principium

Wire EDM
Module 1.2
Wire EDM cut parameters

Cut parameters 2

Part of the Erosion process

Items in this presentation can be referenced in the AgieCharmilles operator training manual

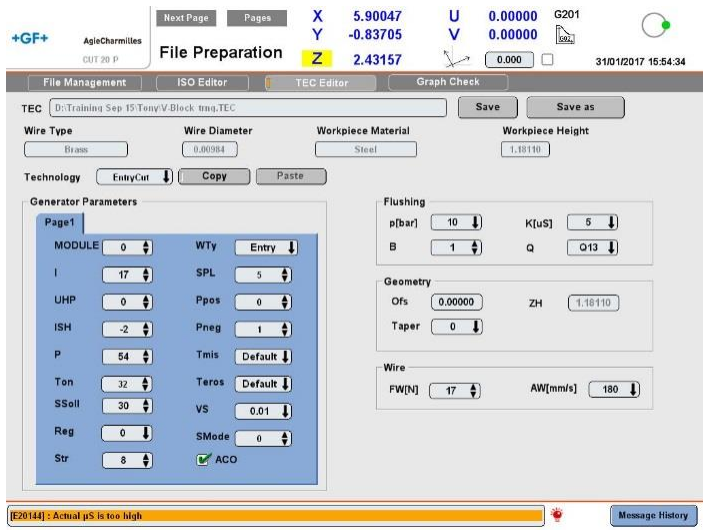
Section: user interface

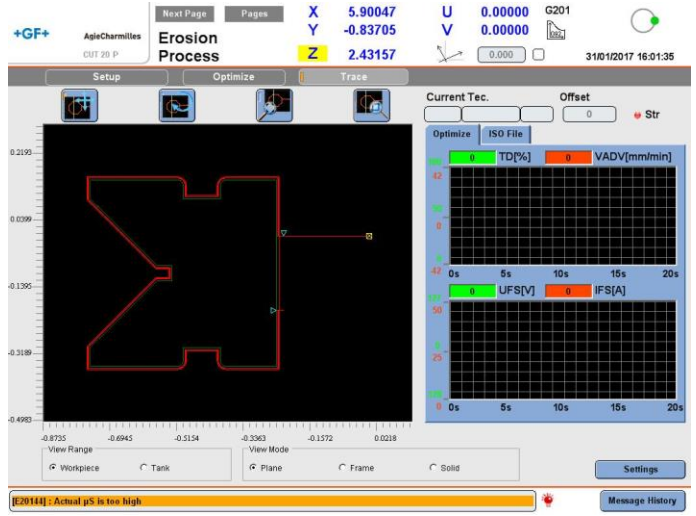
Pages 5 and 6

Wire EDM Parameters

Parameters for the wire EDM directly affect the *EROSION* process

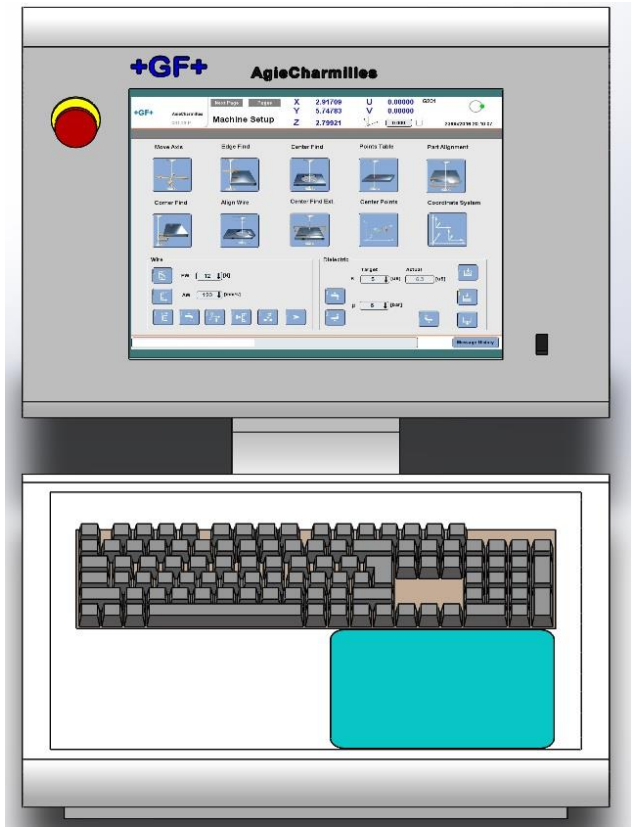
The parameters are created, stored and modified within the ***TEC*** file





If you can recall, our CNC controller operates and monitors both the ***ISO*** and ***TEC*** files during operation of the EROSION process

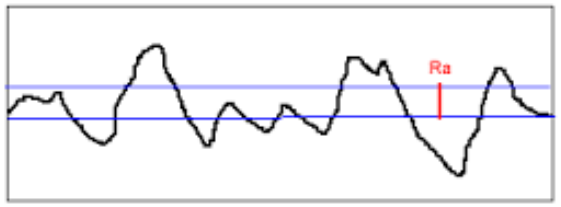
ISO

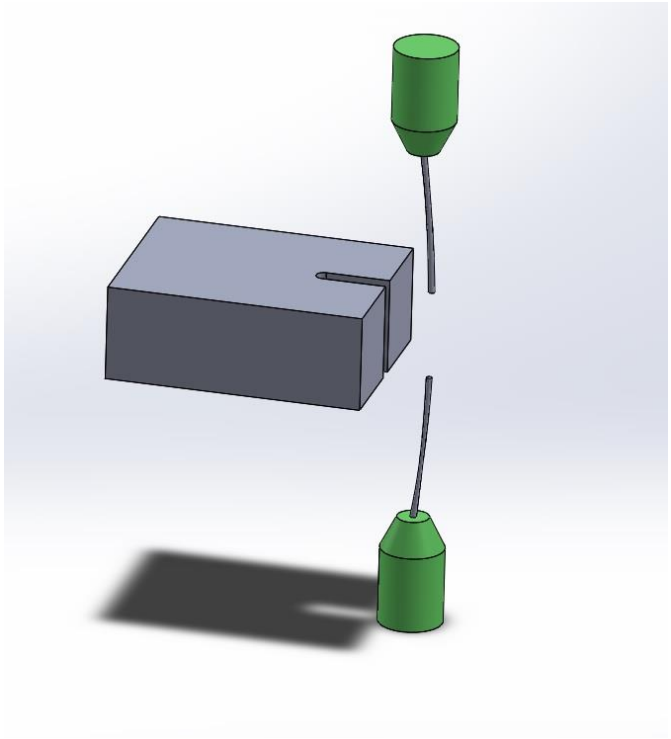


TEC

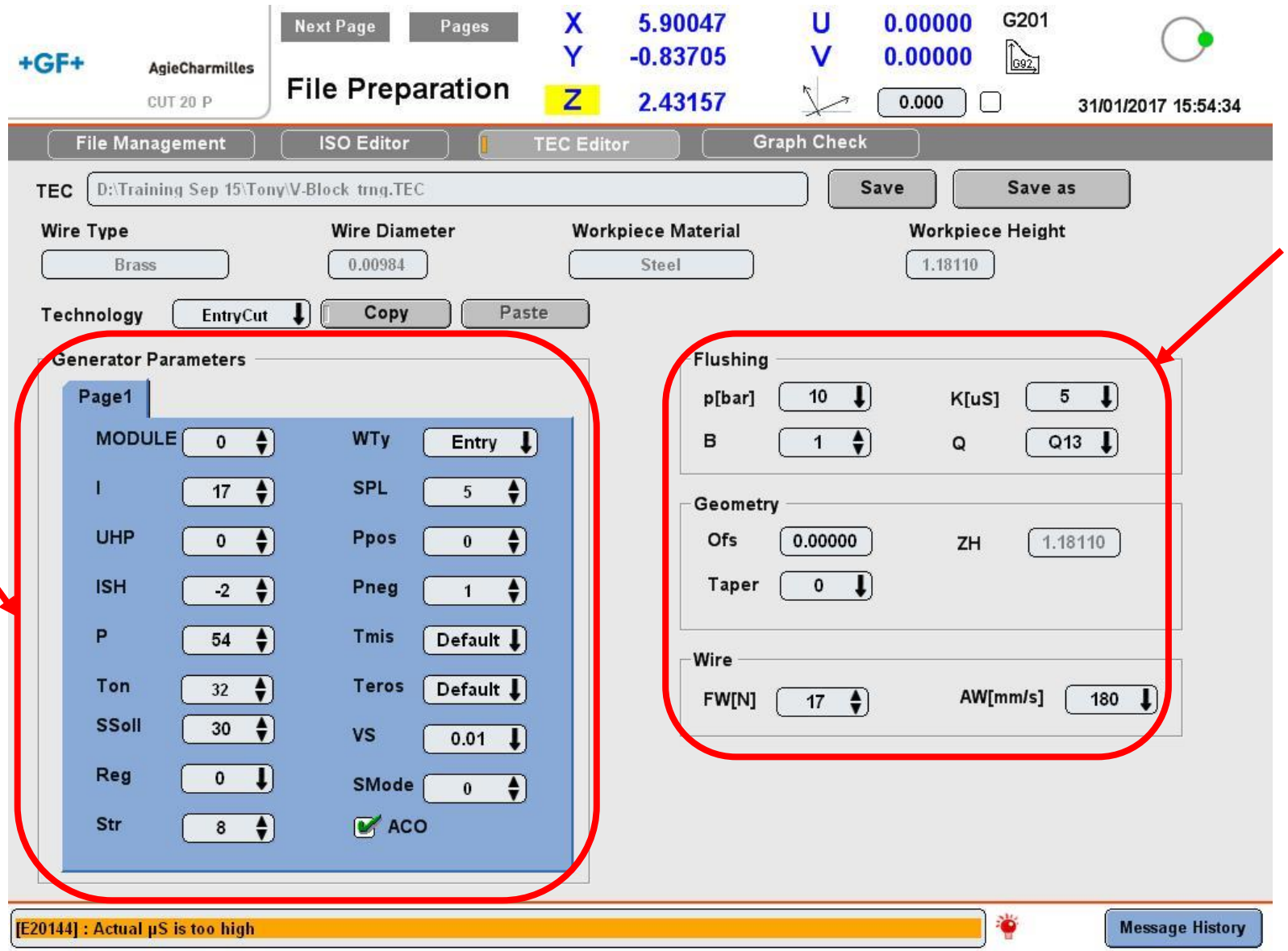
The two most revealing factors in the erosion process that would indicate changing parameters are:

