Technical Note

Broken wire detection

Function

The broken wire detection is a feature in the LCC controllers that helps you identify if the encoder is about to fail. The broken wire detection checks if A+ is the inverted signal of A- at all times. If it is not the broken wire detected error will be communicated. The controller does the same with the B and Index signal. This error is of course not given if a single ended encoder is selected in the setup.

Practical work around

If you get the broken wire detection error it is possible that the encoder or its connection is defective. It is also possible that you are actually having a single ended encoder or a single ended index. In such case you can change the encoder setting by changing the encoder type.
The position encoder type object (0x2312) has the following setting options:

Value = 0 no encoder
value = 1 2 channels (A, B) single ended (no index)
value = 2 3 channels (A,B,I) single ended
value = 3 2 channels (A+,A-.B+,B-) differential (no index)
value = 4 3 channels (A+,A-.B+,B-,I+,I-)

For SMAC actuators the setting is default 4. If you have the situation described above you could change this to the value 2 in the first line of macro 0:

#	Line	Command	Parameter	Comment
0		MacroNumber	0	auto run macro
1	0-1	SetVariable	Var=Position_encoder_type(0x002312),Constant,Const=2	change the encoder to single ended with index

You can also change the object 0x2312 in the configuration file (using text editor).

Precautions

If there actually is a broken wire it is likely that over time more wires will break causing unpredictable behaviour of the actuator. It is important to be aware of this risk. In general it is better to have the issue analysed by a SMAC engineer. An encoder analysis tool can identify which signal is missing.