Automation has a name.

FANUC

500*i*-A SYSTEM

Functions • Communication • Software

001
Table of Contents

002

003

004

005

006

007

008

Foreword

You will find in this catalog an extensive selection of essential product information about FANUC components, functions and software. There are many FANUC products available to help you build the most competitive machine or automated system. This catalog contains a lot of information but cannot cover all subjects extensively; use it as a guide and do not hesitate to call your local FANUC representative for further information and assistance.

About controller functions

The descriptions of each function provided in this catalogue may contain information, descriptions, technical data as well as performance data which may not always apply as described. Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. The functions described are options and may not be installed on a given configuration. It is however mostly possible to purchase additional functions and hardware to retrofit an existing system to increase its productivity. In case of doubt or if you need additional information on functions, compatibility and retrofit, contact your FANUC representative.

Export control

The products listed in this catalogue may be subject to export control laws and regulations of Japan, the United States of America, the European Union, its Member States and any amendments thereof. Contact your FANUC representative for further information.

Notes

The illustrations, charts, sample programs and layout examples shown in this catalogue are intended solely for purposes of example. Availability and technical specifications are subject to change without notice.

Copyrights

010

CNC

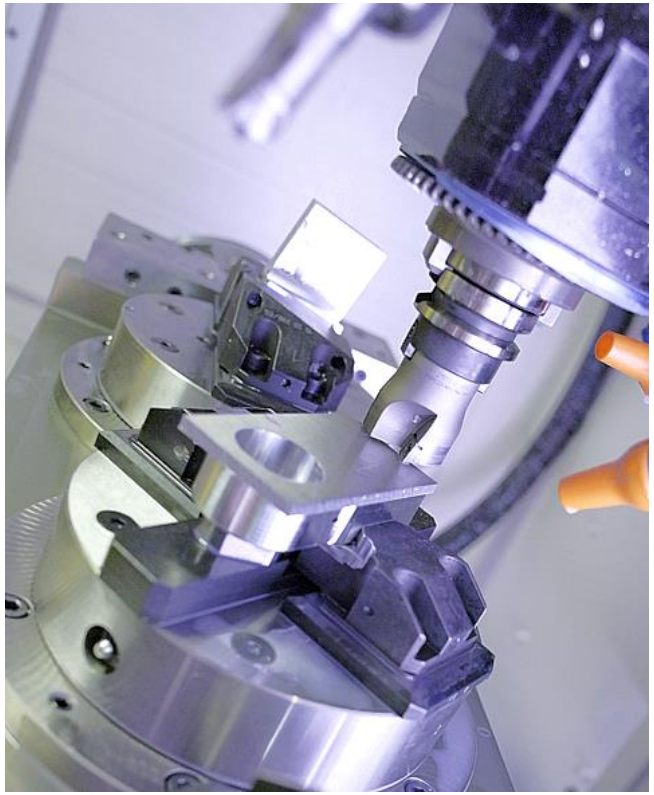
FANUC develops and manufactures state-of-the-art automation products and solutions. The CNC product range includes both entry-level and complex CNC products with high-speed functions, digitally controlled servo motors and spindle motors, and user-friendly operator interfaces.

The FANUC CNC system is installed in the machine in the form of a productive CNC package complete with CNC, amplifier, motors, I/O modules and operator panel. Such a complete CNC concept promises that the components are coordinated to optimum effect, offering the highest performance and productivity.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

011
CNC



Functions

This section of the catalogue describes functions provided by the CNC software. They have been grouped by relevance to provide a better overview.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

012
Functions

Controlled Axis

This section of the catalogue contains the functions related to axis control in the CNC, from the number of axes, paths and axes groups, via many other synchronization and precision and safety functions.

Some of the functions detailed in the catalogue:

- Designation of controlled axes, machine groups, path and technology
- Cs contouring control
- Synchronous / Composite control
- Tandem control
- Chopping
- High precision learning control
- HRV Control
- Interference check functions
- Built-in 3D interference check
- Unexpected disturbance torque detection function
- Dual Check Safety (DCS)
- Etc.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

013

Controlled Axis

Designation of Machine Control Type

This function defines the machine type as controlled by the CNC. It can be chosen between Machining Center, Lathe or Multiple System, i.e. combination of Lathe and Machining Center functions.

Ordering Information

Specification	Description
A02B-0372-S838#C	501iS-A Designation of Machine Control Type - Multiple System (Compound Machining)
A02B-0372-S838#M	501iS-A Designation of Machine Control Type - Machining Center System
A02B-0372-S838#T	501iS-A Designation of Machine Control Type - Lathe System
A02B-0373-S838#C	501i-A Designation of Machine Control Type - Multiple System (Compound Machining)
A02B-0373-S838#M	501i-A Designation of Machine Control Type - Machining Center System
A02B-0373-S838#T	501i-A Designation of Machine Control Type - Lathe System
A02B-0374-S838#C	502iS-A Designation of Machine Control Type - Multiple System (Compound Machining)
A02B-0374-S838#M	502iS-A Designation of Machine Control Type - Machining Center System
A02B-0374-S838#T	502iS-A Designation of Machine Control Type - Lathe System
A02B-0375-S838#C	502i-A Designation of Machine Control Type - Multiple System (Compound Machining)
A02B-0375-S838#M	502i-A Designation of Machine Control Type - Machining Center System
A02B-0375-S838#T	502i-A Designation of Machine Control Type - Lathe System
A02B-0377-S838#C	503i-A Designation of Machine Control Type - Multiple System (Compound Machining)
A02B-0377-S838#M	503i-A Designation of Machine Control Type - Machining Center System
A02B-0377-S838#T	503i-A Designation of Machine Control Type - Lathe System

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

014
Controlled Axis

Designation of Controlled Axes

This function specifies the maximum number of axes that the CNC can control. The number of maximum controlled axes is the sum of the number of machine controlled axes and the number of loader controlled axes.

The number of Cs and PMC axes is included in the number of machine controlled axes.

The maximum number of axes is also linked to the hardware configuration of the CNC.

Ordering Information

Specification	Description
A02B-0372-J802#10	501iS-A Designation of Control Axes - 10 Axes
A02B-0372-J802#11	501iS-A Designation of Control Axes - 11 Axes
A02B-0372-J802#12	501iS-A Designation of Control Axes - 12 Axes
A02B-0372-J802#13	501iS-A Designation of Control Axes - 13 Axes
A02B-0372-J802#14	501iS-A Designation of Control Axes - 14 Axes
A02B-0372-J802#15	501iS-A Designation of Control Axes - 15 Axes
A02B-0372-J802#16	501iS-A Designation of Control Axes - 16 Axes
A02B-0372-J802#17	501iS-A Designation of Control Axes - 17 Axes
A02B-0372-J802#18	501iS-A Designation of Control Axes - 18 Axes
A02B-0372-J802#19	501iS-A Designation of Control Axes - 19 Axes
A02B-0372-J802#2	501iS-A Designation of Control Axes - 02 Axes
A02B-0372-J802#20	501iS-A Designation of Control Axes - 20 Axes
A02B-0372-J802#21	501iS-A Designation of Control Axes - 21 Axes
A02B-0372-J802#22	501iS-A Designation of Control Axes - 22 Axes
A02B-0372-J802#23	501iS-A Designation of Control Axes - 23 Axes
A02B-0372-J802#24	501iS-A Designation of Control Axes - 24 Axes
A02B-0372-J802#25	501iS-A Designation of Control Axes - 25 Axes
A02B-0372-J802#26	501iS-A Designation of Control Axes - 26 Axes
A02B-0372-J802#27	501iS-A Designation of Control Axes - 27 Axes
A02B-0372-J802#28	501iS-A Designation of Control Axes - 28 Axes
A02B-0372-J802#29	501iS-A Designation of Control Axes - 29 Axes
A02B-0372-J802#3	501iS-A Designation of Control Axes - 03 Axes
A02B-0372-J802#30	501iS-A Designation of Control Axes - 30 Axes
A02B-0372-J802#31	501iS-A Designation of Control Axes - 31 Axes
A02B-0372-J802#32	501iS-A Designation of Control Axes - 32 Axes
A02B-0372-J802#33	501iS-A Designation of Control Axes - 33 Axes
A02B-0372-J802#34	501iS-A Designation of Control Axes - 34 Axes
A02B-0372-J802#35	501iS-A Designation of Control Axes - 35 Axes
A02B-0372-J802#36	501iS-A Designation of Control Axes - 36 Axes
A02B-0372-J802#37	501iS-A Designation of Control Axes - 37 Axes

015

Specification	Description
A02B-0372-J802#38	501iS-A Designation of Control Axes - 38 Axes
A02B-0372-J802#39	501iS-A Designation of Control Axes - 39 Axes
A02B-0372-J802#4	501iS-A Designation of Control Axes - 04 Axes
A02B-0372-J802#40	501iS-A Designation of Control Axes - 40 Axes
A02B-0372-J802#41	501iS-A Designation of Control Axes - 41 Axes
A02B-0372-J802#42	501iS-A Designation of Control Axes - 42 Axes
A02B-0372-J802#43	501iS-A Designation of Control Axes - 43 Axes
A02B-0372-J802#44	501iS-A Designation of Control Axes - 44 Axes
A02B-0372-J802#45	501iS-A Designation of Control Axes - 45 Axes
A02B-0372-J802#46	501iS-A Designation of Control Axes - 46 Axes
A02B-0372-J802#47	501iS-A Designation of Control Axes - 47 Axes
A02B-0372-J802#48	501iS-A Designation of Control Axes - 48 Axes
A02B-0372-J802#49	501iS-A Designation of Control Axes - 49 Axes
A02B-0372-J802#5	501iS-A Designation of Control Axes - 05 Axes
A02B-0372-J802#50	501iS-A Designation of Control Axes - 50 Axes
A02B-0372-J802#51	501iS-A Designation of Control Axes - 51 Axes
A02B-0372-J802#52	501iS-A Designation of Control Axes - 52 Axes
A02B-0372-J802#53	501iS-A Designation of Control Axes - 53 Axes
A02B-0372-J802#54	501iS-A Designation of Control Axes - 54 Axes
A02B-0372-J802#55	501iS-A Designation of Control Axes - 55 Axes
A02B-0372-J802#56	501iS-A Designation of Control Axes - 56 Axes
A02B-0372-J802#57	501iS-A Designation of Control Axes - 57 Axes
A02B-0372-J802#58	501iS-A Designation of Control Axes - 58 Axes
A02B-0372-J802#59	501iS-A Designation of Control Axes - 59 Axes
A02B-0372-J802#6	501iS-A Designation of Control Axes - 06 Axes
A02B-0372-J802#60	501iS-A Designation of Control Axes - 60 Axes
A02B-0372-J802#61	501iS-A Designation of Control Axes - 61 Axes
A02B-0372-J802#62	501iS-A Designation of Control Axes - 62 Axes
A02B-0372-J802#63	501iS-A Designation of Control Axes - 63 Axes
A02B-0372-J802#64	501iS-A Designation of Control Axes - 64 Axes
A02B-0372-J802#65	501iS-A Designation of Control Axes - 65 Axes
A02B-0372-J802#66	501iS-A Designation of Control Axes - 66 Axes
A02B-0372-J802#67	501iS-A Designation of Control Axes - 67 Axes
A02B-0372-J802#68	501iS-A Designation of Control Axes - 68 Axes
A02B-0372-J802#69	501iS-A Designation of Control Axes - 69 Axes
A02B-0372-J802#7	501iS-A Designation of Control Axes - 07 Axes
A02B-0372-J802#70	501iS-A Designation of Control Axes - 70 Axes
A02B-0372-J802#71	501iS-A Designation of Control Axes - 71 Axes
A02B-0372-J802#72	501iS-A Designation of Control Axes - 72 Axes
A02B-0372-J802#73	501iS-A Designation of Control Axes - 73 Axes

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

016

Specification	Description
A02B-0372-J802#74	501iS-A Designation of Control Axes - 74 Axes
A02B-0372-J802#75	501iS-A Designation of Control Axes - 75 Axes
A02B-0372-J802#76	501iS-A Designation of Control Axes - 76 Axes
A02B-0372-J802#77	501iS-A Designation of Control Axes - 77 Axes
A02B-0372-J802#78	501iS-A Designation of Control Axes - 78 Axes
A02B-0372-J802#79	501iS-A Designation of Control Axes - 79 Axes
A02B-0372-J802#8	501iS-A Designation of Control Axes - 08 Axes
A02B-0372-J802#80	501iS-A Designation of Control Axes - 80 Axes
A02B-0372-J802#81	501iS-A Designation of Control Axes - 81 Axes
A02B-0372-J802#82	501iS-A Designation of Control Axes - 82 Axes
A02B-0372-J802#83	501iS-A Designation of Control Axes - 83 Axes
A02B-0372-J802#84	501iS-A Designation of Control Axes - 84 Axes
A02B-0372-J802#85	501iS-A Designation of Control Axes - 85 Axes
A02B-0372-J802#86	501iS-A Designation of Control Axes - 86 Axes
A02B-0372-J802#87	501iS-A Designation of Control Axes - 87 Axes
A02B-0372-J802#88	501iS-A Designation of Control Axes - 88 Axes
A02B-0372-J802#89	501iS-A Designation of Control Axes - 89 Axes
A02B-0372-J802#9	501iS-A Designation of Control Axes - 09 Axes
A02B-0372-J802#90	501iS-A Designation of Control Axes - 90 Axes
A02B-0372-J802#91	501iS-A Designation of Control Axes - 91 Axes
A02B-0372-J802#92	501iS-A Designation of Control Axes - 92 Axes
A02B-0372-J802#93	501iS-A Designation of Control Axes - 93 Axes
A02B-0372-J802#94	501iS-A Designation of Control Axes - 94 Axes
A02B-0372-J802#95	501iS-A Designation of Control Axes - 95 Axes
A02B-0372-J802#96	501iS-A Designation of Control Axes - 96 Axes
A02B-0373-J802#10	501i-A Designation of Control Axes - 10 Axes
A02B-0373-J802#11	501i-A Designation of Control Axes - 11 Axes
A02B-0373-J802#12	501i-A Designation of Control Axes - 12 Axes
A02B-0373-J802#13	501i-A Designation of Control Axes - 13 Axes
A02B-0373-J802#14	501i-A Designation of Control Axes - 14 Axes
A02B-0373-J802#15	501i-A Designation of Control Axes - 15 Axes
A02B-0373-J802#16	501i-A Designation of Control Axes - 16 Axes
A02B-0373-J802#17	501i-A Designation of Control Axes - 17 Axes
A02B-0373-J802#18	501i-A Designation of Control Axes - 18 Axes
A02B-0373-J802#19	501i-A Designation of Control Axes - 19 Axes
A02B-0373-J802#2	501i-A Designation of Control Axes - 02 Axes
A02B-0373-J802#20	501i-A Designation of Control Axes - 20 Axes
A02B-0373-J802#21	501i-A Designation of Control Axes - 21 Axes
A02B-0373-J802#22	501i-A Designation of Control Axes - 22 Axes
A02B-0373-J802#23	501i-A Designation of Control Axes - 23 Axes

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

017

Specification	Description
A02B-0373-J802#24	501i-A Designation of Control Axes - 24 Axes
A02B-0373-J802#25	501i-A Designation of Control Axes - 25 Axes
A02B-0373-J802#26	501i-A Designation of Control Axes - 26 Axes
A02B-0373-J802#27	501i-A Designation of Control Axes - 27 Axes
A02B-0373-J802#28	501i-A Designation of Control Axes - 28 Axes
A02B-0373-J802#29	501i-A Designation of Control Axes - 29 Axes
A02B-0373-J802#3	501i-A Designation of Control Axes - 03 Axes
A02B-0373-J802#30	501i-A Designation of Control Axes - 30 Axes
A02B-0373-J802#31	501i-A Designation of Control Axes - 31 Axes
A02B-0373-J802#32	501i-A Designation of Control Axes - 32 Axes
A02B-0373-J802#33	501i-A Designation of Control Axes - 33 Axes
A02B-0373-J802#34	501i-A Designation of Control Axes - 34 Axes
A02B-0373-J802#35	501i-A Designation of Control Axes - 35 Axes
A02B-0373-J802#36	501i-A Designation of Control Axes - 36 Axes
A02B-0373-J802#37	501i-A Designation of Control Axes - 37 Axes
A02B-0373-J802#38	501i-A Designation of Control Axes - 38 Axes
A02B-0373-J802#39	501i-A Designation of Control Axes - 39 Axes
A02B-0373-J802#4	501i-A Designation of Control Axes - 04 Axes
A02B-0373-J802#40	501i-A Designation of Control Axes - 40 Axes
A02B-0373-J802#41	501i-A Designation of Control Axes - 41 Axes
A02B-0373-J802#42	501i-A Designation of Control Axes - 42 Axes
A02B-0373-J802#43	501i-A Designation of Control Axes - 43 Axes
A02B-0373-J802#44	501i-A Designation of Control Axes - 44 Axes
A02B-0373-J802#45	501i-A Designation of Control Axes - 45 Axes
A02B-0373-J802#46	501i-A Designation of Control Axes - 46 Axes
A02B-0373-J802#47	501i-A Designation of Control Axes - 47 Axes
A02B-0373-J802#48	501i-A Designation of Control Axes - 48 Axes
A02B-0373-J802#49	501i-A Designation of Control Axes - 49 Axes
A02B-0373-J802#5	501i-A Designation of Control Axes - 05 Axes
A02B-0373-J802#50	501i-A Designation of Control Axes - 50 Axes
A02B-0373-J802#51	501i-A Designation of Control Axes - 51 Axes
A02B-0373-J802#52	501i-A Designation of Control Axes - 52 Axes
A02B-0373-J802#53	501i-A Designation of Control Axes - 53 Axes
A02B-0373-J802#54	501i-A Designation of Control Axes - 54 Axes
A02B-0373-J802#55	501i-A Designation of Control Axes - 55 Axes
A02B-0373-J802#56	501i-A Designation of Control Axes - 56 Axes
A02B-0373-J802#57	501i-A Designation of Control Axes - 57 Axes
A02B-0373-J802#58	501i-A Designation of Control Axes - 58 Axes
A02B-0373-J802#59	501i-A Designation of Control Axes - 59 Axes
A02B-0373-J802#6	501i-A Designation of Control Axes - 06 Axes