- Excessive wire breakage
- Undesired surface finish





Wire EDM Parameters

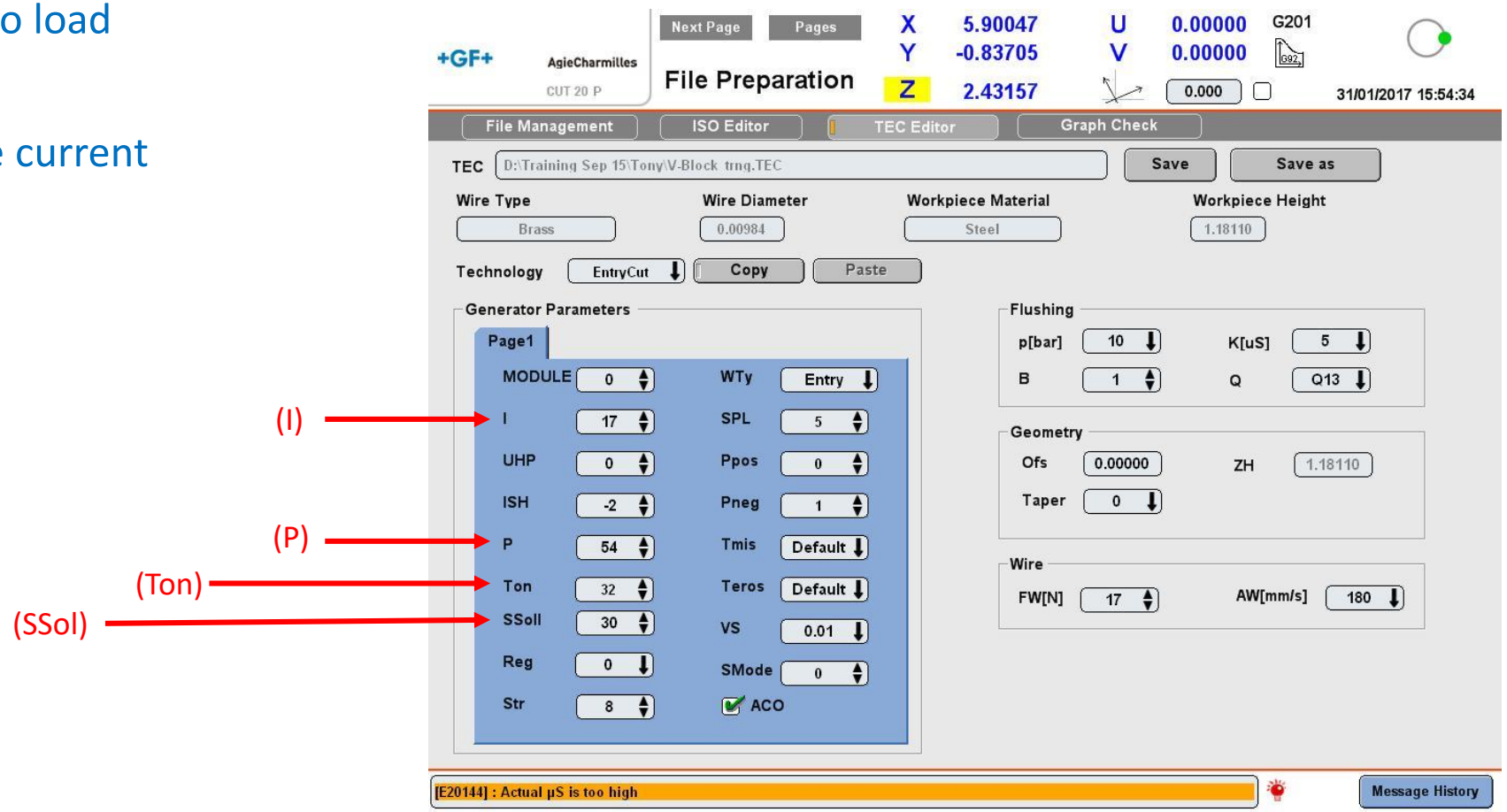


These are programmable and can be modified

These are programmable and can be modified

Look at the four most effective variable parameters to optimize for the Erosion Process:

- Ton = Time on
- Ssol = Servo load
- P = Power
- I Discharge current



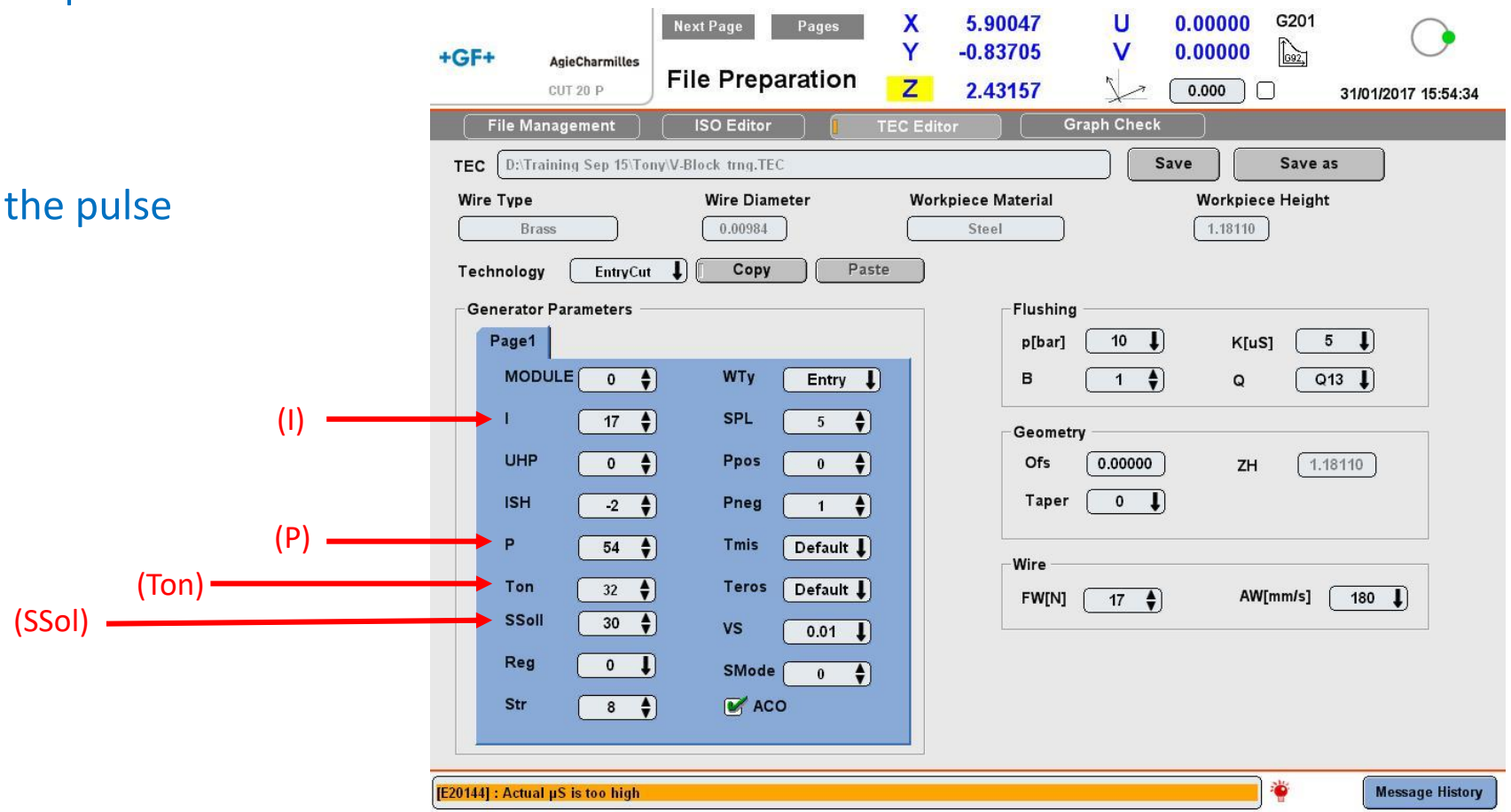
Wire EDM Parameters

The electrical energy in the Erosion process is based on pulse technology.

Pulse technology includes a profile of electrical current which ‘pulses’ in a particular profile.

