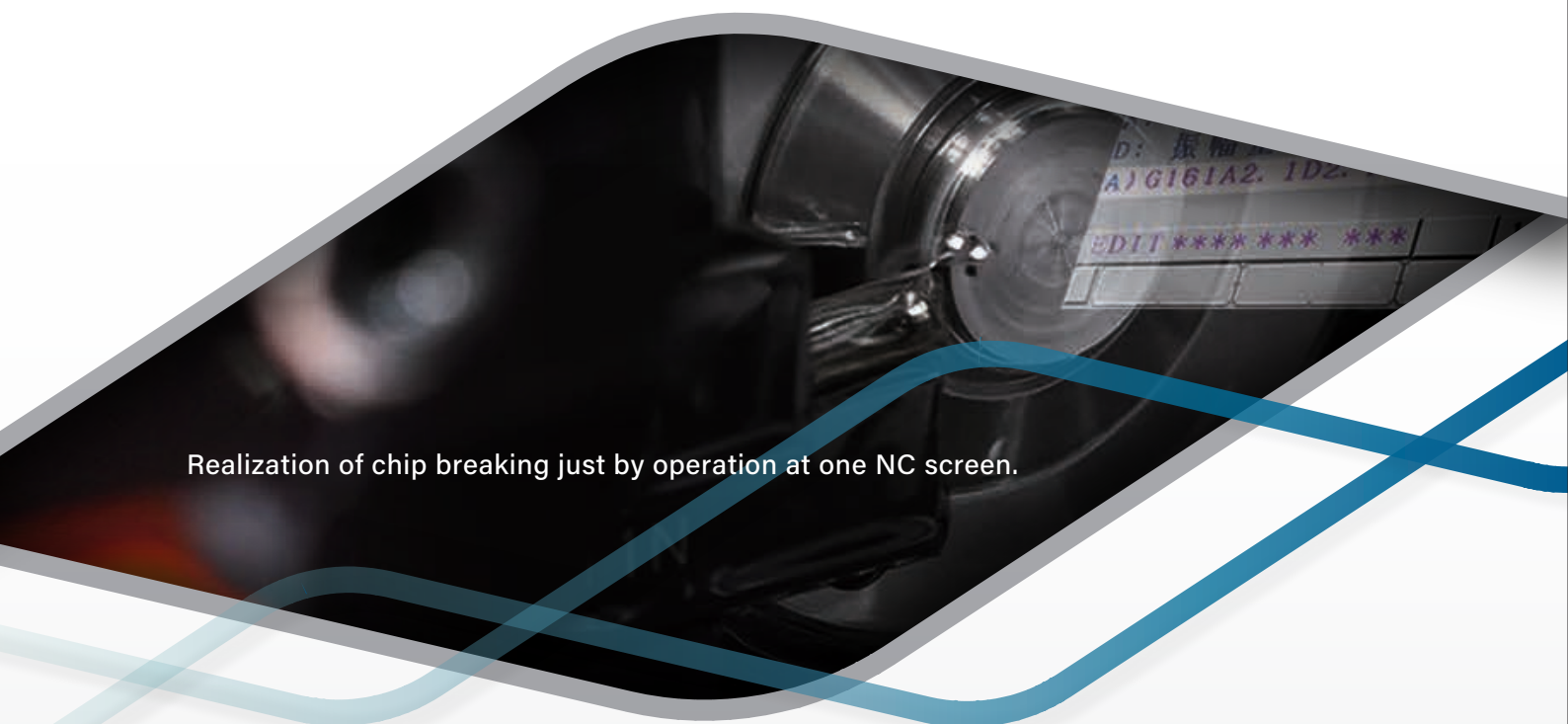
Stepcycle Pro.



Realization of chip breaking just by operation at one NC screen.

EASY A special screen to make the chip breaking operation quick and easy

CONVENIENT A trial function to get a preview of the easy-to-use operation and chip breaking results

What is Stepcycle Pro.?

Stepcycle Pro. is a system that performs the machining method called vibratory cutting or oscillatory cutting. By synchronizing the rotation period of the main spindle with the vibration of the control axis – from the X, Y, or Z axes – this system generates an air-cutting zone during cutting to break the chips. Since chips are broken into small sizes and discharged intermittently, this technology prevents chips from getting entangled in the workpiece. This cutting-edge technology in the new generation reduces problems during cutting and is applicable to various shapes and materials to be machined.