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

018

Specification	Description
A02B-0373-J802#60	501i-A Designation of Control Axes - 60 Axes
A02B-0373-J802#61	501i-A Designation of Control Axes - 61 Axes
A02B-0373-J802#62	501i-A Designation of Control Axes - 62 Axes
A02B-0373-J802#63	501i-A Designation of Control Axes - 63 Axes
A02B-0373-J802#64	501i-A Designation of Control Axes - 64 Axes
A02B-0373-J802#65	501i-A Designation of Control Axes - 65 Axes
A02B-0373-J802#66	501i-A Designation of Control Axes - 66 Axes
A02B-0373-J802#67	501i-A Designation of Control Axes - 67 Axes
A02B-0373-J802#68	501i-A Designation of Control Axes - 68 Axes
A02B-0373-J802#69	501i-A Designation of Control Axes - 69 Axes
A02B-0373-J802#7	501i-A Designation of Control Axes - 07 Axes
A02B-0373-J802#70	501i-A Designation of Control Axes - 70 Axes
A02B-0373-J802#71	501i-A Designation of Control Axes - 71 Axes
A02B-0373-J802#72	501i-A Designation of Control Axes - 72 Axes
A02B-0373-J802#73	501i-A Designation of Control Axes - 73 Axes
A02B-0373-J802#74	501i-A Designation of Control Axes - 74 Axes
A02B-0373-J802#75	501i-A Designation of Control Axes - 75 Axes
A02B-0373-J802#76	501i-A Designation of Control Axes - 76 Axes
A02B-0373-J802#77	501i-A Designation of Control Axes - 77 Axes
A02B-0373-J802#78	501i-A Designation of Control Axes - 78 Axes
A02B-0373-J802#79	501i-A Designation of Control Axes - 79 Axes
A02B-0373-J802#8	501i-A Designation of Control Axes - 08 Axes
A02B-0373-J802#80	501i-A Designation of Control Axes - 80 Axes
A02B-0373-J802#81	501i-A Designation of Control Axes - 81 Axes
A02B-0373-J802#82	501i-A Designation of Control Axes - 82 Axes
A02B-0373-J802#83	501i-A Designation of Control Axes - 83 Axes
A02B-0373-J802#84	501i-A Designation of Control Axes - 84 Axes
A02B-0373-J802#85	501i-A Designation of Control Axes - 85 Axes
A02B-0373-J802#86	501i-A Designation of Control Axes - 86 Axes
A02B-0373-J802#87	501i-A Designation of Control Axes - 87 Axes
A02B-0373-J802#88	501i-A Designation of Control Axes - 88 Axes
A02B-0373-J802#89	501i-A Designation of Control Axes - 89 Axes
A02B-0373-J802#9	501i-A Designation of Control Axes - 09 Axes
A02B-0373-J802#90	501i-A Designation of Control Axes - 90 Axes
A02B-0373-J802#91	501i-A Designation of Control Axes - 91 Axes
A02B-0373-J802#92	501i-A Designation of Control Axes - 92 Axes
A02B-0373-J802#93	501i-A Designation of Control Axes - 93 Axes
A02B-0373-J802#94	501i-A Designation of Control Axes - 94 Axes
A02B-0373-J802#95	501i-A Designation of Control Axes - 95 Axes
A02B-0373-J802#96	501i-A Designation of Control Axes - 96 Axes

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

019

Specification	Description
A02B-0374-J802#10	502iS-A Designation of Control Axes - 10 Axes
A02B-0374-J802#11	502iS-A Designation of Control Axes - 11 Axes
A02B-0374-J802#12	502iS-A Designation of Control Axes - 12 Axes
A02B-0374-J802#13	502iS-A Designation of Control Axes - 13 Axes
A02B-0374-J802#14	502iS-A Designation of Control Axes - 14 Axes
A02B-0374-J802#15	502iS-A Designation of Control Axes - 15 Axes
A02B-0374-J802#16	502iS-A Designation of Control Axes - 16 Axes
A02B-0374-J802#17	502iS-A Designation of Control Axes - 17 Axes
A02B-0374-J802#18	502iS-A Designation of Control Axes - 18 Axes
A02B-0374-J802#19	502iS-A Designation of Control Axes - 19 Axes
A02B-0374-J802#2	502iS-A Designation of Control Axes - 02 Axes
A02B-0374-J802#20	502iS-A Designation of Control Axes - 20 Axes
A02B-0374-J802#21	502iS-A Designation of Control Axes - 21 Axes
A02B-0374-J802#22	502iS-A Designation of Control Axes - 22 Axes
A02B-0374-J802#23	502iS-A Designation of Control Axes - 23 Axes
A02B-0374-J802#24	502iS-A Designation of Control Axes - 24 Axes
A02B-0374-J802#25	502iS-A Designation of Control Axes - 25 Axes
A02B-0374-J802#26	502iS-A Designation of Control Axes - 26 Axes
A02B-0374-J802#3	502iS-A Designation of Control Axes - 03 Axes
A02B-0374-J802#4	502iS-A Designation of Control Axes - 04 Axes
A02B-0374-J802#5	502iS-A Designation of Control Axes - 05 Axes
A02B-0374-J802#6	502iS-A Designation of Control Axes - 06 Axes
A02B-0374-J802#7	502iS-A Designation of Control Axes - 07 Axes
A02B-0374-J802#8	502iS-A Designation of Control Axes - 08 Axes
A02B-0374-J802#9	502iS-A Designation of Control Axes - 09 Axes
A02B-0375-J802#10	502i-A Designation of Control Axes - 10 Axes
A02B-0375-J802#11	502i-A Designation of Control Axes - 11 Axes
A02B-0375-J802#12	502i-A Designation of Control Axes - 12 Axes
A02B-0375-J802#13	502i-A Designation of Control Axes - 13 Axes
A02B-0375-J802#14	502i-A Designation of Control Axes - 14 Axes
A02B-0375-J802#15	502i-A Designation of Control Axes - 15 Axes
A02B-0375-J802#16	502i-A Designation of Control Axes - 16 Axes
A02B-0375-J802#17	502i-A Designation of Control Axes - 17 Axes
A02B-0375-J802#18	502i-A Designation of Control Axes - 18 Axes
A02B-0375-J802#19	502i-A Designation of Control Axes - 19 Axes
A02B-0375-J802#2	502i-A Designation of Control Axes - 02 Axes
A02B-0375-J802#20	502i-A Designation of Control Axes - 20 Axes
A02B-0375-J802#21	502i-A Designation of Control Axes - 21 Axes
A02B-0375-J802#22	502i-A Designation of Control Axes - 22 Axes
A02B-0375-J802#23	502i-A Designation of Control Axes - 23 Axes

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

020

Specification	Description
A02B-0375-J802#24	502i-A Designation of Control Axes - 24 Axes
A02B-0375-J802#25	502i-A Designation of Control Axes - 25 Axes
A02B-0375-J802#26	502i-A Designation of Control Axes - 26 Axes
A02B-0375-J802#3	502i-A Designation of Control Axes - 03 Axes
A02B-0375-J802#4	502i-A Designation of Control Axes - 04 Axes
A02B-0375-J802#5	502i-A Designation of Control Axes - 05 Axes
A02B-0375-J802#6	502i-A Designation of Control Axes - 06 Axes
A02B-0375-J802#7	502i-A Designation of Control Axes - 07 Axes
A02B-0375-J802#8	502i-A Designation of Control Axes - 08 Axes
A02B-0375-J802#9	502i-A Designation of Control Axes - 09 Axes
A02B-0377-J802#10	503i-A Designation of Control Axes - 10 Axes
A02B-0377-J802#11	503i-A Designation of Control Axes - 11 Axes
A02B-0377-J802#12	503i-A Designation of Control Axes - 12 Axes
A02B-0377-J802#2	503i-A Designation of Control Axes - 02 Axes
A02B-0377-J802#3	503i-A Designation of Control Axes - 03 Axes
A02B-0377-J802#4	503i-A Designation of Control Axes - 04 Axes
A02B-0377-J802#5	503i-A Designation of Control Axes - 05 Axes
A02B-0377-J802#6	503i-A Designation of Control Axes - 06 Axes
A02B-0377-J802#7	503i-A Designation of Control Axes - 07 Axes
A02B-0377-J802#8	503i-A Designation of Control Axes - 08 Axes
A02B-0377-J802#9	503i-A Designation of Control Axes - 09 Axes

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

021
Controlled Axis

Designation of Machine Groups

This function specifies the number of machine groups or axes groups that the CNC can control.

If multiple paths are used, several paths can be formed into a group. By doing so, the group can share data, and if an alarm is issued with a path, the other path(s) in the group can be stopped. A group of those paths is referred to as a machine group.

Up to three groups can be used, depending on the type of CNC.

The following items are impacted by the machine group configuration:

- Emergency stop signal
- RESET on the MDI
- Operation performed when an alarm is issued

Ordering Information

Specification	Description
A02B-0372-S836#1	501iS-A Designation of Machine Groups - 1 Group
A02B-0372-S836#2	501iS-A Designation of Machine Groups - 2 Groups
A02B-0372-S836#3	501iS-A Designation of Machine Groups - 3 Groups
A02B-0373-S836#1	501i-A Designation of Machine Groups - 1 Group
A02B-0373-S836#2	501i-A Designation of Machine Groups - 2 Groups
A02B-0373-S836#3	501i-A Designation of Machine Groups - 3 Groups
A02B-0374-S836#1	502iS-A Designation of Machine Groups - 1 Group
A02B-0374-S836#2	502iS-A Designation of Machine Groups - 2 Groups
A02B-0374-S836#3	502iS-A Designation of Machine Groups - 3 Groups
A02B-0375-S836#1	502i-A Designation of Machine Groups - 1 Group
A02B-0375-S836#2	502i-A Designation of Machine Groups - 2 Groups
A02B-0375-S836#3	502i-A Designation of Machine Groups - 3 Groups
A02B-0377-S836#1	503i-A Designation of Machine Groups - 1 Group
A02B-0377-S836#2	503i-A Designation of Machine Groups - 2 Groups

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

022

Controlled Axis

Designation of Control Paths

This function specifies the number of controlled path for the CNC.
A path represents a group of axes that are controlled by the same NC program.
Up to 10 paths can be used, depending on the type of NC system. A path for loader control is also counted as a path.

Ordering Information

Specification	Description
A02B-0372-S801#1	501iS-A Designation of Control Paths - 1 Path
A02B-0372-S801#10	501iS-A Designation of Control Paths - 10 Paths
A02B-0372-S801#11	501iS-A Designation of Control Paths - 11 Paths
A02B-0372-S801#12	501iS-A Designation of Control Paths - 12 Paths
A02B-0372-S801#13	501iS-A Designation of Control Paths - 13 Paths
A02B-0372-S801#14	501iS-A Designation of Control Paths - 14 Paths
A02B-0372-S801#15	501iS-A Designation of Control Paths - 15 Paths
A02B-0372-S801#2	501iS-A Designation of Control Paths - 2 Paths
A02B-0372-S801#3	501iS-A Designation of Control Paths - 3 Paths
A02B-0372-S801#4	501iS-A Designation of Control Paths - 4 Paths
A02B-0372-S801#5	501iS-A Designation of Control Paths - 5 Paths
A02B-0372-S801#6	501iS-A Designation of Control Paths - 6 Paths
A02B-0372-S801#7	501iS-A Designation of Control Paths - 7 Paths
A02B-0372-S801#8	501iS-A Designation of Control Paths - 8 Paths
A02B-0372-S801#9	501iS-A Designation of Control Paths - 9 Paths
A02B-0373-S801#1	501i-A Designation of Control Paths - 1 Path
A02B-0373-S801#10	501i-A Designation of Control Paths - 10 Paths
A02B-0373-S801#11	501i-A Designation of Control Paths - 11 Paths
A02B-0373-S801#12	501i-A Designation of Control Paths - 12 Paths
A02B-0373-S801#13	501i-A Designation of Control Paths - 13 Paths
A02B-0373-S801#14	501i-A Designation of Control Paths - 14 Paths
A02B-0373-S801#15	501i-A Designation of Control Paths - 15 Paths
A02B-0373-S801#2	501i-A Designation of Control Paths - 2 Paths
A02B-0373-S801#3	501i-A Designation of Control Paths - 3 Paths
A02B-0373-S801#4	501i-A Designation of Control Paths - 4 Paths
A02B-0373-S801#5	501i-A Designation of Control Paths - 5 Paths
A02B-0373-S801#6	501i-A Designation of Control Paths - 6 Paths
A02B-0373-S801#7	501i-A Designation of Control Paths - 7 Paths
A02B-0373-S801#8	501i-A Designation of Control Paths - 8 Paths
A02B-0373-S801#9	501i-A Designation of Control Paths - 9 Paths
A02B-0374-S801#1	502iS-A Designation of Control Paths - 1 Path

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

023

Specification	Description
A02B-0374-S801#2	502iS-A Designation of Control Paths - 2 Paths
A02B-0374-S801#3	502iS-A Designation of Control Paths - 3 Paths
A02B-0374-S801#4	502iS-A Designation of Control Paths - 4 Paths
A02B-0375-S801#1	502i-A Designation of Control Paths - 1 Path
A02B-0375-S801#2	502i-A Designation of Control Paths - 2 Paths
A02B-0375-S801#3	502i-A Designation of Control Paths - 3 Paths
A02B-0375-S801#4	502i-A Designation of Control Paths - 4 Paths
A02B-0377-S801#1	503i-A Designation of Control Paths - 1 Path
A02B-0377-S801#2	503i-A Designation of Control Paths - 2 Paths

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

024
Controlled Axis

Designation of Spindle Axes

Features

This function increases the total number of spindle axes that can be controlled by the CNC.