Components of the ‘pulse’ will include:

- Time on
- Time off
- Frequency of the pulse
- Current
- Voltage

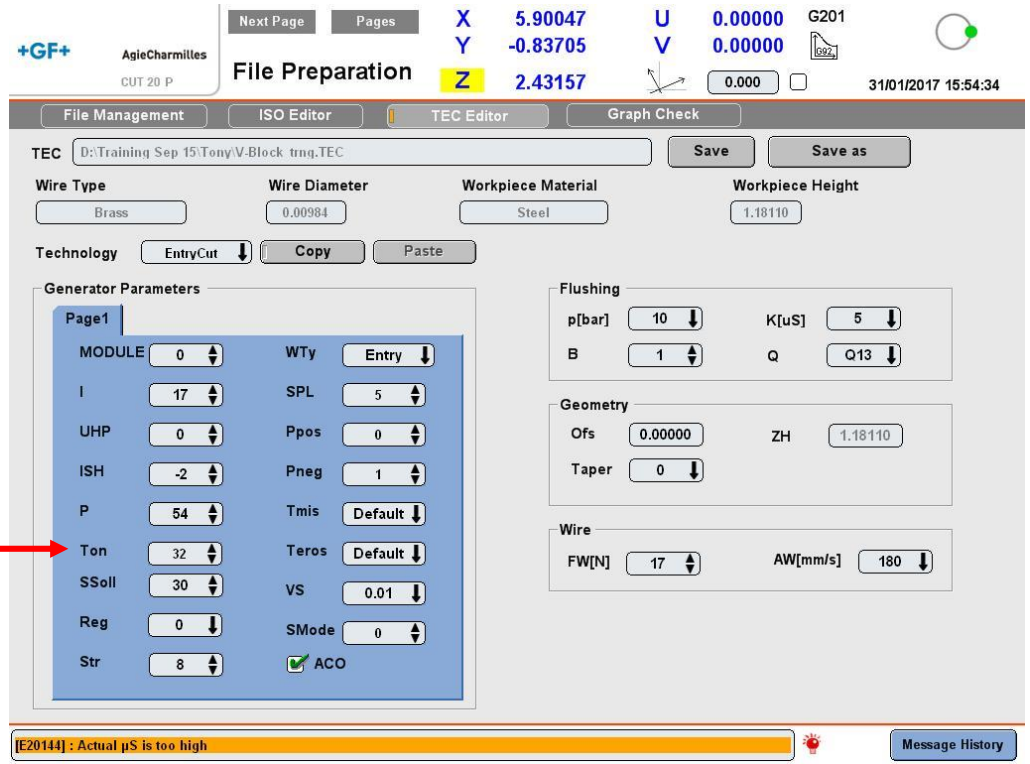


Time on = the length of time in micro seconds the current moves from the wire to the workpiece through the spark gap.

Material removal rate is directly proportional to the time on and the energy released.

Longer time on increases the amount of vaporization and crater size therefore affecting surface finish.

Ton = Time on



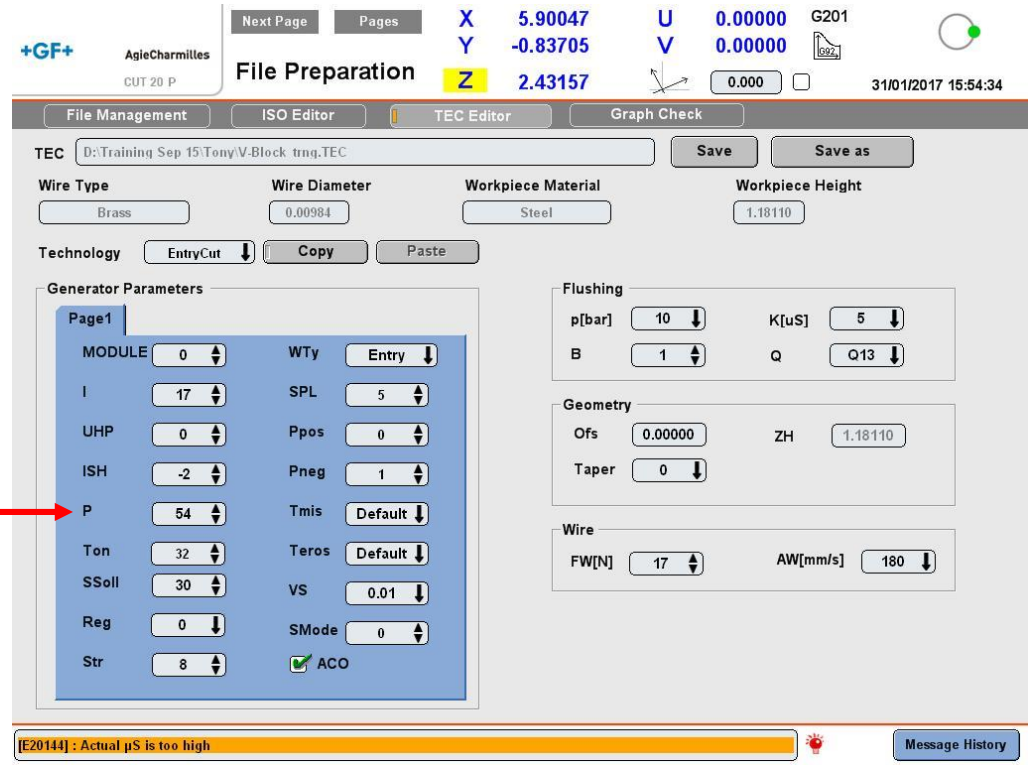
Frequency = The number of pulses that take place in one second.

Frequency also effects the Material removal rate as more pulses result in more frequent vaporization.

Pulse is measured in megahertz.

P = Frequency

(P)

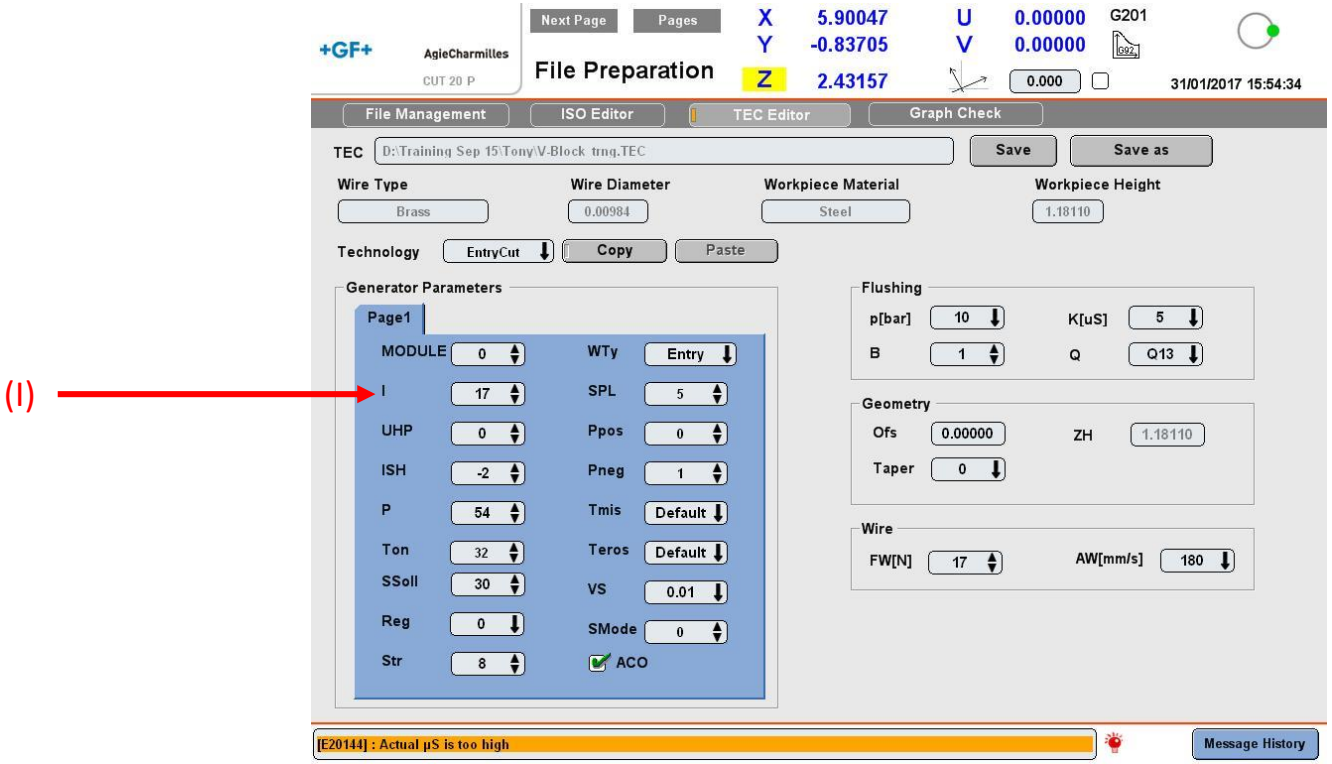


Discharge current = The current in amperes which travels across the spark gap from the wire to the workpiece. The force of electrical energy delivery between the electrodes.

Higher discharge currents result in larger craters of vaporization.

Higher currents can result in higher material removal rates, less desired surface finish, and wire breakage.

I = Discharge current

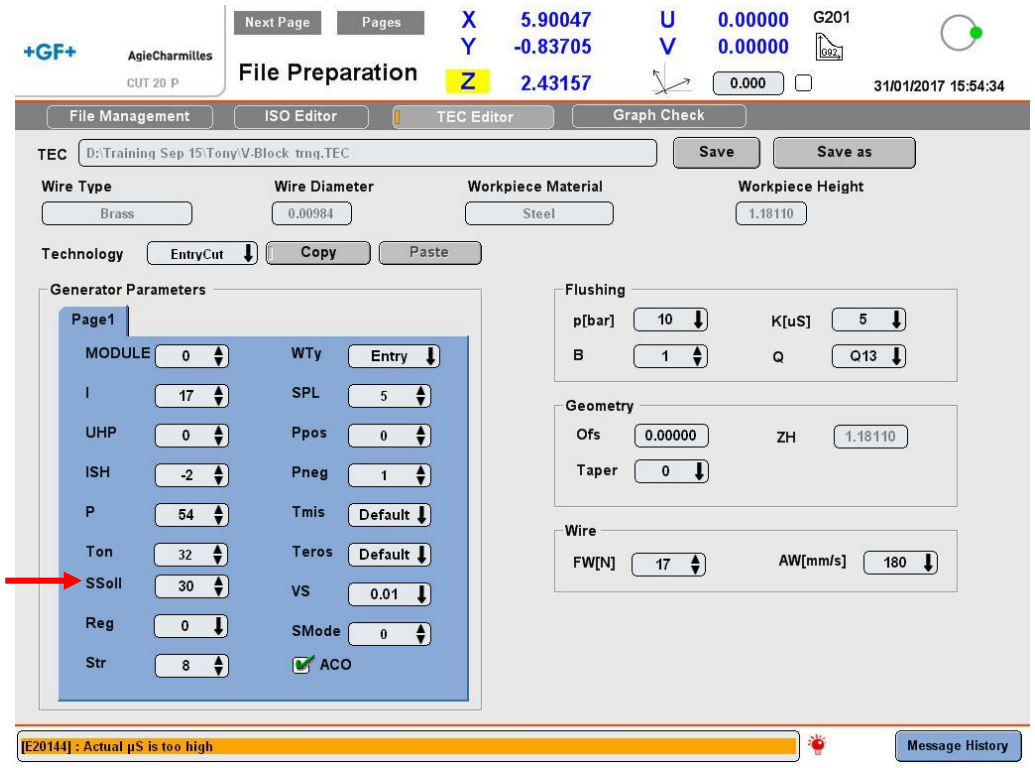


Wire EDM Parameters

Servo Soll = English translation = power to;

The reference parameter determining the optimum federate during the Erosion process.