What are the benefits of Stepcycle Pro.?

Benefit ❶ Prevents chip problems ⇨ Significantly reduces defects

Benefit ❷ Reduces machine downtime ⇨ Reduces operators' workloads

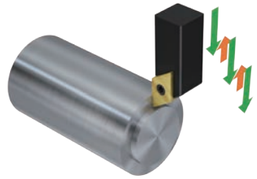
Benefit ❸ Shortens the setup time ⇨ You can start machining right away

Benefit ❹ Just add the NC function ⇨ Reasonable introductory cost

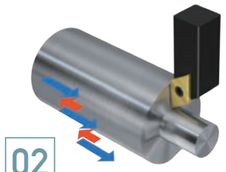
VARIATION

Types of Machining that Stepcycle Pro. is Applicable For

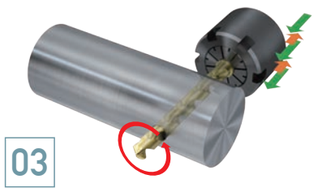
✻ Not applicable to threading and arc shape cutting



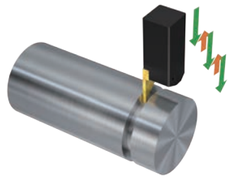
01 **End-face machining**



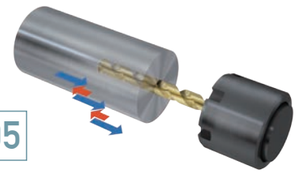
02 **Outer-diameter machining (Side turning)**



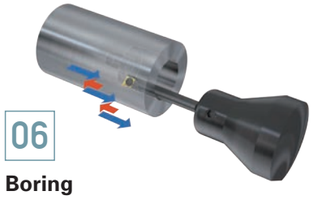
03 **Cross drilling**



04 **Grooving and cutting-off**



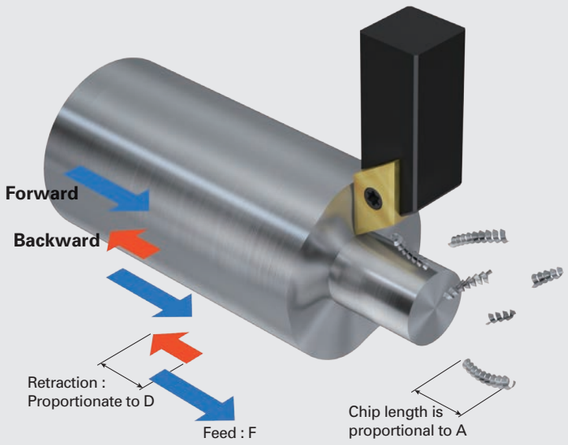
05 **Drilling**



06 **Boring**

ADVANCE POINT 01 **Command Format**

Simple and easy commands



Requires G161 move command + F_A_D_ only

Intuitive and easy-to-use argument

F : Feed rate (mm/rev)

A : Chip length coefficient (rev)

Enter the chip length command by the number of rotations = the chip length is controllable

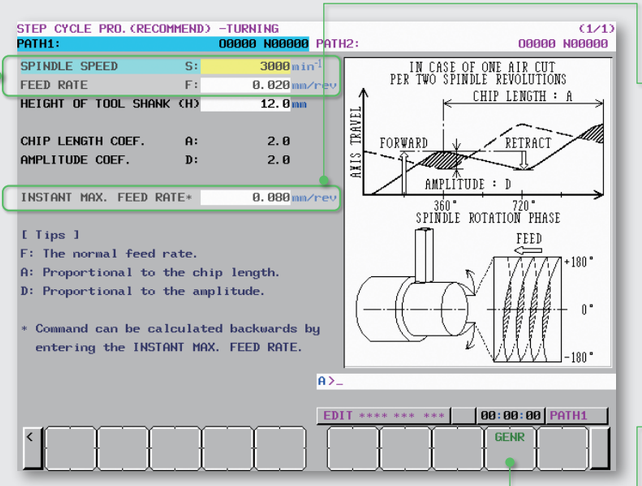
D : Amplitude coefficient (multiplication)

Proportional to the vibration amplitude

ADVANCE POINT 02 **Machining Conditions Setting**

Special screen for the quick setting of machining conditions

Just enter the two values S: spindle speed (min^{-1}) and F: feed rate (mm/rev) on the recommended setting screen to let the system calculate the recommended conditions. There is no need for repeated trial-and-error searching for vibration conditions to break chips.