Ordering Information

Specification	Description
A02B-0372-S837#1	501iS-A Designation of Spindles - 1 Spindle
A02B-0372-S837#10	501iS-A Designation of Spindles - 10 Spindles
A02B-0372-S837#11	501iS-A Designation of Spindles - 11 Spindles
A02B-0372-S837#12	501iS-A Designation of Spindles - 12 Spindles
A02B-0372-S837#13	501iS-A Designation of Spindles - 13 Spindles
A02B-0372-S837#14	501iS-A Designation of Spindles - 14 Spindles
A02B-0372-S837#15	501iS-A Designation of Spindles - 15 Spindles
A02B-0372-S837#16	501iS-A Designation of Spindles - 16 Spindles
A02B-0372-S837#17	501iS-A Designation of Spindles - 17 Spindles
A02B-0372-S837#18	501iS-A Designation of Spindles - 18 Spindles
A02B-0372-S837#19	501iS-A Designation of Spindles - 19 Spindles
A02B-0372-S837#2	501iS-A Designation of Spindles - 2 Spindles
A02B-0372-S837#20	501iS-A Designation of Spindles - 20 Spindles
A02B-0372-S837#21	501iS-A Designation of Spindles - 21 Spindles
A02B-0372-S837#22	501iS-A Designation of Spindles - 22 Spindles
A02B-0372-S837#23	501iS-A Designation of Spindles - 23 Spindles
A02B-0372-S837#24	501iS-A Designation of Spindles - 24 Spindles
A02B-0372-S837#3	501iS-A Designation of Spindles - 3 Spindles
A02B-0372-S837#4	501iS-A Designation of Spindles - 4 Spindles
A02B-0372-S837#5	501iS-A Designation of Spindles - 5 Spindles
A02B-0372-S837#6	501iS-A Designation of Spindles - 6 Spindles
A02B-0372-S837#7	501iS-A Designation of Spindles - 7 Spindles
A02B-0372-S837#8	501iS-A Designation of Spindles - 8 Spindles
A02B-0372-S837#9	501iS-A Designation of Spindles - 9 Spindles
A02B-0373-S837#1	501i-A Designation of Spindles - 1 Spindle
A02B-0373-S837#10	501i-A Designation of Spindles - 10 Spindles
A02B-0373-S837#11	501i-A Designation of Spindles - 11 Spindles
A02B-0373-S837#12	501i-A Designation of Spindles - 12 Spindles
A02B-0373-S837#13	501i-A Designation of Spindles - 13 Spindles
A02B-0373-S837#14	501i-A Designation of Spindles - 14 Spindles

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

025

Specification	Description
A02B-0373-S837#15	501i-A Designation of Spindles - 15 Spindles
A02B-0373-S837#16	501i-A Designation of Spindles - 16 Spindles
A02B-0373-S837#17	501i-A Designation of Spindles - 17 Spindles
A02B-0373-S837#18	501i-A Designation of Spindles - 18 Spindles
A02B-0373-S837#19	501i-A Designation of Spindles - 19 Spindles
A02B-0373-S837#2	501i-A Designation of Spindles - 2 Spindles
A02B-0373-S837#20	501i-A Designation of Spindles - 20 Spindles
A02B-0373-S837#21	501i-A Designation of Spindles - 21 Spindles
A02B-0373-S837#22	501i-A Designation of Spindles - 22 Spindles
A02B-0373-S837#23	501i-A Designation of Spindles - 23 Spindles
A02B-0373-S837#24	501i-A Designation of Spindles - 24 Spindles
A02B-0373-S837#3	501i-A Designation of Spindles - 3 Spindles
A02B-0373-S837#4	501i-A Designation of Spindles - 4 Spindles
A02B-0373-S837#5	501i-A Designation of Spindles - 5 Spindles
A02B-0373-S837#6	501i-A Designation of Spindles - 6 Spindles
A02B-0373-S837#7	501i-A Designation of Spindles - 7 Spindles
A02B-0373-S837#8	501i-A Designation of Spindles - 8 Spindles
A02B-0373-S837#9	501i-A Designation of Spindles - 9 Spindles
A02B-0374-S837#1	502iS-A Designation of Spindles - 1 Spindle
A02B-0374-S837#2	502iS-A Designation of Spindles - 2 Spindles
A02B-0374-S837#3	502iS-A Designation of Spindles - 3 Spindles
A02B-0374-S837#4	502iS-A Designation of Spindles - 4 Spindles
A02B-0374-S837#5	502iS-A Designation of Spindles - 5 Spindles
A02B-0374-S837#6	502iS-A Designation of Spindles - 6 Spindles
A02B-0374-S837#7	502iS-A Designation of Spindles - 7 Spindles
A02B-0374-S837#8	502iS-A Designation of Spindles - 8 Spindles
A02B-0375-S837#1	502i-A Designation of Spindles - 1 Spindle
A02B-0375-S837#2	502i-A Designation of Spindles - 2 Spindles
A02B-0375-S837#3	502i-A Designation of Spindles - 3 Spindles
A02B-0375-S837#4	502i-A Designation of Spindles - 4 Spindles
A02B-0375-S837#5	502i-A Designation of Spindles - 5 Spindles
A02B-0375-S837#6	502i-A Designation of Spindles - 6 Spindles
A02B-0375-S837#7	502i-A Designation of Spindles - 7 Spindles
A02B-0375-S837#8	502i-A Designation of Spindles - 8 Spindles
A02B-0377-S837#1	503i-A Designation of Spindles - 1 Spindle
A02B-0377-S837#2	503i-A Designation of Spindles - 2 Spindles
A02B-0377-S837#3	503i-A Designation of Spindles - 3 Spindles
A02B-0377-S837#4	503i-A Designation of Spindles - 4 Spindles
A02B-0377-S837#5	503i-A Designation of Spindles - 5 Spindles
A02B-0377-S837#6	503i-A Designation of Spindles - 6 Spindles

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

026

Specification	Description
A02B-0377-S837#7	503i-A Designation of Spindles - 7 Spindles
A02B-0377-S837#8	503i-A Designation of Spindles - 8 Spindles

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

027
Controlled Axis

Designation of Servo Axes for Spindle Use

Features

Specify the number of servo axes for spindle use (movement command invalidity) in spindle control with servo motor. The number of servo axes for spindle use needs to be included in spindle axes specification. Spindle control with servo motor is required to use this option.

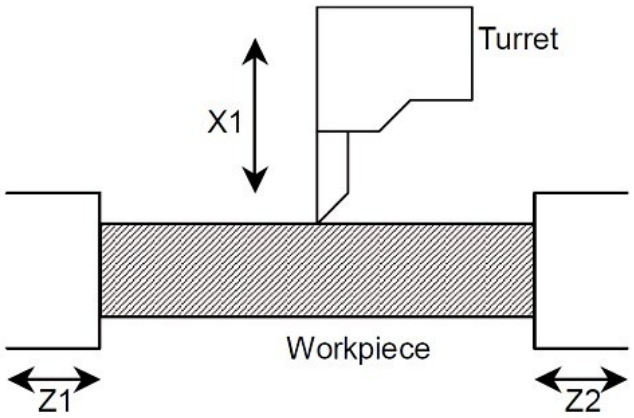
Benefits

- Simplification of the machine structure
- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0377-R710#1	503i-A Designation of Servo Axis for Spindle Use - 1 Axis
A02B-0377-R710#2	503i-A Designation of Servo Axis for Spindle Use - 2 Axes
A02B-0377-R710#3	503i-A Designation of Servo Axis for Spindle Use - 3 Axes
A02B-0377-R710#4	503i-A Designation of Servo Axis for Spindle Use - 4 Axes

028
Controlled Axis



Synchronize Z2 in path 2 with Z1 in path1

Synchronous and Composite Control

Features

The Synchronous and Composite Control function enables an arbitrary axis of one path to be synchronized with an arbitrary axis of another path (synchronous control). In a multi-path control, movements are usually made on the axes of a path according to a move command for the path (independent control in each path).

With Synchronous and Composite Control, a move command for an arbitrary axis of one path and a move command for an arbitrary axis of another path can be exchanged with each other to make a movement on each axis (composite control).

By applying a move command for an axis (master axis) to a different arbitrary axis (slave axis), the movements on the two axes can be synchronized with each other. Whether to synchronize the movement on a slave axis with the move command for the master axis or make a movement on a slave according to the command for the slave can be chosen using the signal (synchronous control selection signal) from the PMC.

A move command for an arbitrary axis of one path and a move command for an arbitrary axis of another path can be exchanged with each other to make a movement on each axis.

Benefits

- Increase of machine efficiency and productivity
- Speed up programming and CNC commissioning
- Easier and faster programming
- Allows complex commands and synchronization between paths

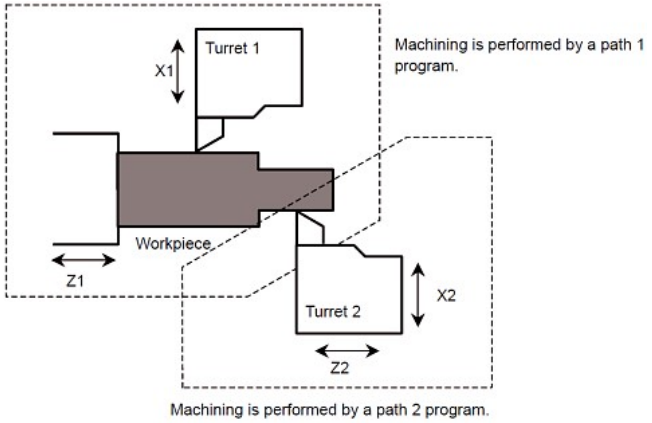
Ordering Information

Specification	Description
A02B-0372-S816	501iS-A Synchronous / Composite Control
A02B-0373-S816	501i-A Synchronous / Composite Control
A02B-0374-S816	502iS-A Synchronous / Composite Control
A02B-0375-S816	502i-A Synchronous / Composite Control
A02B-0377-S816	503i-A Synchronous / Composite Control

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

029
Controlled Axis



Superimposed Control

Features

Superimposed Control enables the travel distance on an arbitrary axis of one path to be superimposed on the travel distance on an arbitrary axis of another path. In multi-path control, usually, movements are made on the axes of path 1 according to a move command for path 1, and movements are made on the axes of path 2 according to a move command for path 2 (independent control in each path).

Superimposed control is very similar to synchronous control. In superimposed control however, a movement on the slave axis can be specified with a command for the path to which the slave axis belongs. The master axis and slave axis may belong to the same path, or the master axis may belong to one axis and the slave axis may belong to another. Moreover, multiple slave axes can be specified for one master axis. WIth the help of parameter settings, the move directions on the master axis and slave axis can be reversed from each other.

Example: in the image a move command for the Z1 axis of path 1 is superimposed on the travel distance on the Z2 axis of path 2.

Benefits

- Increase of machine efficiency and productivity
- Speed up programming and CNC commissioning
- Complex motion commands are easier and faster to programm

Ordering Information

Specification	Description
A02B-0372-S818	501iS-A Superimposed Control
A02B-0373-S818	501i-A Superimposed Control
A02B-0374-S818	502iS-A Superimposed Control
A02B-0375-S818	502i-A Superimposed Control
A02B-0377-S818	503i-A Superimposed Control

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

030

Controlled Axis

Synchronous, Composite and Superimposed Control by Program Command

Features

The Synchronous, Composite and Superimposed Control function can be started or canceled using G-codes in the part program instead of being activated through digital input signals.
It is also possible to perform these controls using digital input signals in addition.

Example

- G51.4 P_ Q_ (L_); Start synchronous control
- G50.4 Q_ ; Cancel synchronous control
- G51.5 P_ Q_ ; Start composite control
- G50.5 P_ Q_ ; Cancel composite control
- G51.6 P_ Q_ ; Start superimposed control
- G50.6 Q_ ; Cancel superimposed control

Benefits

- Flexibility of the machine configuration
- Behaviour change without writing a specific PMC program
- Compatibility with Series 16i function

Ordering Information

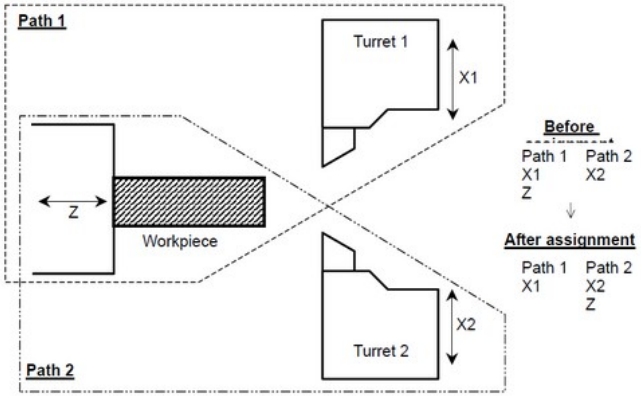
Specification	Description
A02B-0372-S890	501iS-A Synchronous, Composite and Superimposed Conrol by Program Command
A02B-0373-S890	501i-A Synchronous, Composite and Superimposed Conrol by Program Command
A02B-0374-S890	502iS-A Synchronous, Composite and Superimposed Conrol by Program Command
A02B-0375-S890	502i-A Synchronous, Composite and Superimposed Conrol by Program Command
A02B-0377-S890	503i-A Synchronous, Composite and Superimposed Conrol by Program Command

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

031

Controlled Axis



Flexible Path Axis Assignment

Features

The Flexible Path Axis Assignment function enables to disconnect each control axis from the control of each path and to assign the axis as a controlled axis to other path.

When using this function, an axis can be controlled in multiple paths.

The use of a dummy axis as intermediate is not required when using this function, as axis configuration can be changed directly.

Benefits

- High flexibility of the machine configuration and axis usage
- Increase of machine efficiency and productivity
- Speed up programming and CNC commissioning

Ordering Information

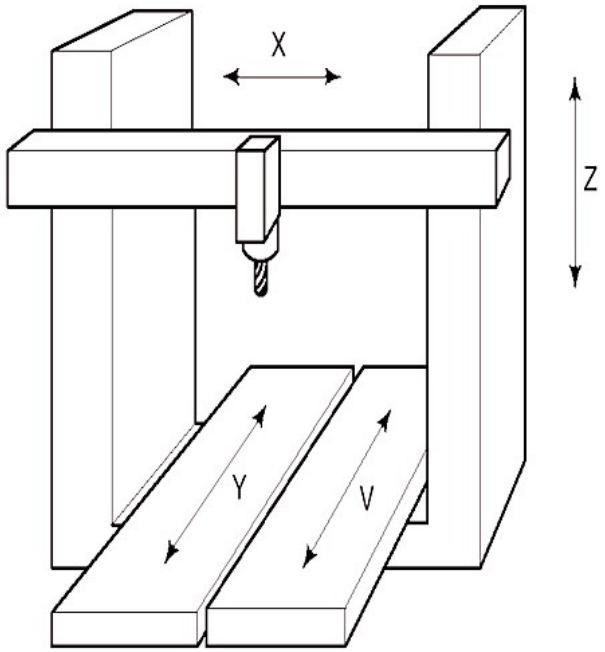
Specification	Description
A02B-0372-R607	501iS-A Flexible Path Axis Assignment
A02B-0373-R607	501i-A Flexible Path Axis Assignment
A02B-0374-R607	502iS-A Flexible Path Axis Assignment
A02B-0375-R607	502i-A Flexible Path Axis Assignment
A02B-0377-R607	503i-A Flexible Path Axis Assignment

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

032

Controlled Axis



Axis Synchronous Control

Features

The Axis Synchronous function allows up to 4 master/slave servo motor pairs to perform synchronized motion. This feature is typically used on gantry or split table axes.

This function is a basic function in FANUC Series 0i-F Plus (Type 0, Type 1).

Benefits

- Machining of large work piece
- Each table can also be independently or synchronized controlled during normal operation
- Up to four axis can be synchronously controlled

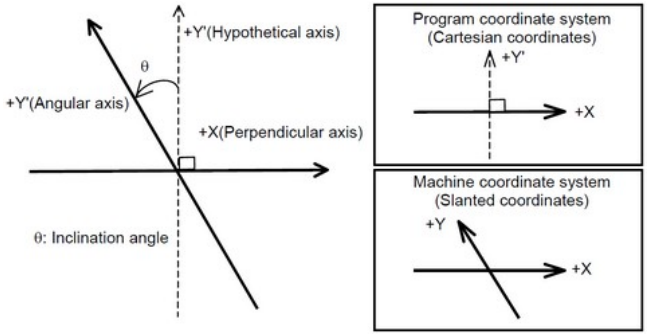
Ordering Information

Specification	Description
A02B-0372-J843	501iS-A Axis Synchronous Control
A02B-0373-J843	501i-A Axis Synchronous Control
A02B-0374-J843	502iS-A Axis Synchronous Control
A02B-0375-J843	502i-A Axis Synchronous Control
A02B-0377-J843	503i-A Axis Synchronous Control

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

033
Controlled Axis



Arbitrary Angular Axis Control

Features

When the angular axis installed makes an angle other than 90° with the perpendicular axis, the angular axis control function can control the distance traveled along each axis according to the inclination angle, as if the angular axis makes and angle of 90° with the perpendicular axis.

Arbitrary axes can be specified as a set of an angular axis and perpendicular axis by parameter setting. The actual distance traveled is controlled according to an inclination angle. However, a program, when created, assumes that the angular axis and perpendicular axis intersect at right angles.

Benefits

- Increase machine efficiency and productivity
- Simplified programming of the machining cycles
- Speeds up CNC and machine commissioning

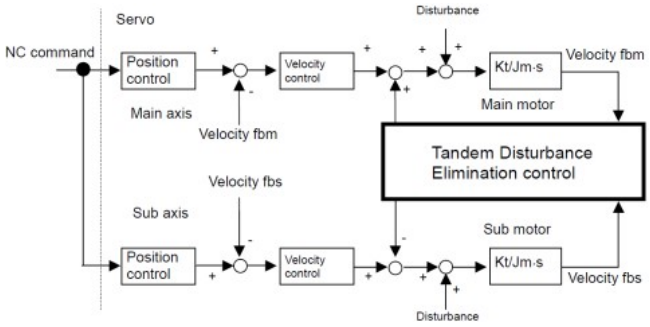
Ordering Information

Specification	Description
A02B-0372-J924	501iS-A Arbitrary Angular Axis Control
A02B-0373-J924	501i-A Arbitrary Angular Axis Control
A02B-0374-J924	502iS-A Arbitrary Angular Axis Control
A02B-0375-J924	502i-A Arbitrary Angular Axis Control
A02B-0377-J924	503i-A Arbitrary Angular Axis Control

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

034
Controlled Axis



Tandem Disturbance Elimination Control

Features

This function suppresses vibration caused by interferences between the main axis and the sub-axis in a position tandem control (feed axis synchronization).

Note

The axis synchronous control function is required.

Benefits

- Simple and effective implementation of vibration suppression on a tandem machine
- Increase machining quality, efficiency and productivity

Ordering Information

Specification	Description
A02B-0372-S660	501iS-A Tandem Disturbance Elimination Control
A02B-0373-S660	501i-A Tandem Disturbance Elimination Control
A02B-0374-S660	502iS-A Tandem Disturbance Elimination Control
A02B-0375-S660	502i-A Tandem Disturbance Elimination Control
A02B-0377-S660	503i-A Tandem Disturbance Elimination Control

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

035

Controlled Axis

Control Axis Detach

Features

With the Controlled Axes Detach function, an entire axis, including servo motor and feedback, can be "detached" or disabled from the machine and the control system without creating any alarm.