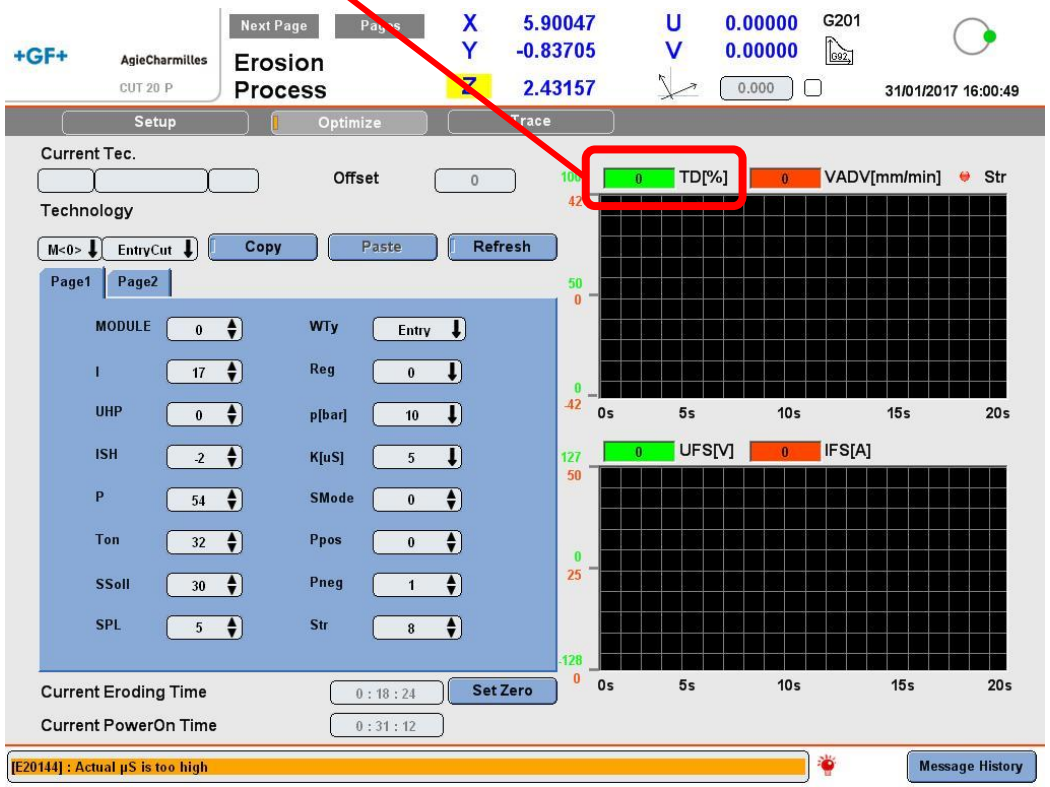
Corresponds to the **TD** parameter displayed on the optimize tab of the Erosion process.



(SSoll)

SSoll = Servo Soll; Value preset for the servo; power to the servo

TD parameter



Wire EDM Parameters

Servo Soll = English translation = power to;

The Ssoll is compared with the TD information (current feed rate) and the result determines an increase or decrease in feed rate.

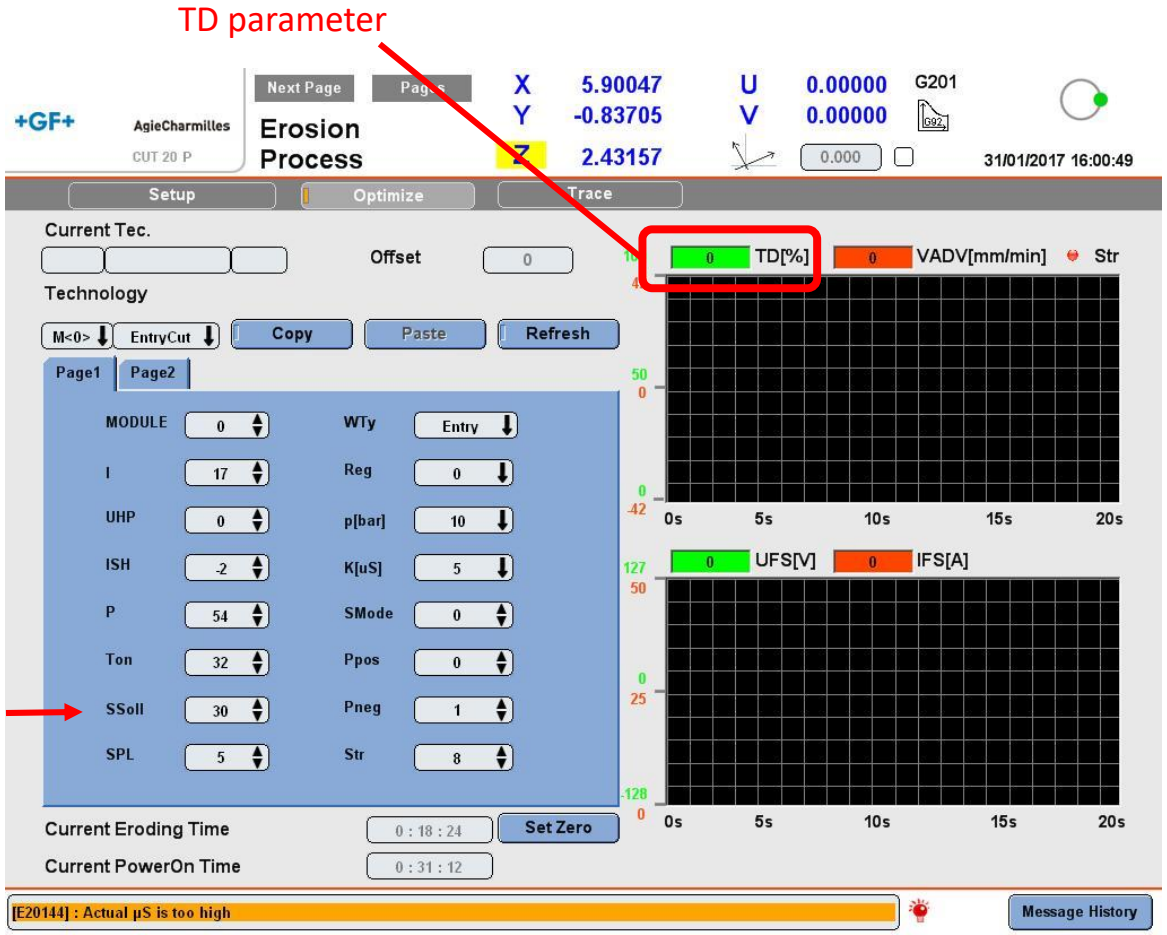
Effects the cutting speed and process stability.

When Ssoll is decreased, the cutting speed in INCREASED

When Ssoll is increased, the cutting speed in DECREASED

Raise the SSoll number if you are encountering excessive wire breakage

(SSoll)

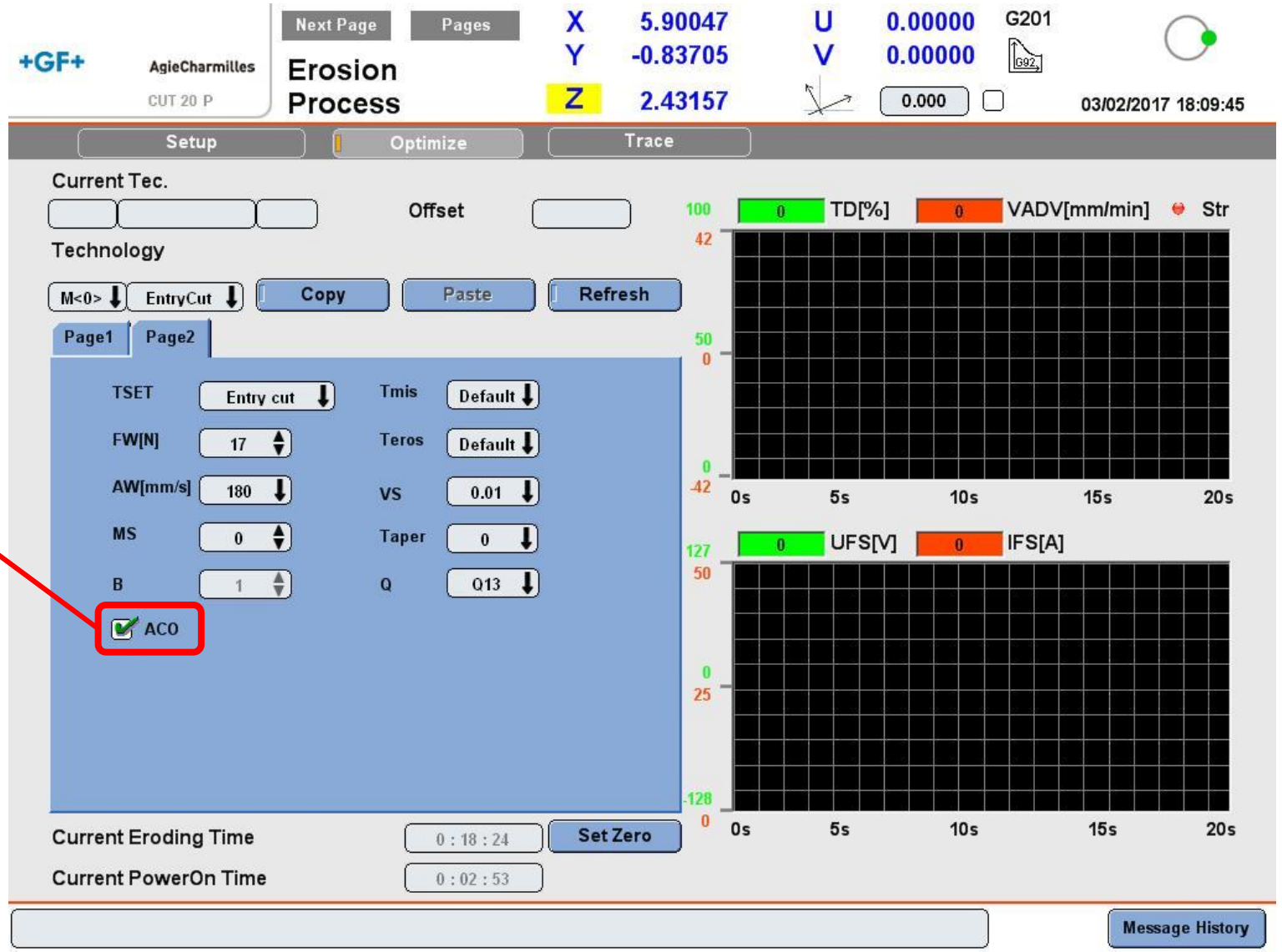


The OPTIMIZE page for the erosion process

ACO = Adaptive Current Optimization

ACO (Adaptive Current Optimization)