ADVANCE POINT 03 **Instantaneous Maximum Feed Rate**

Visualization of instantaneous maximum feed rate at the tool tip

Input arbitrary machining conditions and the system displays the expected instantaneous maximum feed rate at the tool tip, enabling you to make changes to optimize the machining condition or select the tool to fit the cutting feed rate.

ADVANCE POINT 04 **Inputs to the Program**

Inserting to the program is made easy

Just create and insert with the soft keys the vibration condition command into the current program.

ADVANCE POINT 05 **Trial Function**

Trial function(*) to get a preview of the chip breaking effect

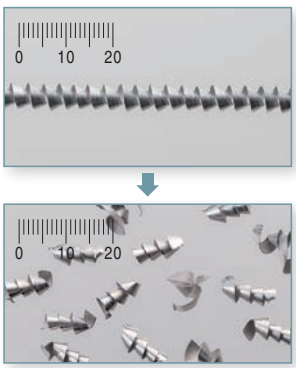
All current models will be equipped with Stepcycle Pro. trial function in sequence.
Get a preview of the chip breaking operation effect before making a decision.

*The trial function is valid only for one cycle under the setting mode.
*Contact Star' s sales team for the models already equipped with the trial function.

Chip comparison

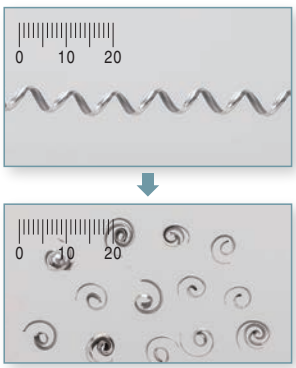
☐ Outer diameter machining (aluminum)

Material : A6061
Material diameter : ϕ16 mm
Spindle speed : 4,000 min^{-1}
Feed rate : 0.05 mm/rev
Depth of cut : 3 mm



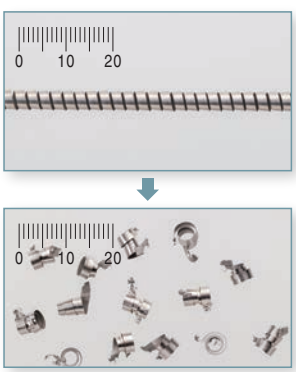
☐ Cutting-off machining (aluminum)

Material : A6061
Material diameter : ϕ16 mm
Spindle speed : 4,000 min^{-1}
Feed rate : 0.04 mm/rev
Cutoff width : 2 mm



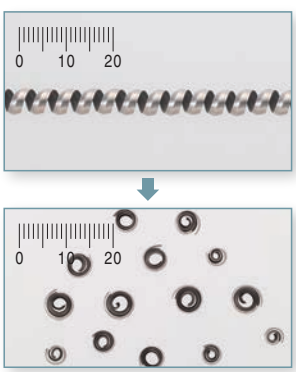
☐ Outer diameter machining (stainless steel)

Material : SUS304
Material diameter : ϕ16 mm
Spindle speed : 3,000 min^{-1}
Feed rate : 0.03 mm/rev
Depth of cut : 2 mm



☐ Cutting-off machining (stainless steel)

Material : SUS304
Material diameter : ϕ16 mm
Spindle speed : 1,500 min^{-1}
Feed rate : 0.02 mm/rev
Cutoff width : 2 mm



Notes on the introduction

- Since this system employs micro-vibration on either the tool post or the headstock during machining, a shorter lifetime of the feed system such as the ball screw, linear guide, and slide guide may be expected.
- The accuracy of the roundness and surface roughness of the machining may be affected compared to normal machining.
- Using this system with the front machining may cause tool marks to show on the rear when both are machined simultaneously, or vice versa.
- The tool life may be shorter than usual.

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