This function is a basic function in FANUC Series 0i-F Plus (Type 0, 1 and 3).

Benefits

- Typically used for fourth axis such as rotary table, right angle head
- Easy to implement a plug and play solution without operator intervention with the machine controller
- Position display shows the attached axis positions
- Easy to use for production adaptability and flexibility

Ordering Information

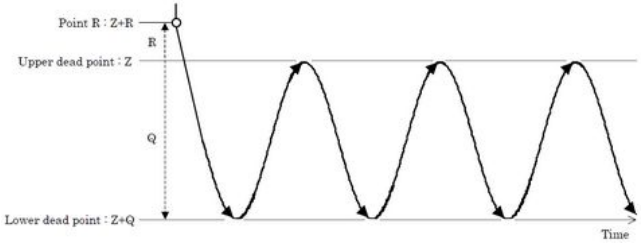
Specification	Description
A02B-0372-J807	501iS-A Control Axis Detach
A02B-0373-J807	501i-A Control Axis Detach
A02B-0374-J807	502iS-A Control Axis Detach
A02B-0375-J807	502i-A Control Axis Detach
A02B-0377-J807	503i-A Control Axis Detach

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

036

Controlled Axis



High-Precision Oscillation Function

Features

In this function, the feedrate of an oscillation axis (equivalent to a chopping axis that is moved vertically and repeatedly for grinding) changes along a sine curve.

This function is effective to improve the accuracy of movement between upper dead point and lower dead point.

In addition, the look-ahead feed forward function can be used with oscillation motion; in this case a higher accuracy can be achieved even if the oscillation feedrate or the upper or lower dead point are changed.

Benefits

- Simplification of the programming
- Increase of the precision and productivity of the machine

Ordering Information

Specification	Description
A02B-0372-R662	501iS-A High Precision Oscillation Function
A02B-0373-R662	501i-A High Precision Oscillation Function
A02B-0374-R662	502iS-A High Precision Oscillation Function
A02B-0375-R662	502i-A High Precision Oscillation Function
A02B-0377-R662	503i-A High Precision Oscillation Function

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

037
Controlled Axis

PMC Axis Control - Acceleration/Deceleration Specification Feed

Features

The PMC Axis Control - Acceleration/Deceleration Specification Feed function allows to specify the acceleration and the deceleration of an PMC-controlled axis motion independently.

The Axis Control by PMC function is necessary to use this function.

Benefits

- Extends the application range of the Axis Control by PMC function

Ordering Information

Specification	Description
A02B-0372-R640	501iS-A PMC Axis Control Acceleration / Deceleration Specification Feed
A02B-0373-R640	501i-A PMC Axis Control Acceleration / Deceleration Specification Feed
A02B-0374-R640	502iS-A PMC Axis Control Acceleration / Deceleration Specification Feed
A02B-0375-R640	502i-A PMC Axis Control Acceleration / Deceleration Specification Feed
A02B-0377-R640	503i-A PMC Axis Control Acceleration / Deceleration Specification Feed

038
Controlled Axis

Increment System D

Features

The Increment System D allows programming to 0.00001mm or 0.000001 inches or 0.00001 degrees.

Ordering Information

Specification	Description
A02B-0372-S694	501iS-A Increment System D
A02B-0373-S694	501i-A Increment System D
A02B-0374-S694	502iS-A Increment System D
A02B-0375-S694	502i-A Increment System D
A02B-0377-S694	503i-A Increment System D

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

039
Controlled Axis

Increment System E

Features
The Increment System E allows programming to 0.000001mm or 0.0000001 inches or 0.000001 degrees.

Ordering Information

Specification	Description
A02B-0372-S805	501iS-A Increment System E
A02B-0373-S805	501i-A Increment System E
A02B-0374-S805	502iS-A Increment System E
A02B-0375-S805	502i-A Increment System E
A02B-0377-S805	503i-A Increment System E

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

040

Controlled Axis

Arbitrary Command Multiply

Features

The Arbitrary Command Multiply function provides the flexibility to set the gearing between the position feedback device and the motor for a given axis.

When the detection unit assumes a special value, an arbitrary command multiply can be set using a ratio of n:m. The setting range is 1/9999 to 9999/1.

Benefits

- Increase of the flexibility and adpatation of the CNC to the machine structure
- Speeds up CNC and machine design and commissioning

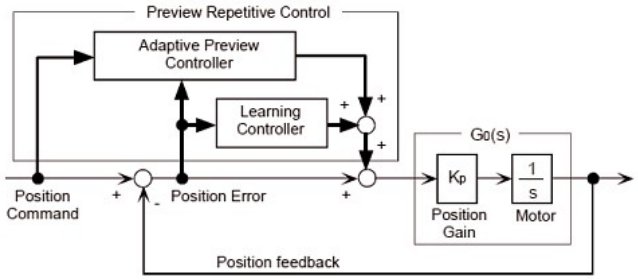
Ordering Information

Specification	Description
A02B-0372-S806	501iS-A Arbitrary Command Multiply
A02B-0373-S806	501i-A Arbitrary Command Multiply
A02B-0374-S806	502iS-A Arbitrary Command Multiply
A02B-0375-S806	502i-A Arbitrary Command Multiply
A02B-0377-S806	503i-A Arbitrary Command Multiply

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

041
Controlled Axis



High-Precision Learning Control A

Features

The High-Precision Learning Control A function (formerly Preview Repetitive Control) is a function designed to allow high-speed and high-precision cutting by recovering previously saved cutting data from memory and utilizing that data during production for optimization purpose.

High-Precision Learning Control A, is used to increase the speed and accuracy of machining high volume parts.

Before employing this function in production, the axes involved in the prescribed machining operation must first be "taught" the desired path movements and related cutting data. This data is stored in memory and recovered for use as a template during production.

Compared to High-Precision Learning Control B (formerly Learning Control), this function reduces also the Following Error of the first cycle while using advanced previewing functionality of the control.

This function is ideal for camshaft grinding, crankshaft pin grinding, piston lathes or aspherical lens cutting applications.

Benefits

- Increased speed and accuracy when machining high volume parts
- Higher accuracy than the High-Precision Learning Control B function as it reduces the position error much faster
- Replaces an expensive mechanical cam with an electronic template that causes the axes to follow a virtual cam

Ordering Information

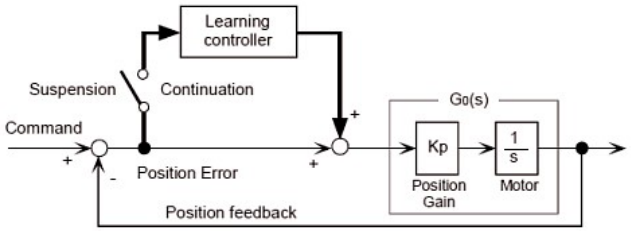
Specification	Description
A02B-0372-J706	501iS-A High Precision Learning Control A
A02B-0373-J706	501i-A High Precision Learning Control A
A02B-0374-J706	502iS-A High Precision Learning Control A
A02B-0375-J706	502i-A High Precision Learning Control A

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

042

Controlled Axis



High-Precision Learning Control B

Features

The High-Precision Learning Control B function (formerly Learning Control) is a function designed to allow high-speed and high-precision cutting by recovering previously saved cutting data from memory and utilizing that data during production. The CNC works to eliminate the position error in the live cutting path versus the memorized data.

Before employing this function in production, the axes involved in the prescribed machining operation must first be "taught" the desired path movements and related cutting data. These are then stored in memory and recovered for use as a template during production.

Compared to the High-Precision Learning Function A, the High-Precision Learning Function B does not feature the Advanced Preview Control

This function is ideal for camshaft grinding, crankshaft pin grinding, piston lathes or aspherical lens cutting applications.

Benefits

- Learning Control is used to increase the speed and accuracy of machining high volume parts.
- Replace an expensive mechanical cam with an electronic template that causes the axes to follow a virtual cam.

Ordering Information

Specification	Description
A02B-0372-J705	501iS-A High Precision Learning Control B
A02B-0373-J705	501i-A High Precision Learning Control B
A02B-0374-J705	502iS-A High Precision Learning Control B
A02B-0375-J705	502i-A High Precision Learning Control B

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

043

Controlled Axis

High-Precision Learning Control C

Features

The High-Precision Learning Control C function (formerly Compact Learning Control) is a subset function of the High-Precision Learning Control B. It can be implemented on standard servo axis cards instead of the servo axes card with large memory (L24 servo cards).

This function provides an angle-base learning control for compact application without handling learning data.

The High-Precision Learning Control C function can be used for applications such as gear grinding, gear cutting and shaping as well as to control grinder oscillation.

Benefits

- Learning Control increases the speed and accuracy of the machining when producing parts in high volume.

Ordering Information

Specification	Description
A02B-0372-R692	501iS-A High Precision Learning Control C
A02B-0373-R692	501i-A High Precision Learning Control C
A02B-0374-R692	502iS-A High Precision Learning Control C
A02B-0375-R692	502i-A High Precision Learning Control C

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

044

Controlled Axis

Spindle Learning Control

Features

The Spindle Learning Control function is used to increase the speed and accuracy of machining high volume parts.

This function works like the servo-based Learning Control, except that the spindle control loop applies to the compensation mechanism instead of the servo control loop.

Notes

- A special software is required in the spindle amplifier
- The Cs Contouring Control function is required in the CNC

Benefits

- Increase the speed and accuracy of machining high volume parts

Ordering Information

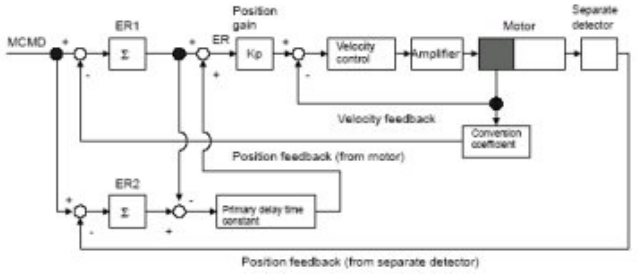
Specification	Description
A02B-0372-S635	501iS-A Spindle Learning Control
A02B-0373-S635	501i-A Spindle Learning Control
A02B-0374-S635	502iS-A Spindle Learning Control
A02B-0375-S635	502i-A Spindle Learning Control

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

045

Controlled Axis



Dual Position Feedback

Features

In general, a machine with a large load inertia ratio or with a large backlash may operate stably with a semi-closed loop (motor feedback only) but may vibrate with a closed loop (separate encoder feedback).

The Dual Position Feedback function improves the control in such a way that a machine can operate stably with a closed loop as it would in the case of a semi-closed loop.

Benefits

- Increase machine stability and precision

Ordering Information

Specification	Description
A02B-0372-J704	501iS-A Dual Position Feedback
A02B-0373-J704	501i-A Dual Position Feedback
A02B-0374-J704	502iS-A Dual Position Feedback
A02B-0375-J704	502i-A Dual Position Feedback
A02B-0377-J704	503i-A Dual Position Feedback

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

046

Controlled Axis

Position Feedback Dynamic Switching Function

Features

The Position Feedback Dynamic Switching function used when a single rotary table with turning capability (hereafter called a rotary table) is controlled by two different operations such as one turning operation and one milling operation.

In case of a turning operation, the rotary table is turned by a spindle motor and a separate position detector.

In case of a milling operation, the rotary table is rotated by a servo motor and a built-in pulse coder.

This function enables the management of the coordinate of the rotary axis even if the position detector is switched. According to the state of control, the position feedback of the rotary axis is dynamically switched between the separate position detector attached with a rotary table and the built-in pulse coder of servo motor using PMC signals.

Benefits

- Flexible configuration of machines
- Simpler control of advanced mill-turn machine architectures

Ordering Information

Specification	Description
A02B-0372-S747	501iS-A Position Feedback Dynamic Switching
A02B-0373-S747	501i-A Position Feedback Dynamic Switching
A02B-0374-S747	502iS-A Position Feedback Dynamic Switching
A02B-0375-S747	502i-A Position Feedback Dynamic Switching
A02B-0377-S747	503i-A Position Feedback Dynamic Switching

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

047
Controlled Axis

Stored Stroke Check 1 Area Expansion

Features

With the Stored Stroke Check function included in the Basic Function of the CNC, it is possible to switch the 2 checking areas with Digital Input signals.

The Stored Stroke Check 1 Area Expansion function expands the checking areas from 2 to 8.

It is easy to change the stored stroke check area in case of changes of the machine moving area such as during tool changing or tool measuring.

Benefits

- Increase of the machine flexibility

Ordering Information

Specification	Description
A02B-0372-R552	501iS-A Stored Stroke Check 1 Area Expansion
A02B-0373-R552	501i-A Stored Stroke Check 1 Area Expansion
A02B-0374-R552	502iS-A Stored Stroke Check 1 Area Expansion
A02B-0375-R552	502i-A Stored Stroke Check 1 Area Expansion
A02B-0377-R552	503i-A Stored Stroke Check 1 Area Expansion

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

048

Controlled Axis

Stroke Limit Area Changing Function

Features

The Stroke Limit Area Changing function enables parameters setting that set the side boundary of the stroke limit during axis movement.

The setting of the parameters is available through the PMC window function (WINDW: SUB52), FOCAS2, and C language executor. The new forbidden area is enabled as soon as the writing parameters is completed.

Note

The Stroke Limit Area Changing function is disabled when automatic slave axis parameter setting on feed axis synchronization is enabled. In this case, the parameters can only be written when all axes are stopped.

Benefits

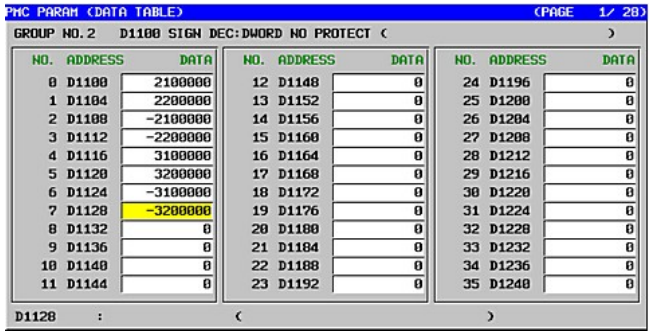
- The setting of the stroke limit can be customized, for instance through a specific HMI

Ordering Information

Specification	Description
A02B-0372-R585	501iS-A Stroke Limit Area Changing Function
A02B-0373-R585	501i-A Stroke Limit Area Changing Function
A02B-0374-R585	502iS-A Stroke Limit Area Changing Function
A02B-0375-R585	502i-A Stroke Limit Area Changing Function
A02B-0377-R585	503i-A Stroke Limit Area Changing Function

049

Controlled Axis



Stored Stroke Limit Range Switching Function by Signal

Features

With this function, the Range Stored Stroke Limit can be switched by an input signal of the PMC. It is then possible to set the limit easily.

The ranges are stored in data tables in the PMC and signals can be used for switching on and off the limits.

Benefits

- Simplified management of multiple zones directly from the PMC
- Protection of the machine and asset against destructive movements
- Overall improvement of the machine productivity

Ordering Information

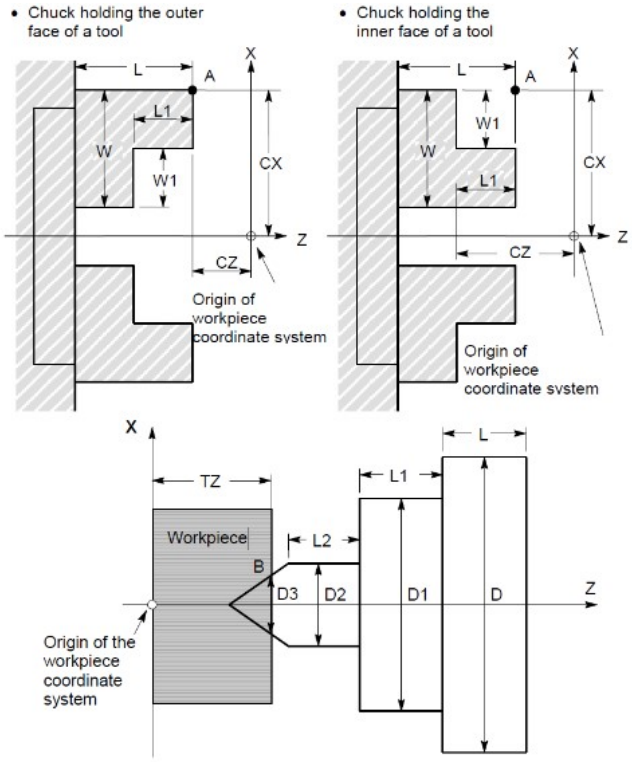
Specification	Description
A02B-0372-R849	501iS-A Stored Stroke Limit Range Switching Function by Signal
A02B-0373-R849	501iS-A Stored Stroke Limit Range Switching Function by Signal
A02B-0374-R849	502iS-A Stored Stroke Limit Range Switching Function by Signal
A02B-0375-R849	502i-A Stored Stroke Limit Range Switching Function by Signal
A02B-0377-R849	503i-A Stored Stroke Limit Range Switching Function by Signal

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

050

Controlled Axis



Chuck and Tail Stock Barrier

Features

The Chuck and Tail Stock Barrier function prevents damages to the machine by checking whether the tool tip interferes with either the chuck or tail stock.