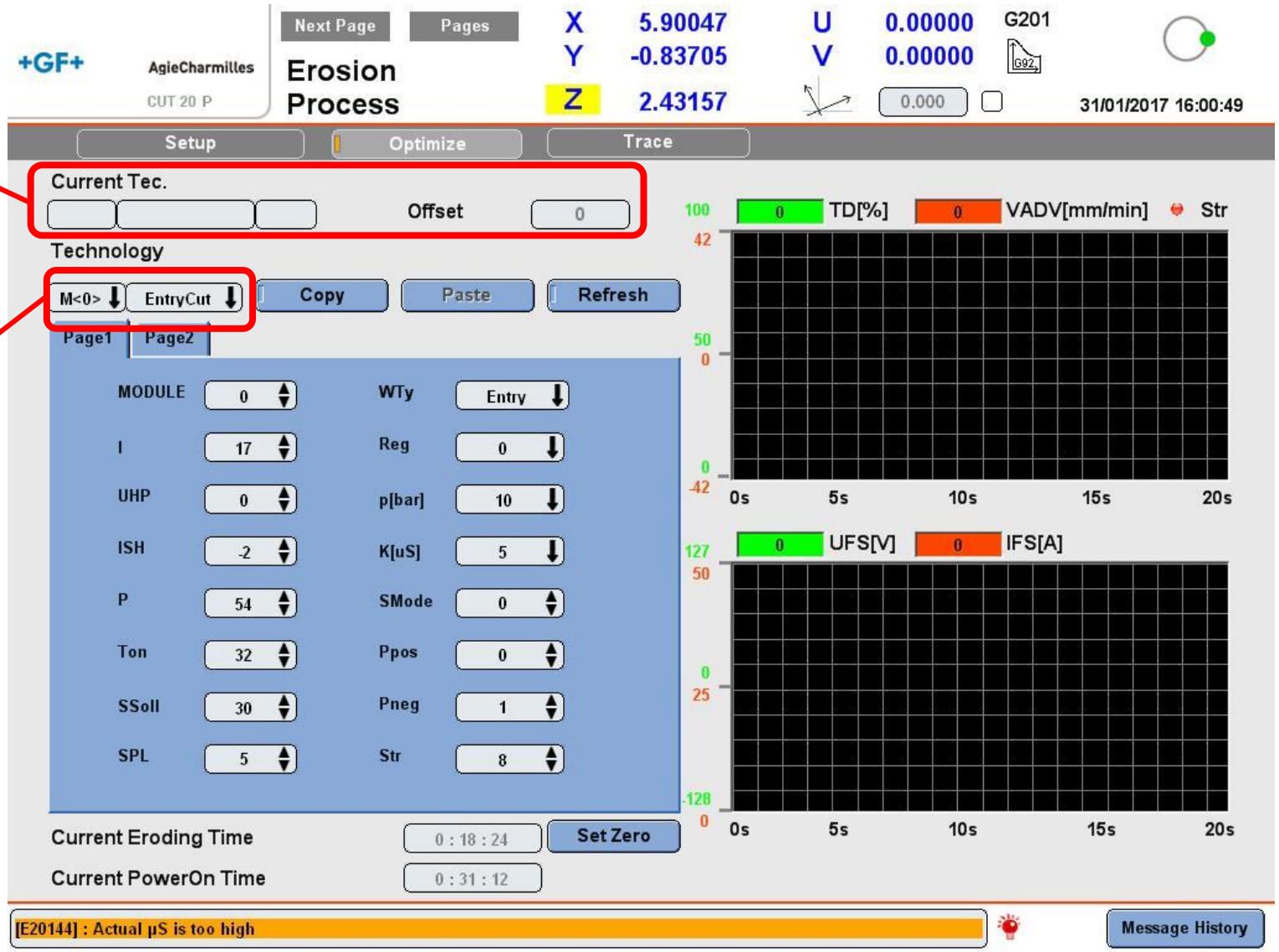
Provides real-time process monitoring and adapting during cutting



The OPTIMIZE page for the erosion process

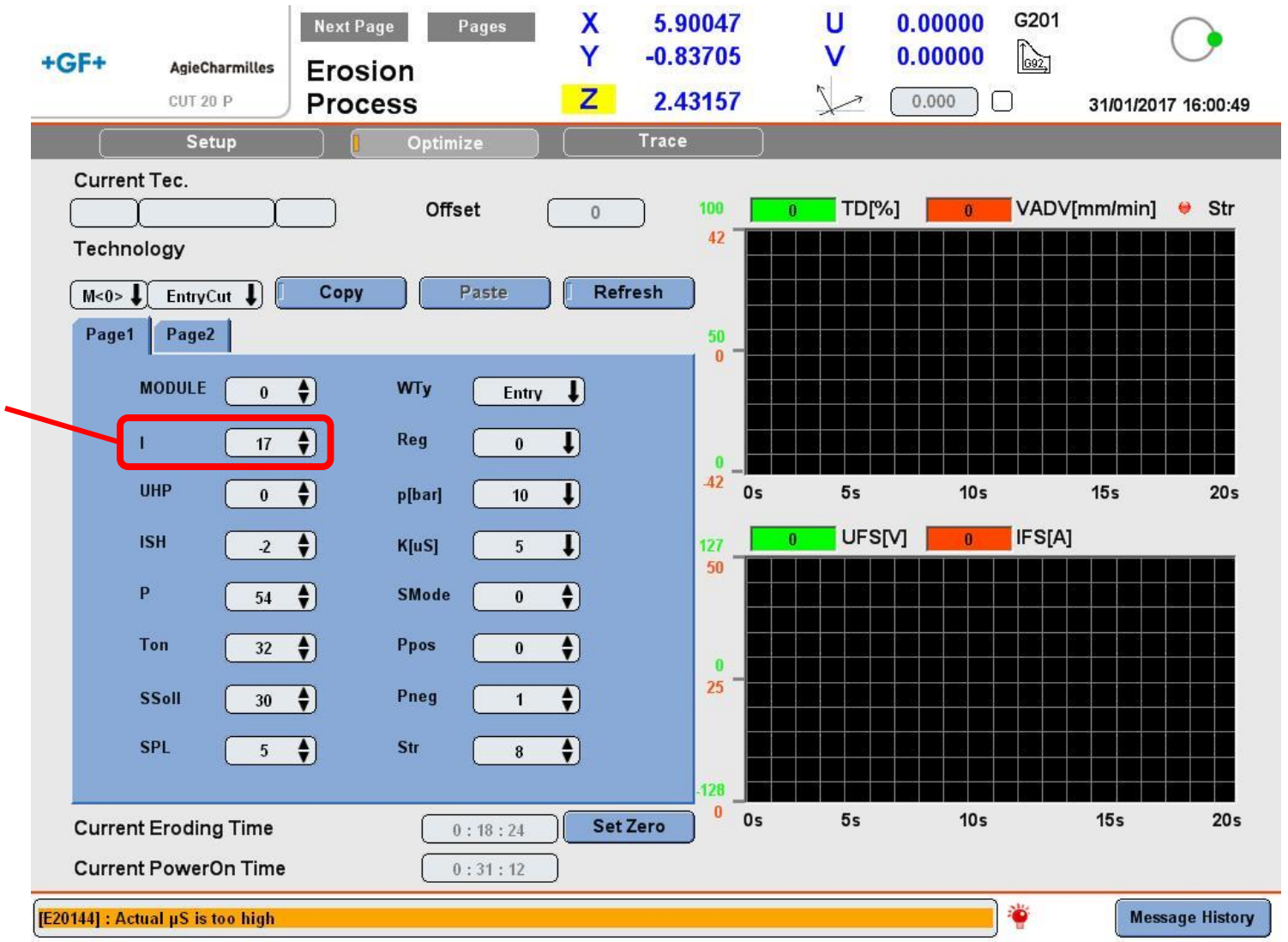
Current technology and offset information will be displayed

The current cut will be displayed. The M<0> is standard for ISO files without specialized Multi-TEC code



