

This document applies to all sizes of the Unidrive Classic and Unidrive SP

It.AC Trip



Unidrive Classic Family



Unidrive SP Family

The **It.AC** trip indicates the output overload accumulator has timed out. This can be viewed at #4.19 and is in units of %. When it reaches 100% the drive will trip out. Parameter #4.19 is a percentage of calculated maximum motor temperature. The thermal time constant is set up at parameter #4.15 and is units of seconds. If #4.15 is increased it adjusts the thermal model of the motor so that the drive will run longer at high currents before the drive trips out. The point at which the accumulator at #4.19 starts to increase is when #4.01 (Current Magnitude) exceeds #5.07 (Motor rated current).

If #4.01 > #5.07 then #4.19 increases at a rate determined by #4.15.

There are several reasons for an **It.AC** trip to occur. The most common ones are listed below:

- 1) In Closed Loop applications (those using a motor mounted speed feedback device) Parameter 0.48 will show you the mode (**CLVEct** or **SErVO** are closed loop modes). The mode is also displayed briefly upon application of power.

Encoder or Resolver
Speed feedback device



- a. Incorrect/faulty wiring to/from encoder or resolver is the main cause of **It.AC**.
- b. Mechanical coupling loose on feedback device (encoder/resolver)
- c. Electrical noise on the speed feedback signal (resulting in commutation errors)

There are several steps that can be taken to isolate the cause of the **It.AC** trip.

Checking for Speed feedback from motor mounted device without a Scope

- (1) Go to parameter #3.27 in the Unidrive Classic or #3.29 in the UnidriveSP. These will indicate the position of the encoder within 1 revolution of the motor. You can power up the drive but leave it disabled – the display should show **inh**. When the motor shaft is rotated the counter in the Unidrive Classic (#3.27 should increment up to 16,383 then roll over to 0. The UnidriveSP (#3.29) will increment to 65,535 then roll over to 0 **within 1 motor revolution**.

- (a) If the position counters roll over at any other number than values stated above, the encoder could be bad or the set up is wrong.
- (b) If the position counters either don't count smoothly or not at all or free run without you turning the motor, there is a problem with the encoder or associated wiring.
- (c) If a Resolver module is being utilized the same test can be preformed at the following parameters:

- (i) UniSP = xx.05 = position 0 to 65,535.
- (ii) UNI Classic = #16.03 = position 0 to 16,384.



SM-Resolver



SOM UD53

To determine if the encoder or resolver may be the cause you can read the signals with an oscilloscope. If you do not have an oscilloscope or can not access the wires you could put the drive into open loop to eliminate the feedback signal from the speed loop of the drive.

Checking the encoder signal with an oscilloscope.

- (1) The signal from the encoder should have a duty cycle of 50%. The rising and falling edges should be clearly defined on the scope. One would view Channel A to \A then B to \B when rotating the motor slowly by hand or viewing while running slowly.



- (2) Check for excessive noise. The noise could cause the drive to register false rising edges.

Encoder Interface (15 pin high density D-type connector)

Terminal Description (\ represents “non” or “negative”)

1. Encoder input channel A
2. Encoder input channel \A
3. Encoder input channel B
4. Encoder input channel \B

Other causes can include:

- 2) Excessive load on the motor
 - a) Mechanical binding or load jammed/stacking
 - i. Read parameter #4.01 is total motor current. This should be the same as the current measured in the motor cables. You can use a clamp on amp meter to read the real current to motor. It should be within 20% of parameter #4.01. If the current is found to be too high there could be mechanical binding or a possible motor problem.
Measure the current on all three phases going to the motor. The current should be balanced. If they are not balanced the drive could have instability that may be causing the **It.AC** trip.
 - (1) Check the motor map parameters and make sure they match the motor nameplate specifications. Voltage, FL RPM, Frequency, etc...
 - (2) Perform an autotune. This can be done with #0.40.
- 3) Short circuit on the output of the drive
 - a) Motor phase to phase short.
 - b) Ground fault.
 - c) Faulty power stage on the drive (IGBT).

Evaluate the motor. Use a Megger to look for insulation breakdown or shorts. Motors rated at 460 Vac should be megged for at least 1kV. Check phase to phase and phase to earth.

The drive could have a faulty power stage or control board causing the trip. If the drive trips **It.AC** with the motor cables removed the drive will need to be serviced.

Resources: can be found on our website: www.controltechniques.com
For help contact techsupport.cta@mail.nidec.com, or
call Technical Support at 952-995-8000, 24/7/365