This is realized when specifying an area into which the tool may not enter (entry-prohibition area). This is done using a special setting screen, according to the shapes of the chuck and tail stock.

If the tool tip would enter the set area during a machining operation, this function stops the tool and outputs an alarm message. The tool can be removed from the prohibited area only by retracting it in the direction from which the tool entered the area.

Note: when Stored Stroke Check 2 or 3 option and Chuck / Tail Stock Barrier option are used at the same time, the Chuck / Tail Stock Barrier option is valid and Stored Stroke Check 2 or 3 is ignored.

This function is a basic function in FANUC Series 0i-TF Plus (Type 0, 1 and 3).

Benefits

- Protection of the machine work space
- Protection against programming errors

Ordering Information

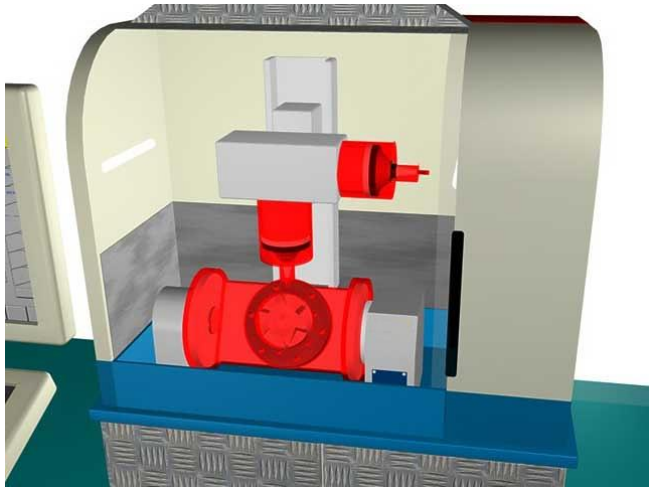
Specification	Description
A02B-0372-J720	501iS-A Chuck and Tail Stock Barrier
A02B-0373-J720	501i-A Chuck and Tail Stock Barrier
A02B-0374-J720	502iS-A Chuck and Tail Stock Barrier
A02B-0375-J720	502i-A Chuck and Tail Stock Barrier
A02B-0377-J720	503i-A Chuck and Tail Stock Barrier

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

051

Controlled Axis

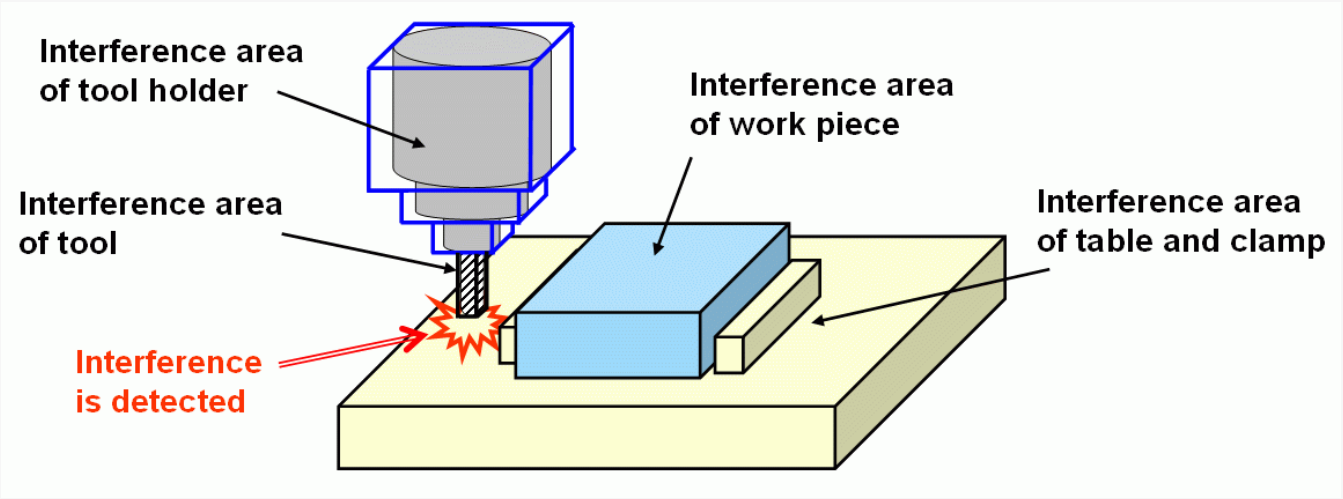


Built-In 3D Interference Check

Features

The 3D Interference Check function is an advanced anti collision function. The function is implemented directly into the CNC and has extremely rapid interference check in real time. The success in avoiding collisions is almost 100% - even when setting up or in manual mode. This function is available for both milling and turning machines and is particularly recommended for 5 axes machines or complex machines.

The critical working area of a machine can be emulated using geometric elements (planes, rectangular parallelepipedes and cylinders) that are defined using absolute dimensional data (to the micron) and work in conjunction with the programmed tool data taken from the normal CNC memory. The CNC will use this spatial data to determine whether any moving part of the machine may collide with fixed elements such as the table, fixtures and machine structure. All this occurs in realtime.



The collision can be checked by detecting the interference among machine parts such as tool, work-piece and table in three dimensional space in real time. This function is the measure for an expensive workpiece to be protected from being damaged. This function is also useful in manual operation, for example, for protection against malfunction during setup. Thus, the time required for setup can be reduced.

With the M series, the interference check targets include a tool, tool holder, workpiece, jig, and table. With the T series, the interference check targets include a single point tool + tip, tool post, workpiece, chuck, and spindle.

Key functions

- 3D Interference Check Among Objects Like Tool, Work Piece, Etc.

- Each Interference Area of Tool or Work Piece or Table, Etc. Consists of Rectangular Parallelepipeds
- The function is effective also with 5-axis Machining (Rotary Tool, Table, Etc.)
- The function is available in both Auto and Manual modes
- The function is embedded in the CNC Kernel (High-Speed CPU is required)
- Up to 4 paths are supported
- Easy definition of interference check figure on setting screen: each objects can be built up with up to 6 shapes (Parallelepipeds, Cylinders or Planes). The system provides database information for up to 150 Shapes, which can be arbitrary combined to built up to 10 registerable tool holder and 10 registerable objects
- Interference check figures can be switched by the Part Program
- Each tool specified by the Parts Program is automatically considered as rectangular parallelepiped or cylinder of the proper size
- Interference between tool and workpiece is checked in rapid traverse

The PC software "Built-in 3D Interference Check Setting Tool is available to create the shapes and the 3D model of the machine working zone, the tool, holders and workpieces. It can import 3D object from CAD-CAM systems as well as show the process in real-time when connected to the CNC over Ethernet.

Benefits

- **Near#Zero Collision Risk**
  Real#time 3D monitoring of tools, workpieces, fixtures, and machine structures helps prevent crashes before they occur. By protecting critical components and high#value parts, you avoid costly damage and preserve machine accuracy over the long term. This delivers stronger operational reliability and reduces unexpected expenses.
- **Shorter Setup and Changeover Time**
  The system validates movements during manual and automatic operation, allowing operators to set up confidently without trial#and#error. Visual 3D checks eliminate guesswork and reduce the time spent verifying clearances, positioning, and tool paths. As a result, you accelerate preparation for new jobs and increase machine availability.
- **Higher Productivity With No CNC Slowdown**
  Because the interference check is embedded directly in the CNC kernel, it operates at high speed without affecting machining cycle times. You gain continuous protection without sacrificing throughput or machine performance. This helps maximize output and keep production on schedule.
- **Flexible Protection for Complex Machining**
  The system supports multiple shapes, multiple axes, and up to four paths, making it ideal for 5#axis and multi#function machines. You can precisely model your tooling, holders, fixtures, and workpieces for accurate, application#specific protection. This flexibility improves process stability even in highly demanding machining environments.
- **Easy Configuration and Operator#Friendly Use**

Intuitive tools allow quick creation of interference geometry and straightforward management of machine#area models. Operators can adjust or expand monitoring zones as needed—even in manual mode—supporting safe operation for both experts and less experienced users. This reduces setup errors, improves training efficiency, and strengthens overall shop#floor safety.

Ordering Information

Specification	Description
A02B-0372-R541	501iS-A Built-in 3-D Interference Check
A02B-0373-R541	501i-A Built-in 3-D Interference Check
A02B-0374-R541	502iS-A Built-in 3-D Interference Check
A02B-0375-R541	502i-A Built-in 3-D Interference Check
A02B-0377-R541	503i-A Built-in 3-D Interference Check

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

054
Controlled Axis

3D Interference Check with PC Function

Features

3D Interference Check with PC Function is a set of FOCAS2 functions. These Functions enable a CAD system on a PC to use its 3D animation to check for interference between the actual machine motion and a structure such as the tool, the workpiece, or the table. If a potential interference is detected, the machine can be stopped immediately before a collision occurs.

Benefits

- Prevent damage and downtime caused by machine collisions

Ordering Information

Specification	Description
A02B-0372-R542	501iS-A 3-D Interference Check for CNC with PC Function
A02B-0373-R542	501i-A 3-D Interference Check for CNC with PC Function
A02B-0374-R542	502iS-A 3-D Interference Check for CNC with PC Function
A02B-0375-R542	502i-A 3-D Interference Check for CNC with PC Function
A02B-0377-R542	503i-A 3-D Interference Check for CNC with PC Function

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

055
Controlled Axis

Rotary Axis Control

Features

The Rotary Axis Control function controls a rotary axis as specified by an absolute command. With this function, the sign of the value specified in the command is interpreted as the direction of rotation, and the absolute value of the specified value is interpreted as the coordinates of the target end position.

This function is valid when rotary axis roll-over is enabled. If the parameter is set, an absolute command specified for the rollover rotary axis is interpreted as follows: the sign and absolute value of the value specified in the command represent the direction of rotation and the end position of movement respectively.

Benefits

- Simplifies the management of rotary axes

Ordering Information

Specification	Description
A02B-0372-J743	501iS-A Rotary Axis Control
A02B-0373-J743	501i-A Rotary Axis Control
A02B-0374-J743	502iS-A Rotary Axis Control
A02B-0375-J743	502i-A Rotary Axis Control
A02B-0377-J743	503i-A Rotary Axis Control

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

056

Controlled Axis

High-Speed Position Switch

Features

The High-Speed Position Switch function monitors the current position at shorter intervals than the normal position switch function to output a high-speed precise position switch signal.

In the same way as for the normal position switch function, it is possible to set parameters to specify arbitrary controlled axes and machine coordinate operating ranges for which position switch signals are output.

Up to 6 high-speed position signals can be output. Additional settings are available to to use up to 16 high-speed position switch signals.

Benefits

- A high-speed signal can be sent to the machine at certain positions to initiate automatic actions
- No hardware to adjust to change "trip" positions of up to 6 switches - Just change coordinate value in parameters
- Improves machine reliability by simplifying machine wiring

Ordering Information

Specification	Description
A02B-0372-J987	501iS-A High-Speed Position Switch
A02B-0373-J987	501i-A High-Speed Position Switch
A02B-0374-J987	502iS-A High-Speed Position Switch
A02B-0375-J987	502i-A High-Speed Position Switch
A02B-0377-J987	503i-A High-Speed Position Switch

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

057

Controlled Axis

Direction-Dependent Type of High-Speed Position Switch

Features

The High-Speed Position Switch function monitors the machine coordinates and move direction to output high-speed position switch signals to drive additional processes on the machine.

Two machine coordinates are monitored. When the tool passes through one coordinate in the specified direction, the high-speed position switch signal is set to 1. When it passes through the other coordinate in the specified direction, the signal is set to 0.

The output mode of high-speed position switch signals (normal type or direction-dependent type) is set using parameters.

Benefits

- A high-speed signal can be sent to the machine at certain positions to initiate automatic actions
- Actions can be set depending on the movement direction
- No hardware to adjust to change "trip" positions of the switches
- Improves machine reliability by simplifying machine wiring

Ordering Information

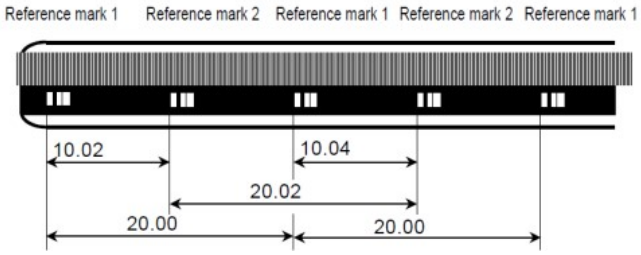
Specification	Description
A02B-0372-S721	501iS-A Direction-Dependent Type of High-Speed Position Switch
A02B-0373-S721	501i-A Direction-Dependant Type of High-Speed Position Switch
A02B-0374-S721	502iS-A Direction-Dependent Type of High-Speed Position Switch
A02B-0375-S721	502i-A Direction-Dependent Type of High-Speed Position Switch
A02B-0377-S721	503i-A Direction-Dependant Type of High-Speed Position Switch

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

058

Controlled Axis



Linear Scale Interface with Absolute Address Reference Mark

Features

With the Linear Scale Interface with Absolute Address (Distance Coded) Reference Mark function, an absolute position can be identified with a distance coded linear/rotary encoder.

For calculating the absolute position the axis must detect minimum 2 reference marks. In this case, a reference position can be established at any position of the axis by short distance movement.

A/B-phase Interface - Absolute Address Referenced Mark

- The encoder with Absolute Address Referenced Mark (A/B-phase) interface requires the SDU (Separate Detector Unit).
- The encoder is then used as separate feedback
- In this case a fully closed system is created

Serial type Interface - Distance Coded Reference Marks

- The encoder with Distance Coded Reference Marks and with sinusoidal 1Vpp interface requires the High Resolution Serial Output Circuit (type C)
- If the High Resolution Output Circuit is connected to the servo amplifier, then the encoder is used as motor feedback; in this case a semi-closed system is created
- If the High Resolution Output Circuit is connected to the SDU, then the encoder is used as separate feedback; in this case a fully closed system is created

Benefits

- Simplified integration of distance coded scales
- Increase of the precision of the machine tool

Ordering Information

Specification	Description
A02B-0372-J670	501iS-A Linear Scale Interface with Absolute Address Reference Mark

059

Specification	Description
A02B-0373-J670	501i-A Linear Scale Interface with Absolute Address Reference Mark
A02B-0374-J670	502iS-A Linear Scale Interface with Absolute Address Reference Mark
A02B-0375-J670	502i-A Linear Scale Interface with Absolute Address Reference Mark
A02B-0377-J670	503i-A Linear Scale Interface with Absolute Address Reference Mark

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

060

Controlled Axis

Linear Scale I/F Expansion with Absolute Address Reference Mark

Features

With the Linear Scale Interface Expansion with Absolute Address Reference Mark, a reference position can be established without executing the reference position return operation if a distance coded encoder is used. If a G00 command or a move command based on jog feed is specified, this function enables a reference mark interval measurement to be made automatically in order to establish a reference position.

The Linear Scale Interface with Absolute Address Reference Mark option is also neccessary to use this function.

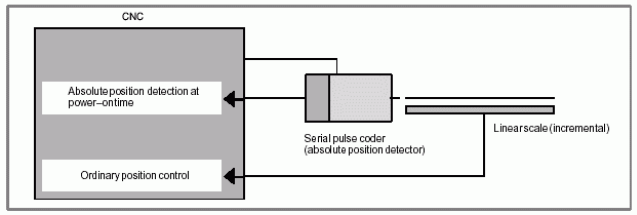
Benefits

- Simplified integration of distance coded scales
- Increase of the precision of the machine tool

Ordering Information

Specification	Description
A02B-0372-S730	501iS-A Linear Scale with Absolute Address Reference Mark Expansion
A02B-0373-S730	501i-A Linear Scale with Absolute Address Reference Mark Expansion
A02B-0374-S730	502iS-A Linear Scale with Absolute Address Reference Mark Expansion
A02B-0375-S730	502i-A Linear Scale with Absolute Address Reference Mark Expansion
A02B-0377-S730	503i-A Linear Scale with Absolute Address Reference Mark Expansion

061
Controlled Axis



System using tentative absolute coordinate system setting

Temporary Absolute Coordinate Setting

Features

In a full–closed system with a built–in absolute position detector (serial pulse coder) and incremental linear scale, a coordinate system can be set up using the absolute position data received from the built–in absolute position detector when the power is switched on.

After the startup procedure, the position control is carried out using the linear scale with incremental data.

Since the machine position obtained immediately after the power is switched on is tentative, obtaining the accurate machine position requires making a manual reference position return.

For safety reasons and before a reference position return is made, this function enables a stroke limit, although the machine position obtained when the power is switched on is approximate.

Note that this function does not substitute to the use of a real absolute detection system as the main position measurement remains incremental.