The OPTIMIZE page for the erosion process

I = has to do with discharge current during cuts

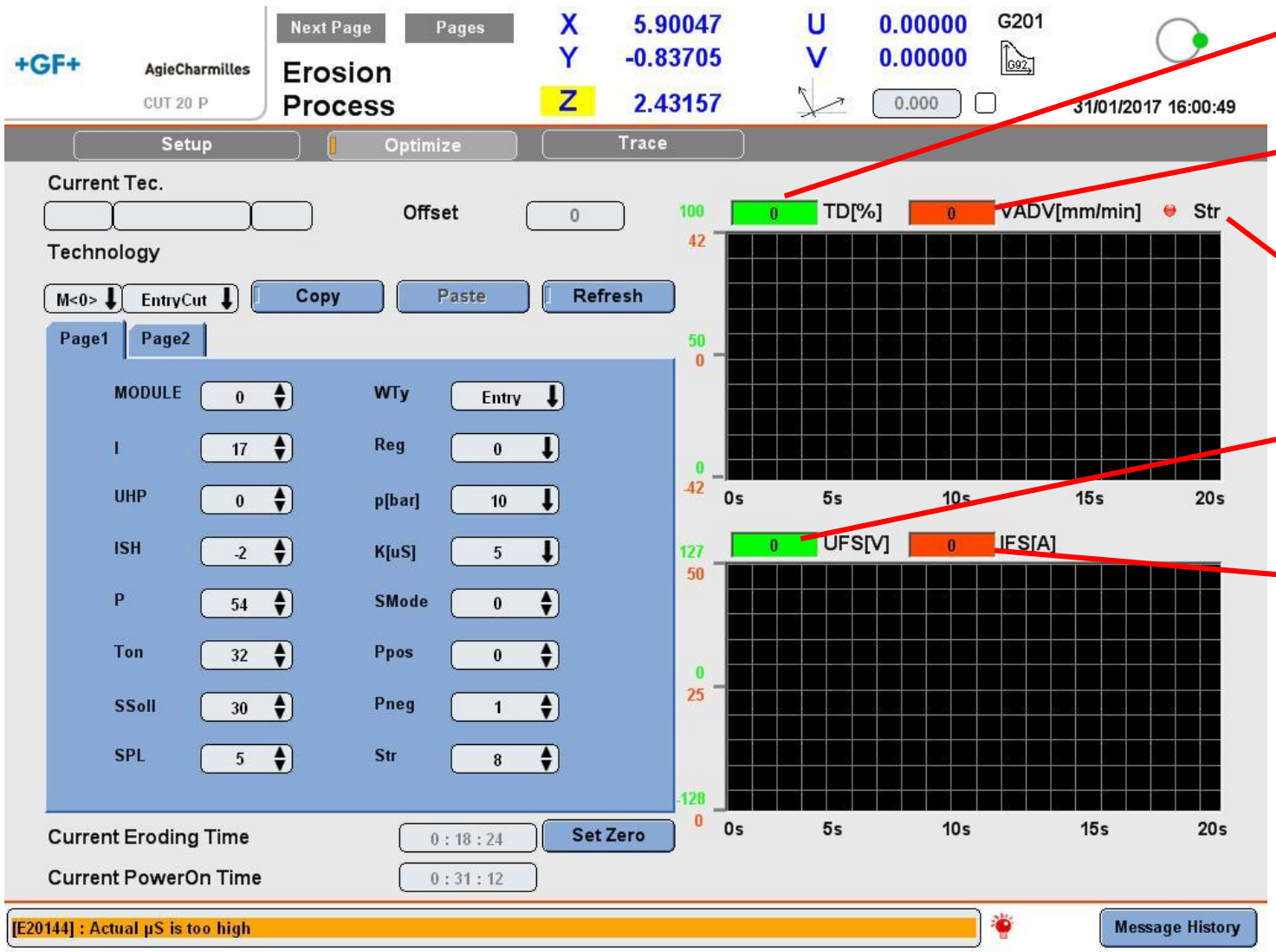


I (Discharge Current)

This can affect:

1) Cutting width
2) Geometric errors
3) Surface finish
4) Wire breakage
5) Cutting speed

The OPTIMIZE page for the erosion process



Expresses the real value of the servo-control parameter; corresponds with SSOL

Current linear feed in mm/minute

Activate or deactivate corner radii blend strategy

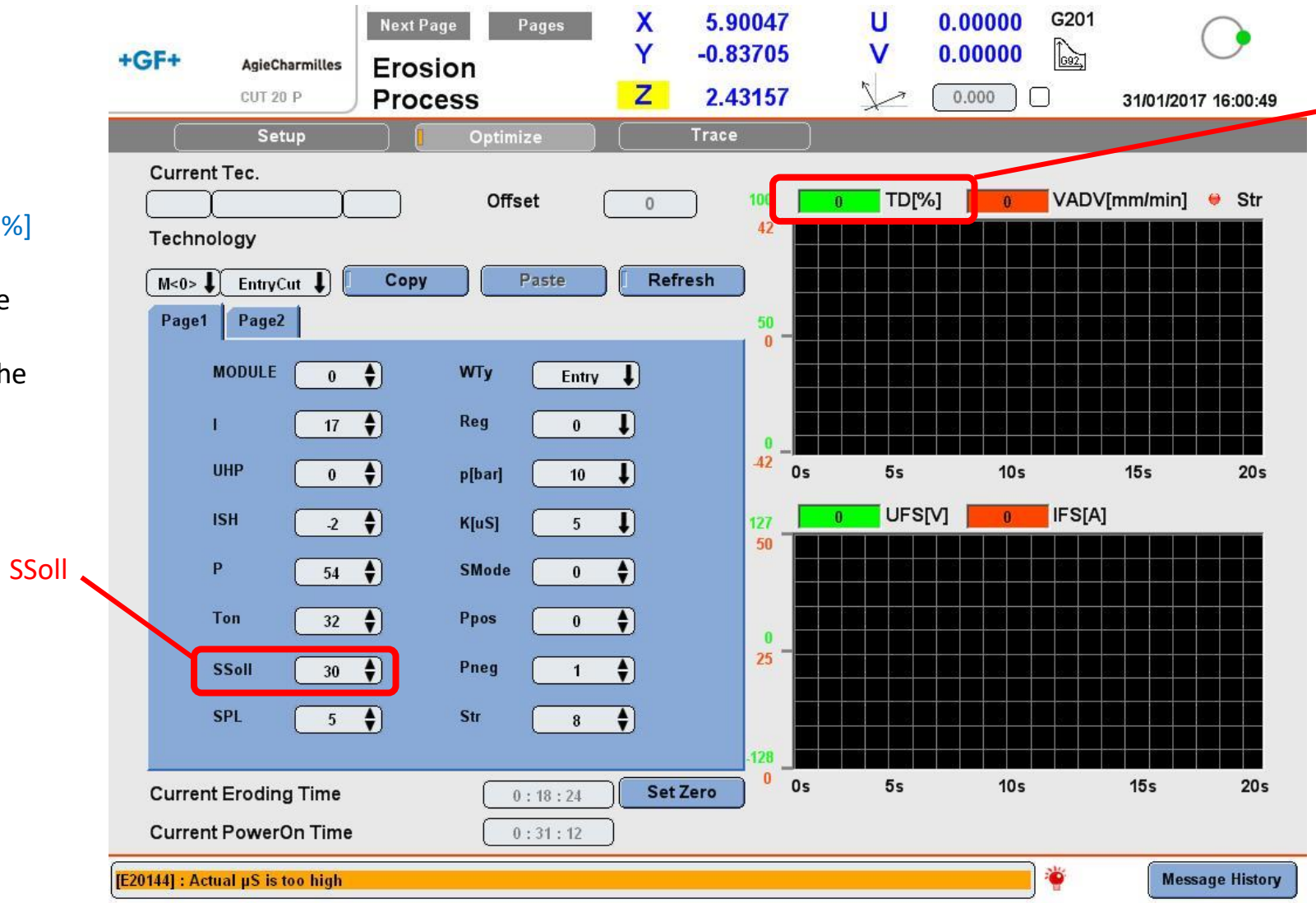
Average voltage between wire and workpiece

Average machining current expressed in red

The OPTIMIZE page for the erosion process

Ssoll = has to do with programmed feed rate and adjustment in real time
Works in conjunction with TD[%] parameter
The lower the SSol number the faster the federate
The higher the SSoll number the slower the federate

