)</sup>
160-450	500 V $\Delta$	<sup>2)</sup>	<sup>2)</sup>	<sup>2)</sup>

A chart of world voltages can be obtained from from an ABB motors sales office.

<sup>1)</sup> The voltage range varies from type to type. Check the valid values in relevant product catalogs.  
<sup>2)</sup> On request.

## Motors for other voltages

Motors wound for a given voltage at 50 Hz can also be used for other voltages. Efficiency, power factor, and speed remain approximately the same. Exact motor-specific values are available on request.

Motor wound for	230 V		400 V		500 V		690 V	
	220 V	230 V	380 V	415 V	500 V	550 V	660 V	690 V
Connected to (50 Hz):	% of values in a 400 V, 50 Hz network		% of values in a 400 V, 50 Hz network		% of values in a 400 V, 50 Hz network		% of values in a 400 V, 50 Hz network	
Output	100	100	100	100	100	100	100	100
$I_N$	180	174	105	98	80	75	61	58
$I_S/I_N$	90	100	90	106	100	119	90	100
$T_S/T_N$	90	100	90	106	100	119	90	100
$T_{max}/T_N$	90	100	90	106	100	119	90	100

## 3.7 Voltage and frequency

The impact on temperature rise caused by voltage and frequency fluctuation is defined in IEC 60034-1. The standard divides the combinations into two zones, A and B. Zone A is the combination of voltage deviation of  $\pm 5\%$  and frequency deviation of  $\pm 2\%$ . Zone B is the combination of voltage deviation of  $\pm 10\%$  and frequency deviation of  $\pm 5\%$ . This is illustrated in figure 3.1.

Motors are capable of supplying the rated torque in both zones A and B, but the temperature rise will be higher than at rated voltage and frequency. Motors can be run in zone B only for a short period of time.

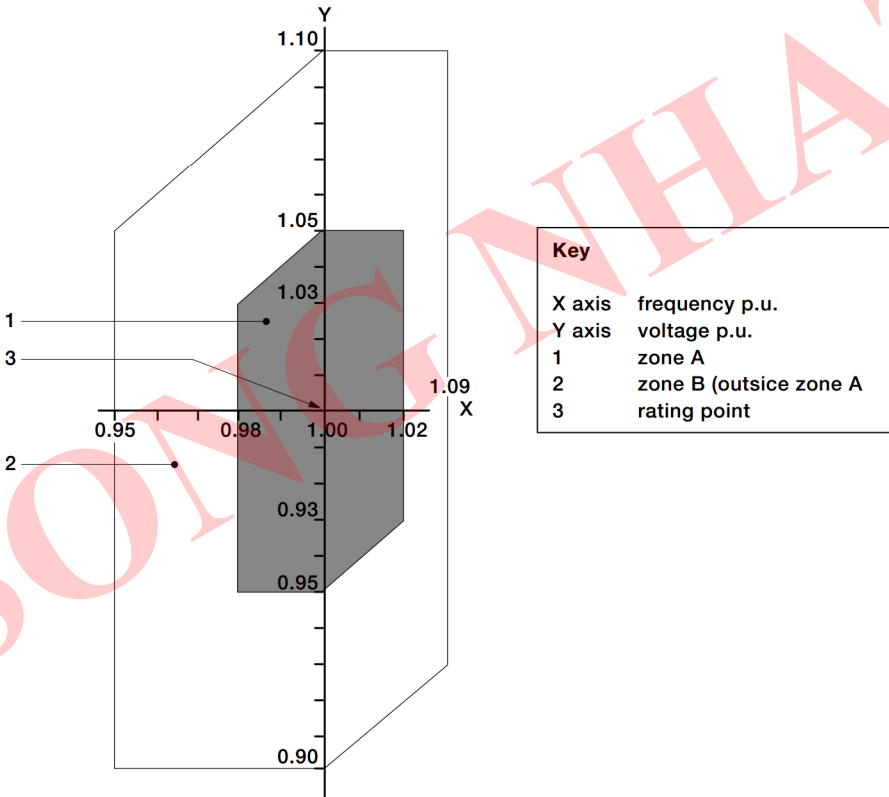


Figure 3.1 Voltage and frequency deviation in zones A and B.