Benefits

- Provides a simplified startup procedure for incremental scales

Ordering Information

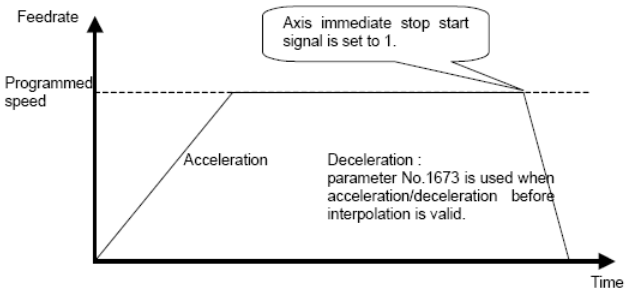
Specification	Description
A02B-0372-J786	501iS-A Temporary Absolute Coordinate Setting
A02B-0373-J786	501i-A Temporary Absolute Coordinate Setting
A02B-0374-J786	502iS-A Temporary Absolute Coordinate Setting
A02B-0375-J786	502i-A Temporary Absolute Coordinate Setting
A02B-0377-J786	503i-A Temporary Absolute Coordinate Setting

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

062

Controlled Axis



Axis Immediate Stop Function

Features

The Axis Immediate Stop function can be used to stop motors immediately during AI Contour Control and control the position at the same time.

This mode of operation can be required on certain machine where the immediate stop by emergency stop is not sufficient, for instance since it does not control position.

Procedure

- Change of acceleration / deceleration before interpolation in AI contour mode
- Feed axes stop
- Output of an alarm message

Notes

- AI Contour Control I (S807) or AI Contour Control II (S808) option is required.

This function cannot be performed to an axis under the the control with following functions.

- PMC axis control
- Chopping function
- Polygon turning
- EGB function
- Live tool control with servo motor
- Spindle control of Cs contouring control

Benefits

- Reduction of the stop distance by changing the acceleration rate of the acceleration/deceleration before interpolation
- The position control remains valid during a series of stop sequence
- Safer and controlled stop to protect the machine

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

063

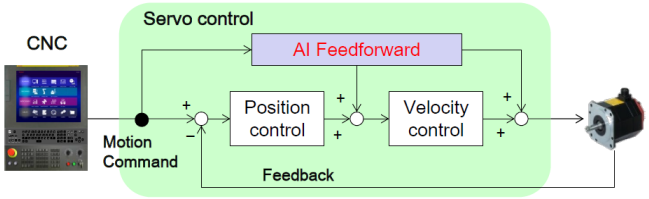
Ordering Information

Specification	Description
A02B-0372-R613	501iS-A Axis Immediate Stop Function
A02B-0373-R613	501i-A Axis Immediate Stop Function
A02B-0374-R613	502iS-A Axis Immediate Stop Function
A02B-0375-R613	502i-A Axis Immediate Stop Function
A02B-0377-R613	503i-A Axis Immediate Stop Function

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

064
Controlled Axis



AI Feedforward

Features

AI Feedforward is an advanced feedforward function for FANUC's servo control. It improves machining precision by minimizing contouring error and eliminating machine vibration. The parameters of AI Feedforward are automatically optimized according to the machine characteristic by Machine Learning with SERVO GUIDE. No expert knowledge is necessary to tune the AI Feedforward function. This greatly simplifies startup of the AI Feedforward function, reducing time to market and saving R&D resources.

Benefits

- Reduce time to market
- Save R&D resources
- Improve machine accuracy

Ordering Information

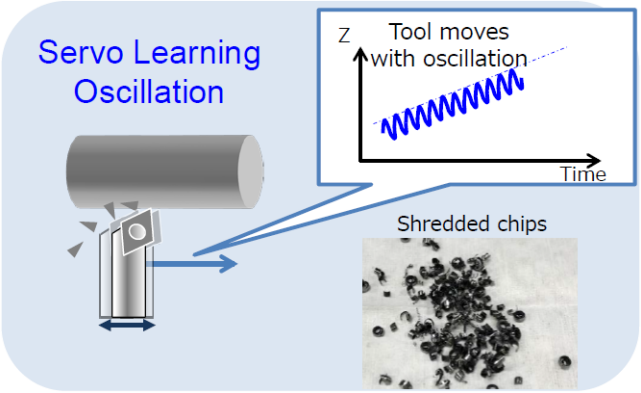
Specification	Description
A02B-0372-R368	501iS-A AI Feed Forward
A02B-0373-R368	501i-A AI Feed Forward
A02B-0374-R368	502iS-A AI Feed Forward
A02B-0375-R368	502i-A AI Feed Forward
A02B-0377-R368	503i-A AI Feed Forward

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

065

Controlled Axis



Servo Learning Oscillation

Features

Servo Learning Oscillation allows you perform oscillation cutting in turning applications. The function lets the tool oscillate along the cutting direction. By applying Servo Learning Control, this is done without compromising accuracy.

The oscillating tool produces small chips and avoids entanglement of large, twisted chips to the tool or workpiece. As you do not have to unwind the chips from the tool or workpiece, downtime is minimized. The disposal of the chips is simplified as well.

Benefits

- **Cleaner Cuts, Zero Chip Entanglement**
  Oscillating the tool along the cutting direction breaks chips into small, manageable pieces. This prevents long, twisted chips from wrapping around the tool or workpiece, eliminating unplanned stops and keeping production running smoothly. Shops gain a more stable process and fewer operator interventions.
- **Higher Productivity With Less Downtime**
  By avoiding chip buildup, machines can continue cutting without frequent pauses to remove tangled chips. This directly increases spindle uptime and shortens overall cycle times. Operators spend less time on manual clearing tasks, allowing them to focus on higher#value work.
- **Consistent Accuracy Under Tough Conditions**
  With Servo Learning Control, the tool's oscillation maintains precise positioning throughout the cutting process. This ensures dimensional accuracy even in demanding materials or deep#cut operations. The result is more reliable part quality and fewer rejects.
- **Improved Safety and Easier Handling**
  Small, broken chips are far safer to manage and significantly reduce the risk of operator injury from sharp, spiraled chips. Chip disposal becomes faster and more ergonomic, contributing to a cleaner, safer shop-floor environment. This improves compliance and lowers operational risk.
- **Better Tool and Machine Longevity**
  Preventing chip packing reduces heat, pressure, and vibration on the cutting edge and spindle area. Tools last longer and machine components experience less stress, lowering consumable costs and extending maintenance intervals. This improves total cost of ownership and strengthens long-term ROI.

Ordering Information

Specification	Description
A02B-0372-R162	501iS-A Servo Learning Oscillation (1 Axis)
A02B-0373-R162	501i-A Servo Learning Oscillation (1 Axis)
A02B-0374-R162	502iS-A Servo Learning Oscillation (1 Axis)

066

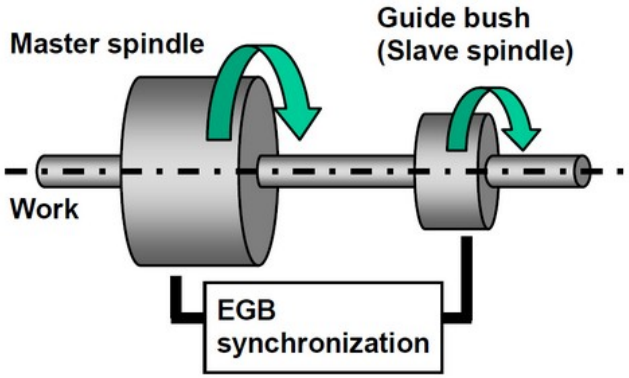
Specification	Description
A02B-0375-R162	502i-A Servo Learning Oscillation (1 Axis)
A02B-0377-R162	503i-A Servo Learning Oscillation (1 Axis)

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

067

Controlled Axis



Spindle Synchronous Control for Guide Bush

Features

In order to control an axis (slave spindle axis) to follow an axis (master spindle axis) synchronously between two spindle axes, the function “Spindle Electronic Gear Box” called “Spindle EGB” or “Simple spindle EGB” can be used. Both functions require Cs contour control to the slave axis.

With the “Spindle Synchronous Control for Guide Bush”, a similar functionality as for the Simple Spindle EGB can be realized WITHOUT using Cs contour control for the slave axis.

When this function is used, the additional control axis is not necessary because there is no Cs contour control axis.

Benefits

- Simplification of the implementation of spindle synchronization for a rotary guide bush

Ordering Information

Specification	Description
A02B-0372-R420	501iS-A Spindle Synchronous Control for Guide Bush
A02B-0373-R420	501i-A Spindle Synchronous Control for Guide Bush
A02B-0374-R420	502iS-A Spindle Synchronous Control for Guide Bush
A02B-0375-R420	502i-A Spindle Synchronous Control for Guide Bush
A02B-0377-R420	503i-A Spindle Synchronous Control for Guide Bush

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

068

Controlled Axis

Servo Learning Oscillation Multi-Turret Function

Features

Servo Learning Oscillation allows you perform oscillation cutting in turning applications. This option is an extension to Servo Learning Oscillation. The Servo Learning Oscillation Multi-Turret Function enables oscillation cutting to be performed on multiple turrets simultaneously.

Benefits

- Avoid entangled chips and minimize downtime
- Simplifies disposal of chips

Ordering Information

Specification	Description
A02B-0372-R088	501iS-A Servo Learning Oscillation with Multiple-Turrets
A02B-0373-R088	501i-A Servo Learning Oscillation with Multiple-Turrets
A02B-0374-R088	502iS-A Servo Learning Oscillation with Multiple-Turrets
A02B-0375-R088	502i-A Servo Learning Oscillation with Multiple-Turrets
A02B-0377-R088	503i-A Servo Learning Oscillation with Multiple-Turrets

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

069
Functions

Operation

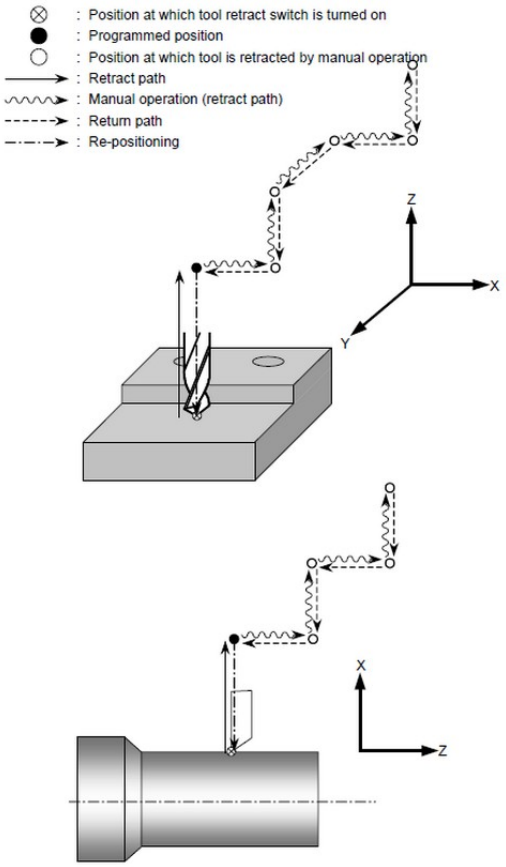
This section of the catalogue contains the functions related to operation or ease of operation of the CNC system.
The CNCs feature powerful functions for programming and/or operating the machine. Some of these functions are specifically designed for Turning Machines, some are for Machining Centers and some can be used in both applications.
Some of the operation functions detailed in the catalogue:

- Referencing
- Manual functions
- Assisted manual functions
- Program stop and restart
- Tool retract and recover
- 3-dimensional manual functions
- Etc.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

070
Operation



Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Tool Retract and Recover

Features

With the Tool Retract and Recover function the tool can be retracted from the workpiece when it is damaged, when it has to be replaced or when status of the machining has to be checked. The retraction position has to be specified with a program in advance. Afterwards the tool is returned to the workpiece and machining is restarted.

Example of sequence

1. When tool retraction signal is set during the execution of an automatic operation, the retraction is performed up to the retraction position specified in the program.
2. The operator switches to manual mode and moves the tool in manual operation (jog feed, incremental feed, handle feed and manual numeric command). Up to ten movement paths are automatically stored.
3. When the tool recovery signal is set, the tool automatically returns to the retraction position, moving backward along the paths along which it has moved with manual operations.
4. With cycle start, a recovery (repositioning) is performed up to the position at which the tool retraction signal was set.

Benefits

- Enables the operator to restart the program following an interruption such as a tool break or a tool change, or following cancellation of an emergency-stop
- Allows for safe restarting of the program when the machine has been left in an unknown state
- Reduction of time loss after tool break to restart operation

Ordering Information

Specification	Description
A02B-0372-J823	501iS-A Tool Retract and Recover
A02B-0373-J823	501i-A Tool Retract and Recover
A02B-0374-J823	502iS-A Tool Retract and Recover
A02B-0375-J823	502i-A Tool Retract and Recover
A02B-0377-J823	503i-A Tool Retract and Recover

071
Operation

Manual 2nd/3rd/4th Reference Position Return

Features

The Manual 2nd/3rd/4th Reference Position Return function enables the 2nd, 3rd or 4th reference position return by JOG feed operation in manual reference position return mode.

Benefits

- Simplifies operator intervention
- Improves machining productivity

Ordering Information

Specification	Description
A02B-0372-R558	501iS-A Manual 2nd / 3rd / 4th Reference Position Return Function
A02B-0373-R558	501i-A Manual 2nd / 3rd / 4th Reference Position Return Function
A02B-0374-R558	502iS-A Manual 2nd / 3rd / 4th Reference Position Return Function
A02B-0375-R558	502i-A Manual 2nd / 3rd / 4th Reference Position Return Function
A02B-0377-R558	503i-A Manual 2nd / 3rd / 4th Reference Position Return Function

072
Operation

Reference Point Setting with Mechanical Stopper for Feed Axis Synchronization Control

Features

This function enables the reference point setting with mechanical stopper method if the axis is under feed axis synchronization control. The reference point setting is performed to the master axis and the slave axis of the feed axis synchronization control.

Benefits

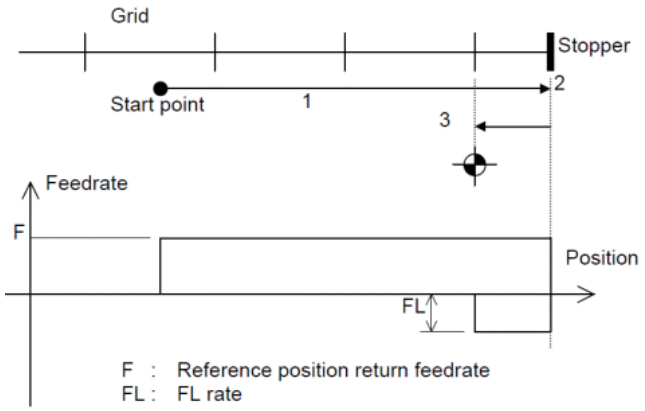
- Expand the application range of the reference point setting with mechanical stopper method

Ordering Information

Specification	Description
A02B-0372-R627	501iS-A Reference Position Setting with Mechanical Stopper for Axis Synchronous Control
A02B-0373-R627	501i-A Reference Position Setting with Mechanical Stopper for Axis Synchronous Control
A02B-0374-R627	502iS-A Reference Position Setting with Mechanical Stopper for Axis Synchronous Control
A02B-0375-R627	502i-A Reference Position Setting with Mechanical Stopper for Axis Synchronous Control
A02B-0377-R627	503i-A Reference Position Setting with Mechanical Stopper for Axis Synchronous Control

073
Operation

Reference Point Setting with Mechanical Stopper by Grid Method



Features

A reference position return for an axis can be made by pushing the axis against the mechanical stopper without using a limit switch or deceleration dog.

As this reference position setting uses a grid method, its precision is on the same level as for a manual reference position return.

Benefits

- Use with Absolute Pulse Encoders to quickly establish a reference point without slow-down switches

Ordering Information

Specification	Description
A02B-0372-S945	501iS-A Reference Position Setting with Mechanical Stopper by Grid Method
A02B-0373-S945	501i-A Reference Position Setting with Mechanical Stopper by Grid Method
A02B-0374-S945	502iS-A Reference Position Setting with Mechanical Stopper by Grid Method
A02B-0375-S945	502i-A Reference Position Setting with Mechanical Stopper by Grid Method
A02B-0377-S945	503i-A Reference Position Setting with Mechanical Stopper by Grid Method

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

074
Operation

Manual Handle Feed 4/5 Units

Features

The Manual Handle Feed 4/5-Units function allows the connection of up to two additional manual pulse generators for the Manual Handle Feed function.

Benefits

- Simplifies operator intervention
- Improves machining productivity

Ordering Information

Specification	Description
A02B-0372-S858	501iS-A Manual Handle Feed - 4 / 5 Units
A02B-0373-S858	501i-A Manual Handle Feed - 4 / 5 Units
A02B-0374-S858	502iS-A Manual Handle Feed - 4 / 5 Units
A02B-0375-S858	502i-A Manual Handle Feed - 4 / 5 Units
A02B-0377-S858	503i-A Manual Handle Feed - 4 / 5 Units

075
Operation

Manual Handle Feed - Multiple 10 Million

Features

With the Manual Handle Feed - Multiple 10 Million, machines using small least input increment such as IS-D and IS-E can obtain more amounts of the movement when using manual handle feed.

This function extends the magnification of feed amount on manual handle feed, up to 10 million times of least input increment per pulse.