Raise the SSoll number if you are encountering excessive wire breakage

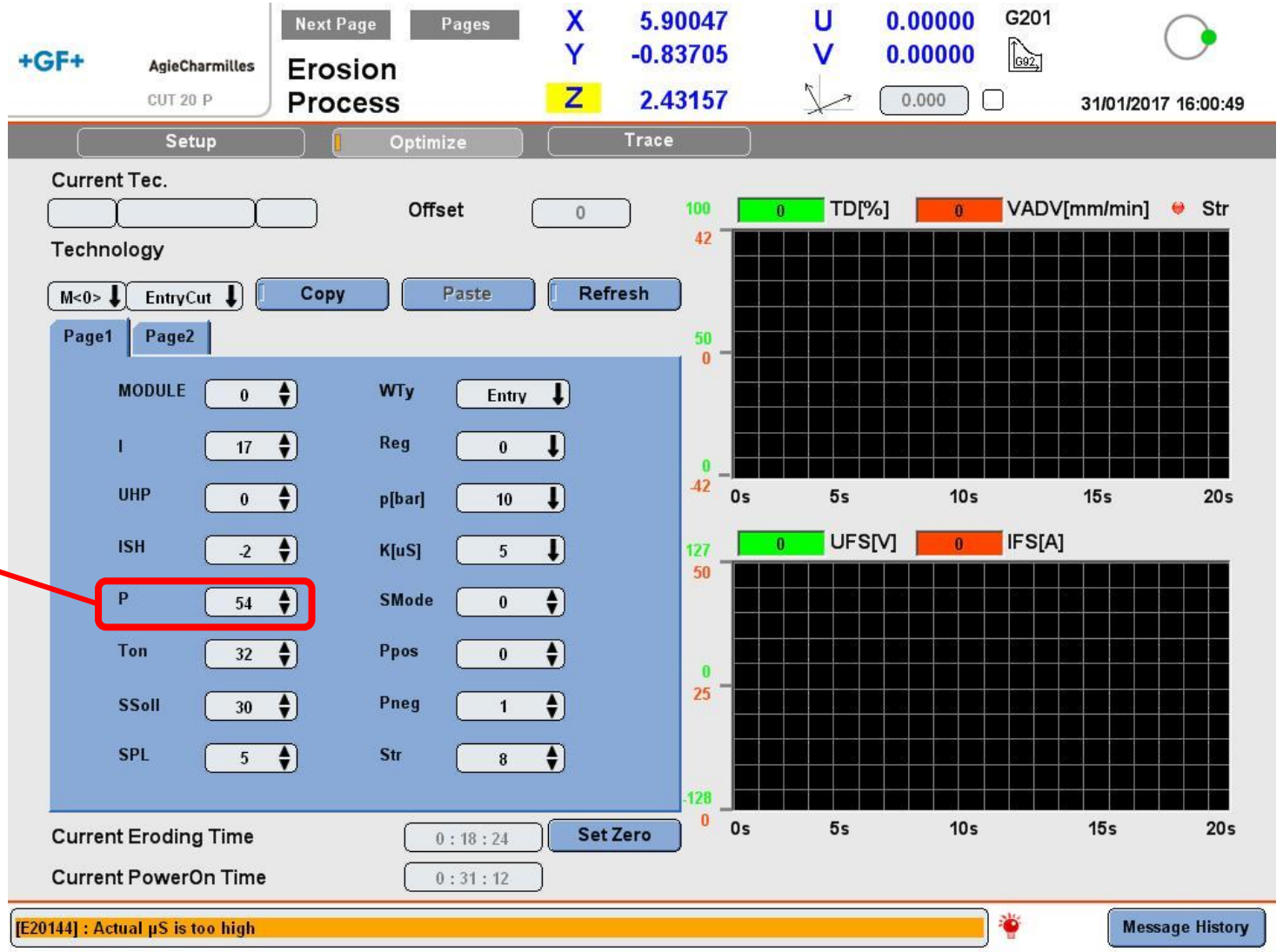


The OPTIMIZE page for the erosion process

P = has to do with pulses in one second
The frequency affects directly the erosion power and indirectly the cutting speed

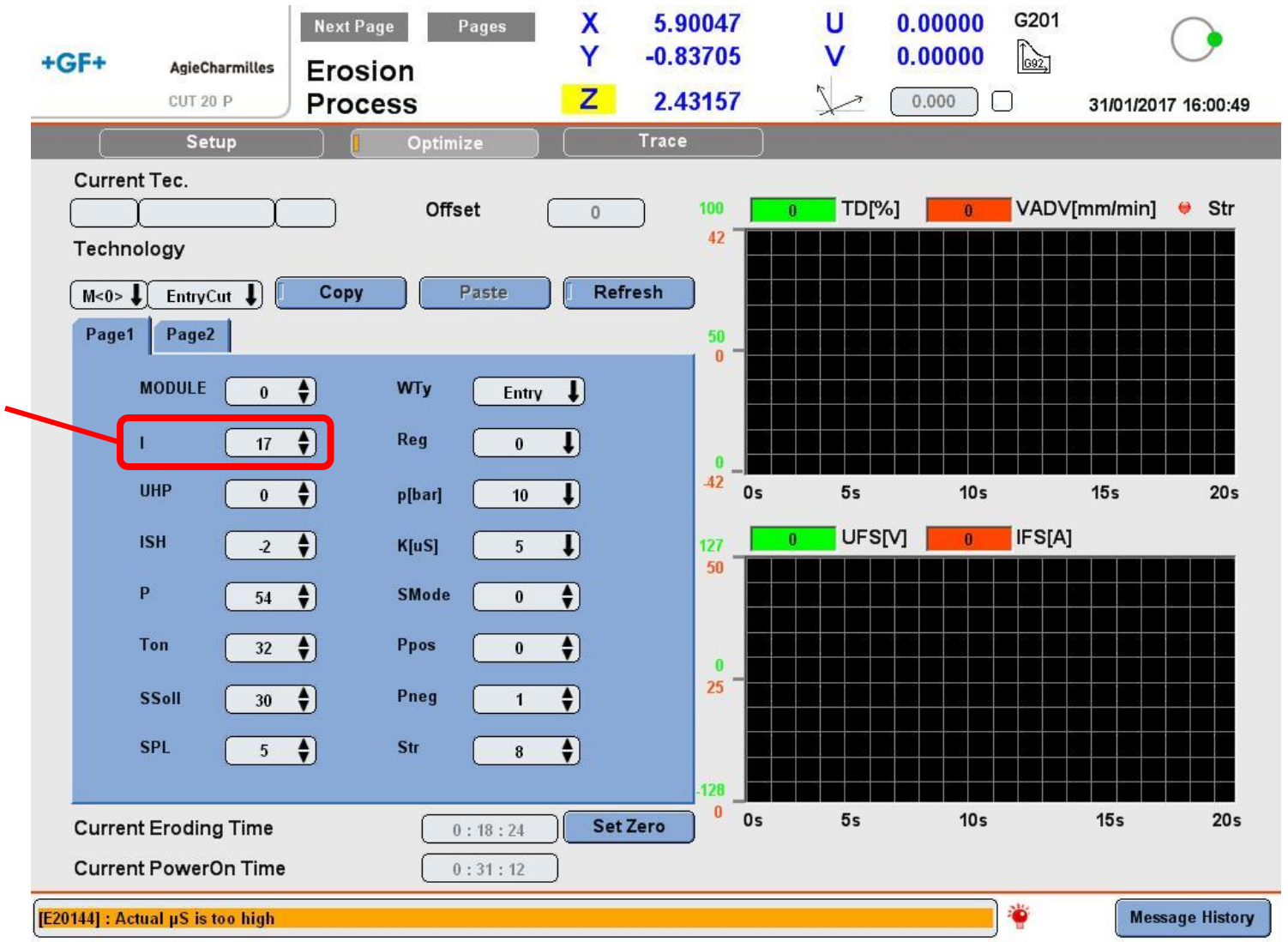
P (pulse frequency)

Lower the P slightly under difficult cutting conditions and during periods of excessive wire breakage



The OPTIMIZE page for the erosion process

I = has to do with discharge current during cuts



I (Discharge Current)

This can affect:

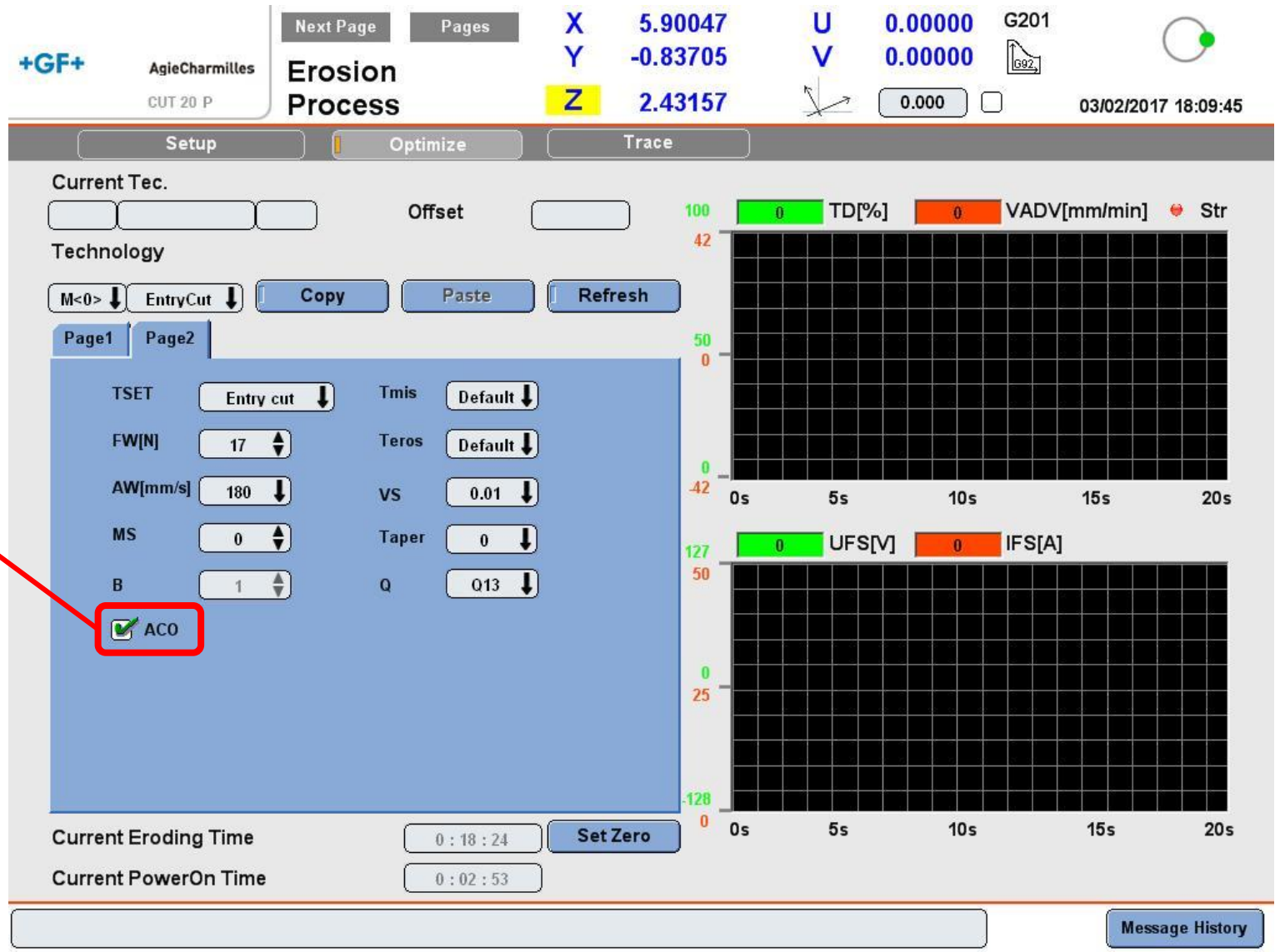
1) Cutting width
2) Geometric errors
3) Surface finish
4) Wire breakage
5) Cutting speed

The OPTIMIZE page for the erosion process

ACO = Adaptive Current Optimization

ACO (Adaptive Current Optimization)

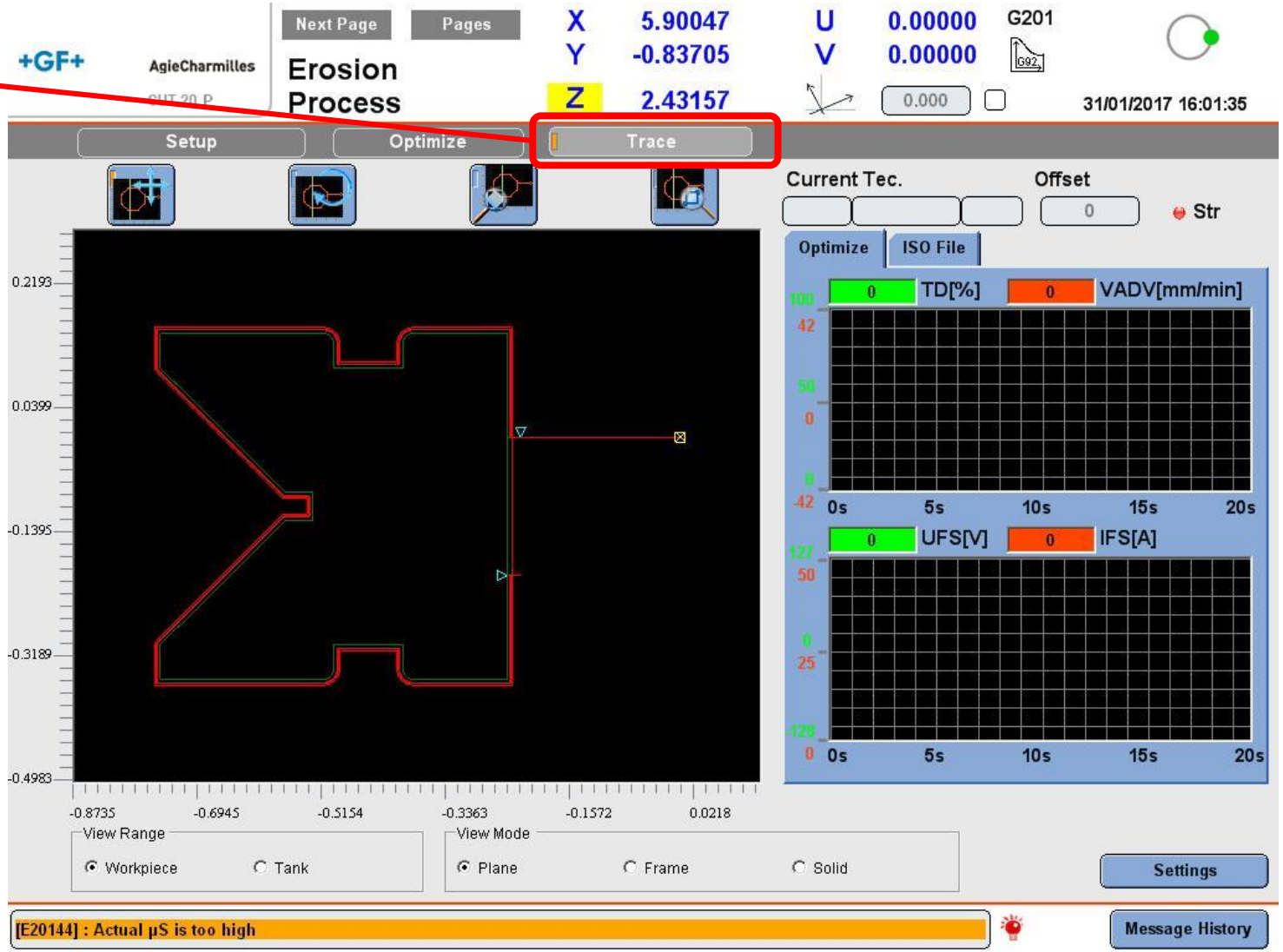
Provides real-time process monitoring and adapting during cutting



The OPTIMIZE page for the erosion process

Select trace

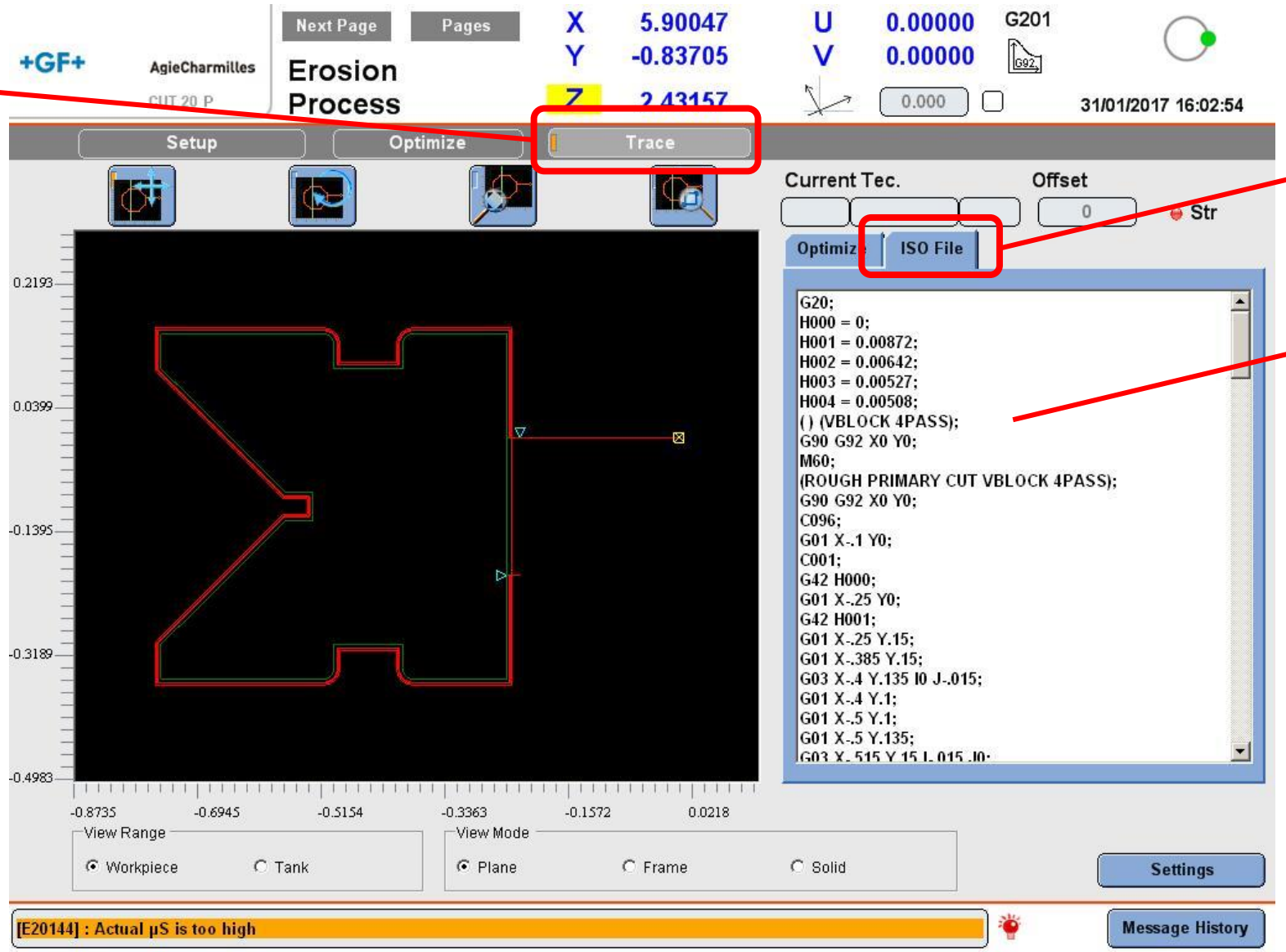
In the Erosion page you can trace the progress of the erosion cut in real-time



The OPTIMIZE page for the erosion process

Select trace

By selecting the ISO tab the user can view in real-time the progress of the cut through the ISO file

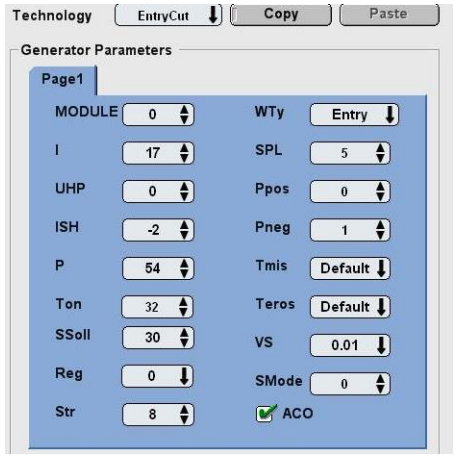


Select ISO

View the ISO file

Wire EDM Parameters

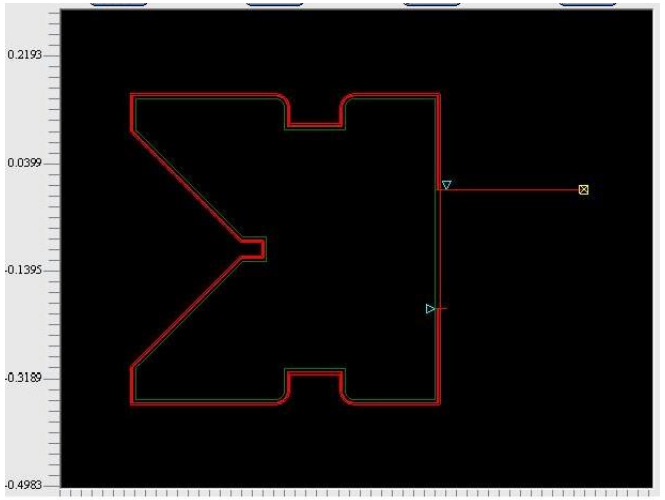
Review from erosion PPT



Use caution when modifying and resaving files

Use preferred file management skills

Always back up a file before modifying and resaving



FINIS