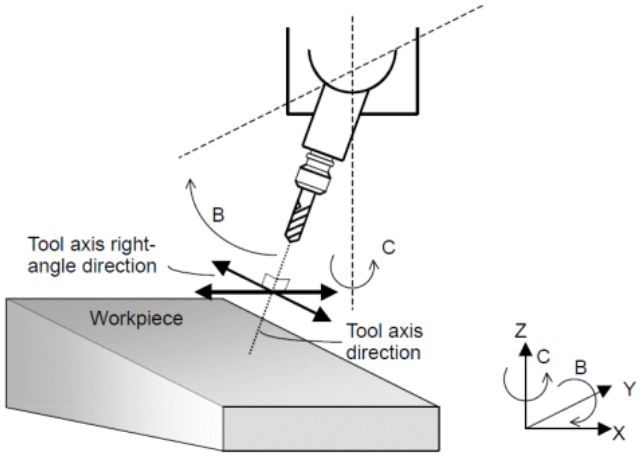
Benefits

- High-precision coasting movements in manual mode
- Improves precision

Ordering Information

Specification	Description
A02B-0372-R600	501iS-A Manual Handle Feed Multiple 10 Million
A02B-0373-R600	501i-A Manual Handle Feed Multiple 10 Million
A02B-0374-R600	502iS-A Manual Handle Feed Multiple 10 Million
A02B-0375-R600	502i-A Manual Handle Feed Multiple 10 Million
A02B-0377-R600	503i-A Manual Handle Feed Multiple 10 Million

076
Operation



3-Dimensional Manual Feed

Features

The function 3-Dimensional Manual Feed (previously Manual Handle Feed for 5-Axis Machining), allows the machine operator to retract the tool along its machining direction when pressing a button and even move the tool in parallel to the tilted working plane.

On a 3-axis machining process, it is realtively easy to move the Z-axis only to free the tool; on a 5-axis machining process, an smart solution such as the 3D Manual Feed function greatly helps the machine operator.

Benefits

- Manual intervention options in the event of emergencies, for example, after a tool break
- Simplifies operation of 5-axis machine manual movements relative to the machining plane or tool direction vector
- Perform setup and adjustments of part location on machines with rotary axes that tilt the workpiece or rotate the tooling axis vector
- Safely remove the tool from a part when operating in 5-axis mode
- Broken tool recovery
- Manually move a tool normal to the feature coordinate system
- Ability to retract a tool on a vector
- Consolidated package of 5-axis features related to Manual Handle Feed usage

Ordering Information

Specification	Description
A02B-0372-S679	501iS-A 3-Dimensional Manual Feed
A02B-0373-S679	501i-A 3-Dimensional Manual Feed
A02B-0374-S679	502iS-A 3-Dimensional Manual Feed
A02B-0375-S679	502i-A 3-Dimensional Manual Feed
A02B-0377-S679	503i-A 3-Dimensional Manual Feed

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

077
Operation

Reference Position Signal Output

Features

The Reference Position Signal Output function provides the capability for the CNC to output a signal to the PMC after the establishment of the reference position on each axis and when the coordinates in the machine coordinate system match the reference position.

In addition, if the coordinates in the machine coordinate system matches a second reference position, the function outputs an additional signal to the PMC.

Benefits

- Simplifies operator intervention
- Simplifies programming
- Improves machining productivity

Ordering Information

Specification	Description
A02B-0372-S629	501iS-A Reference Position Signal Output
A02B-0373-S629	501i-A Reference Position Signal Output
A02B-0374-S629	502iS-A Reference Position Signal Output
A02B-0375-S629	502i-A Reference Position Signal Output
A02B-0377-S629	503i-A Reference Position Signal Output

078
Operation

Active Block Cancel

Features

The Active Block Cancel function is used to cancel the executing block by a signal from the PMC, and to stop.
The distance remaining is cleared, and the execution is restarted from the next block of canceled block by cycle start.

Benefits

- Possibility to check the part program for a short time.
- Simplifies operator work
- Improves machining productivity

Ordering Information

Specification	Description
A02B-0372-S627	501iS-A Active Block Cancel
A02B-0373-S627	501i-A Active Block Cancel
A02B-0374-S627	502iS-A Active Block Cancel
A02B-0375-S627	502i-A Active Block Cancel
A02B-0377-S627	503i-A Active Block Cancel

079
Operation

Dwell / Auxiliary Function Time Override Function

Features

The Time Override Function for Dwell/Auxiliary Function applies override to the dwell and auxiliary (M/S/T/B) function in the range of 0% to 100% in steps of 1%.

If the override is applied to auxiliary (M/S/T/B) function, the next block is executed after a shortage of time. The actual processing time is considered to be 100%, and the shortage is calculated from the time.

Benefits

- Simplifies the operation of the machine
- Improves machining productivity

Ordering Information

Specification	Description
A02B-0372-R500	501iS-A Dwell / Auxiliary Function Time Override Function
A02B-0373-R500	501i-A Dwell / Auxiliary Function Time Override Function
A02B-0374-R500	502iS-A Dwell / Auxiliary Function Time Override Function
A02B-0375-R500	502i-A Dwell / Auxiliary Function Time Override Function
A02B-0377-R500	503i-A Dwell / Auxiliary Function Time Override Function

080
Operation

Pulse Superimposed Function

Features

The Pulse Superimposed Function enables pulse superimposed control in cutting mode that have been specified by the PMC in automatic operation mode (MDI operation, DNC operation, and memory operation) and in memory edit mode.

The maximum number of superimposed axes at the same time is two on each path (twice the number of paths in the entire system).

This function requires the following option:

- Manual handle interrupt
- Manual handle feed, 1 unit
- Manual handle feed, 2/3-units
- (or manual handle feed, 4/5-units)

Benefits

- Simplifies the operation of the machine
- Improves machining productivity

Ordering Information

Specification	Description
A02B-0372-R559	501iS-A Pulse Superimposed Function
A02B-0373-R559	501i-A Pulse Superimposed Function
A02B-0374-R559	502iS-A Pulse Superimposed Function
A02B-0375-R559	502i-A Pulse Superimposed Function
A02B-0377-R559	503i-A Pulse Superimposed Function

081
Functions

Interpolation Functions

This section of the catalogue contains the functions related to the interpolation capabilities and functions of the CNC system.

Interpolation functions control how the CNC will move the axes. Simple positioning, linear and circular interpolation are standard features of the controllers. Other forms of interpolation are optional and depend on the purpose of the machine tool. They can ease drastically the programming of complex geometric shapes, as well as optimize the part programs size and improve the accuracy of the machine.

Some of the interpolation functions detailed in the catalogue:

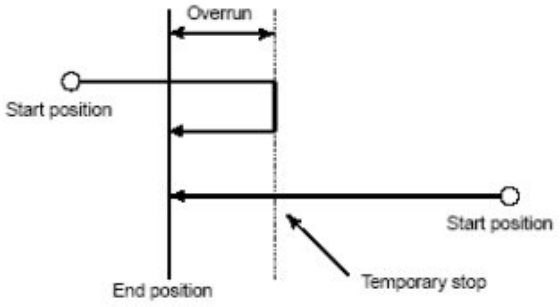
- Exponential Interpolation
- Polar Coordinate Interpolation
- Cylindrical Interpolation
- Helical Interpolation
- Involute Interpolation
- Hypothetical Axes Interpolation
- Conical/Spiral Interpolation
- Smooth Interpolation
- Nano Smoothing
- Thread cutting, synchronous cutting, complex threading
- NURBS Interpolation
- 3 Dimensional Circular Interpolation
- High-speed cutting
- Path Table Operation
- High-speed binary program operation
- Etc.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

082

Interpolation Functions



Single Direction Positioning

Features

When using the Single Direction Positioning function, the CNC automatically approaches specific locations always from the same direction.

Accurate positioning without backlash can be performed and final positioning from one direction is possible as well.

This function is a basic function in FANUC Series 0i-MF Plus.

Benefits

- Minimize backlash error by using unidirectional positioning
- Improves accuracy in bolt hole patterns with minimized backlash error

Ordering Information

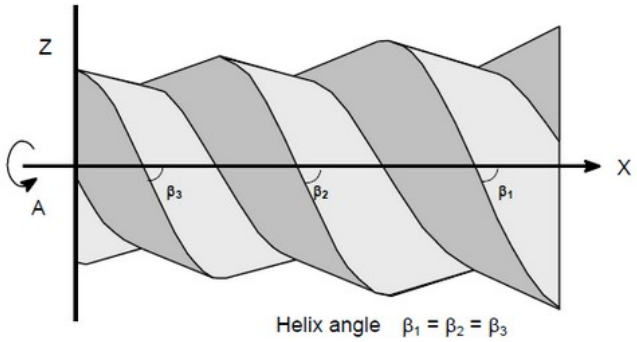
Specification	Description
A02B-0372-J812	501iS-A Single Direction Positioning
A02B-0373-J812	501i-A Single Direction Positioning
A02B-0374-J812	502iS-A Single Direction Positioning
A02B-0375-J812	502i-A Single Direction Positioning
A02B-0377-J812	503i-A Single Direction Positioning

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

083

Interpolation Functions



Exponential Interpolation

Features

The Exponential Interpolation function is used to coordinate linear and rotary axis movement.

Exponential interpolation exponentially changes the rotation of a workpiece with respect to movement on the rotary axis. Furthermore, exponential interpolation performs linear interpolation with respect to another axis.

This enables tapered groove machining with a constant helix angle (constant helix taper machining). This function is best suited for grooving and grinding tools such as taper end mills.

Benefits

- Adds special interpolation type to the CNC
- Provides interpolation specialized for grooving and grinding tools
- Improves overall machining productivity

Ordering Information

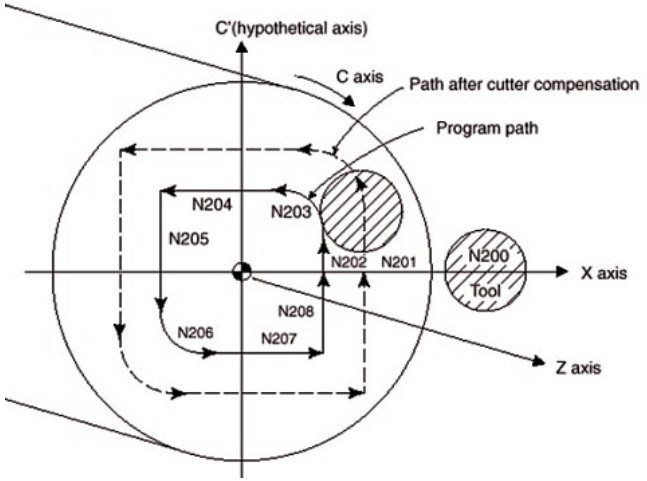
Specification	Description
A02B-0372-J711	501iS-A Exponential Interpolation
A02B-0373-J711	501i-A Exponential Interpolation
A02B-0374-J711	502iS-A Exponential Interpolation
A02B-0375-J711	502i-A Exponential Interpolation
A02B-0377-J711	503i-A Exponential Interpolation

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

084

Interpolation Functions



Polar Coordinate Interpolation

Features

The Polar Coordinate Interpolation function allows a designated pair of axes (one rotary and one linear) to be programmed like two linear axes.

The function converts a command programmed in the Cartesian coordinate system to the movement of a linear axis (movement of a tool) and the movement of a rotary axis (rotation of a workpiece).

Examples of use include cutting grooves in face side of rotary workpiece and grinding a camshaft.

This function is a basic function in FANUC Series 0i-TF Plus.

Benefits

- Simplifies programming when a linear movement and a rotational movement have to be coordinated.

Ordering Information

Specification	Description
A02B-0372-J815	501iS-A Polar Coordinate Interpolation
A02B-0373-J815	501i-A Polar Coordinate Interpolation
A02B-0374-J815	502iS-A Polar Coordinate Interpolation
A02B-0375-J815	502i-A Polar Coordinate Interpolation

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

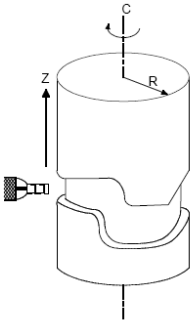
085

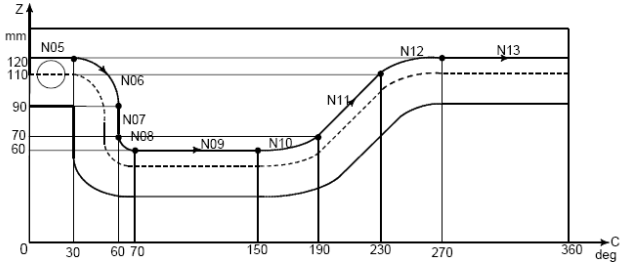
Interpolation Functions

Example of a cylindrical interpolation programs

```
O0001 (CYLINDRICAL INTERPOLATION);
N01 G00 G90 Z100.0 C0 ;
N02 G01 G91 G18 Z0 C0 ;
N03 G07.1 C57299 ;
N04 G90 G01 G42 Z120.0 D01 F250 ;
N05 C30.0 ;
N06 G03 Z90.0 C60.0 R30.0 ;
N07 G01 Z70.0 ;
N08 G02 Z60.0 C70.0 R10.0 ;
N09 G01 C150.0 ;
N10 G02 Z70.0 C190.0 R75.0 ;
N11 G01 Z110.0 C230.0 ;
N12 G03 Z120.0 C270.0 R75.0 ;
N13 G01 C360.0 ;
N14 G40 Z100.0 ;
N15 G07.1 C0 ;
N16 M30 ;
```

Note) Sample program where the C axis is parallel to the X-axis.





Cylindrical Interpolation

Features

The Cylindrical Interpolation function allows the programmer to program a shape on the surface of a cylinder, using linear and circular interpolation commands.

The programmer can visualize the surface of the cylinder being worked as if it had been rolled out on a flat plane.

This function is a basic function in FANUC Series 0i-MF Plus (Type 0, Type 1) and 0i-TF/LF Plus (all Types).

Benefits

- Simplifies programming for machining the curved surface of a cylinder.
- Programs such as those for grooving cylindrical cams can be easily created.

Ordering Information

Specification	Description
A02B-0372-J816	501iS-A Cylindrical Interpolation
A02B-0373-J816	501i-A Cylindrical Interpolation
A02B-0374-J816	502iS-A Cylindrical Interpolation
A02B-0375-J816	502i-A Cylindrical Interpolation
A02B-0377-J816	503i-A Cylindrical Interpolation

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

086

Interpolation Functions

Cylindrical Interpolation by Plane Distance Command

Features

Normally, a program command for the rotary axis in the cylindrical interpolation was given by rotary angle of the rotary axis.

The Cylindrical Interpolation by Plane Distance Command function enables a command for the rotary axis in the cylindrical interpolation by the cylindrical plane distance according to a parameter setting.

Benefits

- Provide an additional method of programming the cylindrical interpolation
- Increases the programming flexibility

Ordering Information

Specification	Description
A02B-0372-R578	501iS-A Cylindrical Interpolation by Plane Distance Command
A02B-0373-R578	501i-A Cylindrical Interpolation by Plane Distance Command
A02B-0374-R578	502iS-A Cylindrical Interpolation by Plane Distance Command
A02B-0375-R578	502i-A Cylindrical Interpolation by Plane Distance Command

087

Interpolation Functions

Helical Interpolation B

Features

Helical Interpolation B permits the programmer to command a move in which up to four axes are moved in a linear fashion at the same time as the basic two axes that are performing circular interpolation.

Benefits

- Provides additional methods to realize advanced helical cuts
- Increases the programming flexibility of the CNC

Ordering Information

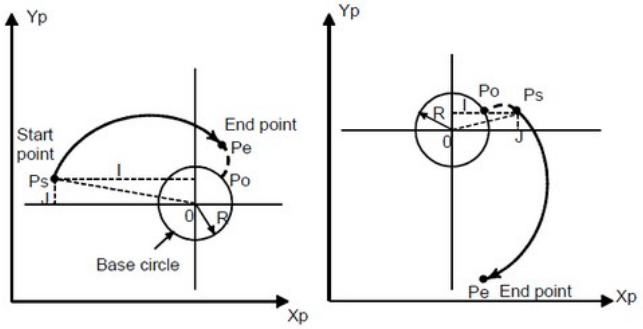
Specification	Description
A02B-0372-J655	501iS-A Helical Interpolation B
A02B-0374-J655	502iS-A Helical Interpolation B

Notice

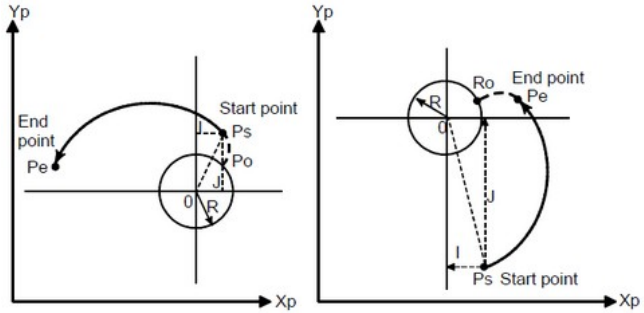
Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

088

Interpolation Functions



Clockwise involute interpolation (G02.2)



Counterclockwise involute interpolation (G03.2)

Involutes Interpolation

Features

The Involutes Interpolation function performs the machining of complex involute curves. Involute interpolation eliminates the need for approximating an involute curve with minute segments or arcs, and continuous pulse distribution is ensured even in high-speed operation of small blocks.

Accordingly, high-speed operation can be performed smoothly. Furthermore, machining programs can be created easily and efficiently, reducing the required length of program. Involutes interpolation is useful for tool grinding.

The Helical Involute Interpolation function performs on two axes involute interpolation and on up to four other axes linear interpolation simultaneously.

When using only "Helical Involute Interpolation (S853)", this function performs two axes involute interpolation and up to two other axes linear interpolation simultaneously.

To enable the function to perform two axes involute interpolation and more than three other axes linear interpolation simultaneously, Helical Interpolation B (J655) option is required.

Benefits

- Adds special interpolation type to the CNC
- Simplifies programming
- Improves overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J710	501iS-A Involute Interpolation
A02B-0373-J710	501i-A Involute Interpolation
A02B-0374-J710	502iS-A Involute Interpolation
A02B-0375-J710	502i-A Involute Interpolation
A02B-0377-J710	503i-A Involute Interpolation

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

089

Interpolation Functions

Helical Involute Interpolation

Features

The Helical Involute Interpolation function is similar to Involutes Interpolation in that it performs machining of complex involute curves. But in addition to 2 axes involute interpolation, up to 4 other linear axes can be interpolated simultaneously. If 3 or 4 linear axes are interpolated simultaneously, the Helical Interpolation B option is required additionally.

Benefits

- Adds special interpolation type to the CNC
- Simplifies programming
- Improves overall machining productivity

Ordering Information

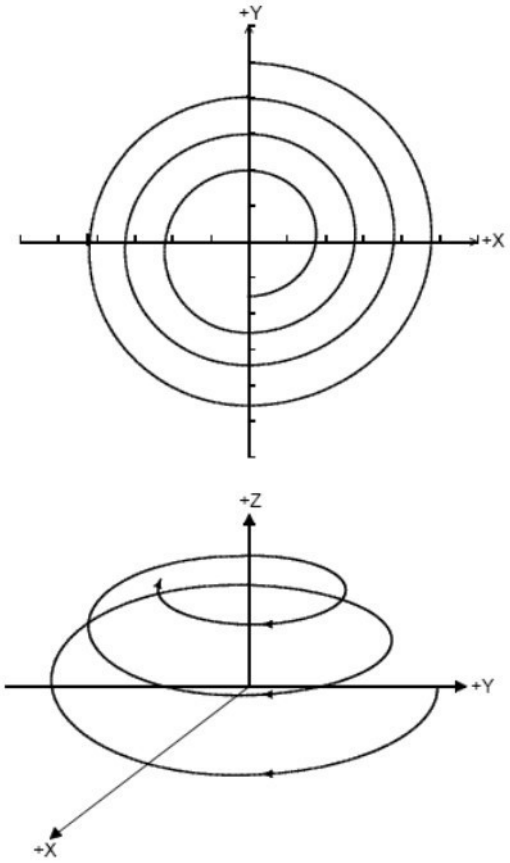
Specification	Description
A02B-0372-S853	501iS-A Helical Involute Interpolation
A02B-0373-S853	501i-A Helical Involute Interpolation
A02B-0374-S853	502iS-A Helical Involute Interpolation
A02B-0375-S853	502i-A Helical Involute Interpolation
A02B-0377-S853	503i-A Helical Involute Interpolation

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

090

Interpolation Functions



Conical/Spiral Interpolation

Features

The Conical/Spiral Interpolation function allows the CNC programmer to command, in a single block, a spiral move in a plane (two axes) or a conical move in three dimensions.

Benefits

- Simple command block for spiral interpolation.
- Simple command block for conical interpolation.
- Common command structure for conical/spiral interpolation.

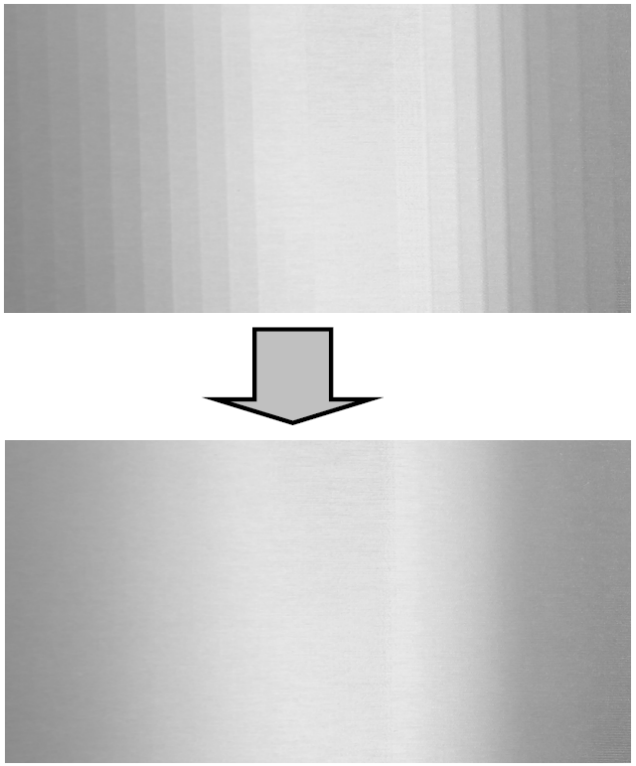
Ordering Information

Specification	Description
A02B-0372-J780	501iS-A Conical / Spiral Interpolation
A02B-0373-J780	501i-A Conical / Spiral Interpolation
A02B-0374-J780	502iS-A Conical / Spiral Interpolation
A02B-0375-J780	502i-A Conical / Spiral Interpolation
A02B-0377-J780	503i-A Conical / Spiral Interpolation

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

091
Interpolation Functions



Smooth Tolerance Control

Features

Smooth Tolerance+ Control improves the surface quality and accuracy of parts with free-form surfaces, which are often found in die/mold machining. Free-form surfaces are usually approximated by a sequence of multiple small linear elements. This leads to the undesired consequence that the transitions between linear blocks are visible on the surface of the workpiece after machining.

Smooth Tolerance+ Control has a sophisticated algorithm which converts a sequence of multiple small blocks automatically into a smooth curve which approximates that sequence within a given tolerance. This eliminates the surface artifacts and leads to a smoothly finished surface.

Smooth Tolerance+ Control detects corners in the path automatically. If a corner is detected, it is also converted into a smooth curve within a distinct tolerance. High-quality and high-precision machining is achieved with this feature.

Users can machine a workpiece that meets individual specifications by simply defining the two tolerances stated above. This saves time spent on fine-tuning the machined surface. Whether the path to be machined belongs to a free-form surface where a smooth finish is required, or to a corner where the priority is set on precision is determined automatically, meaning that both requirements ca be fulfilled simultaneously.

This function is a basic function in FANUC Series 0i-MF Plus (Type 0, 1 and 3) and 0i-LF Plus.

Benefits

- Enhance surface quality of machined parts
- Simplify fine-tuning of surface quality

Ordering Information

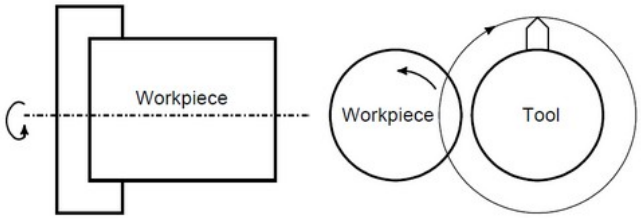
Specification	Description
A02B-0372-R696	501iS-A Smooth Tolerance+ Control
A02B-0373-R696	501i-A Smooth Tolerance+ Control
A02B-0374-R696	502iS-A Smooth Tolerance+ Control
A02B-0375-R696	502i-A Smooth Tolerance+ Control
A02B-0377-R696	503i-A Smooth Tolerance+ Control

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

092

Interpolation Functions



Polygon Turning

Features

The Polygon Turning function allows the programmer to machine (turn) a workpiece into a polygonal figure by rotating the workpiece (spindle axis) and tool (rotary tool axis) at a certain ratio.

This function is a basic function in FANUC Series 0i-TF Plus.

Benefits

- Provides the capability to machine square and / or hexagonal heads on bolts or hexagonal nuts.
- Simplifies programming
- Improves overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J817	501iS-A Polygon Turning
A02B-0373-J817	501i-A Polygon Turning
A02B-0374-J817	502iS-A Polygon Turning
A02B-0375-J817	502i-A Polygon Turning
A02B-0377-J817	503i-A Polygon Turning

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

093

Interpolation Functions

Polygon Machining with Two Spindles

Features

The Polygon Turning with Two Spindles function allows the programmer to machine (turn) a workpiece into a polygonal figure by rotating the workpiece and the tool at a certain ratio. Both axes must be spindle axes, each controlled by a Serial Spindle.

This function is a basic function in FANUC Series 0i-TF Plus (Type 0, Type 1).

Benefits

- Polygon Turning with Two Spindles is used for machining square and/or hexagonal heads on bolts, or for hexagonal nuts, where the two synchronized axes are spindle axes
- Important feature on lathes with mill-turn capability
- With a multiple path system, polygon turning is possible on each path

Ordering Information

Specification	Description
A02B-0372-J708	501iS-A Polygon Machining with 2 Spindles
A02B-0373-J708	501i-A Polygon Machining with 2 Spindles
A02B-0374-J708	502iS-A Polygon Machining with 2 Spindles
A02B-0375-J708	502i-A Polygon Machining with 2 Spindles
A02B-0377-J708	503i-A Polygon Machining with 2 Spindles

094

Interpolation Functions

Multi-Step Skip

Features

Multi-Step Skip, activated in a block by specifying P1 to P4 after G31, stores coordinates in a custom macro variable, when a skip signal, (4-point or 8-point; 8-point when a high-speed skip signal is used) is turned on.

In the block where Q1 to Q4 are specified after G04, dwell can be skipped when skip signals (four or eight signals, or eight signals when high-speed skip signals are used) are input. A skip signal from equipment such as a fixed-dimension measuring instrument can be used to skip programs being executed.

In plunge grinding, for example, a series of operations from rough machining to spark-out can be performed automatically by applying a skip signal each time rough machining, semi-fine machining, fine-machining, or spark-out operation is completed.

This function is a basic function in FANUC Series 0i-MF Plus.

Note

Multi-Step Skip requires the Custom Macro B option to be able to access the stored variables.

Benefits

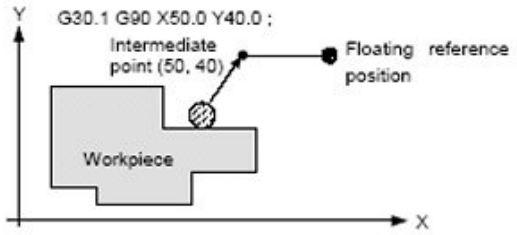
- Adds special skip functions to the CNC
- Simplifies programming
- Improves overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J849	501iS-A Multi-Step Skip
A02B-0373-J849	501i-A Multi-Step Skip
A02B-0374-J849	502iS-A Multi-Step Skip
A02B-0375-J849	502i-A Multi-Step Skip
A02B-0377-J849	503i-A Multi-Step Skip

095

Interpolation Functions



Floating Reference Position Return

Features

With the Floating Reference Position Return function, tools can be returned to the floating reference position.
A floating reference position is a position on a machine tool, and serves as a reference position for machine tool operation.
A floating reference position does not always need to be fixed, but can be moved as required.

Benefits

- Adds flexibility to the machine
- Simplifies programming
- Improves overall machining productivity

Ordering Information

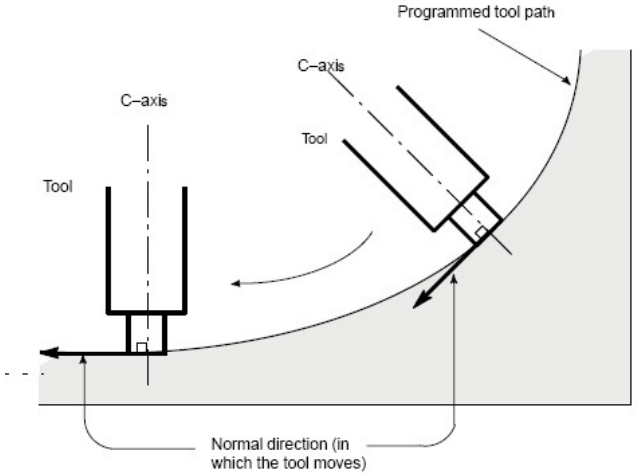
Specification	Description
A02B-0372-J831	501iS-A Float Reference Position Return
A02B-0373-J831	501i-A Float Reference Position Return
A02B-0374-J831	502iS-A Float Reference Position Return
A02B-0375-J831	502i-A Float Reference Position Return
A02B-0377-J831	503i-A Float Reference Position Return

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

096

Interpolation Functions



Normal Direction Control

Features

In the Normal Direction Control, the rotary axis (C axis) can be commanded so that the tool constantly faces the advancing workpiece and is always perpendicular to the plane of the workpiece during cutting.

This function is a basic function in FANUC Series 0i-MF Plus (Type 0, Type 1) and 0i-LF Plus.

Benefits

- Used on precision Jig Grinders to rotate the C Axis to keep it normal (perpendicular) to a position in the X-Y plane.

Ordering Information

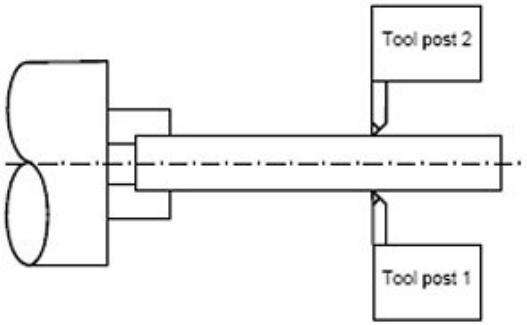
Specification	Description
A02B-0372-J813	501iS-A Normal Direction Control
A02B-0373-J813	501i-A Normal Direction Control
A02B-0374-J813	502iS-A Normal Direction Control
A02B-0375-J813	502i-A Normal Direction Control
A02B-0377-J813	503i-A Normal Direction Control

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

097

Interpolation Functions



Balanced Cutting

Features

The Balanced Cutting function can be used when machining a single part with two turrets at the same time.

If a thin workpiece needs to be machined a precision machining can be achieved by machining each side of the workpiece with a tool simultaneously; this function can prevent the workpiece from warpage that can result when only one side is machined at a time (see the figure below).

When both sides are machined at the same time, the movement of one tool must be in phase with that of the other tool. Otherwise, the workpiece can vibrate, resulting in poor machining. With this function, the movement of one tool post can be easily synchronized with that of the other tool post.

Benefits

- Adds special function to machine thin parts to the CNC
- Simplifies programming
- Improves overall machining productivity

Ordering Information

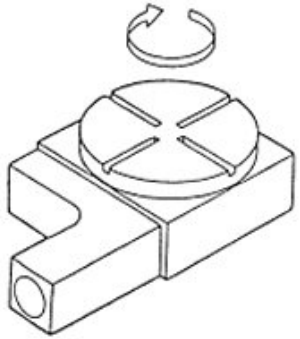
Specification	Description
A02B-0372-J834	501iS-A Balanced Cutting
A02B-0373-J834	501i-A Balanced Cutting
A02B-0374-J834	502iS-A Balanced Cutting
A02B-0375-J834	502i-A Balanced Cutting
A02B-0377-J834	503i-A Balanced Cutting

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

098

Interpolation Functions



Index Table Indexing

Features

The Table Indexing function can be used to control rotary axes that index between predefined locations. By specifying indexing positions (angles) for the indexing axis (one arbitrary axis), the index table of the machining center can be indexed.

It is not necessary to command the exclusive M code in order to clamp or unclamp the table, the CNC will automatically send signals to the PMC to do this, and therefore programming will be easier.

This function is a basic function in FANUC Series 0i-MF Plus (Type 0, 1 and 3).

Benefits

- Simplifies the integration of a rotary table in the machine
- Simplifies programming
- Improves overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J822	501iS-A Index Table Indexing
A02B-0373-J822	501i-A Index Table Indexing
A02B-0374-J822	502iS-A Index Table Indexing
A02B-0375-J822	502i-A Index Table Indexing
A02B-0377-J822	503i-A Index Table Indexing

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

099

Interpolation Functions

G31 P90 α__ F__

α__: Skip axis address and amount of travel
Only one axis can be specified. G31 is a one–shot G code.

Continuous High-Speed Skip

Features

The Continuous High–Speed Skip function enables the reading of absolute coordinates by using the high–speed skip signal.

Once a high–speed skip signal has been input in a G31 P90 block, the absolute coordinates are read into custom macro variables #5061 to #5068.

The input of a skip signal does not stop axial movement, thus enabling reading of the coordinates of two or more points. The rising and falling edges of the high–speed skip signal can be used as a trigger, depending on the parameter setting.

Benefits

- Adds advanced skip capabilities to the CNC
- Simplifies programming
- Improves overall machining productivity

Ordering Information

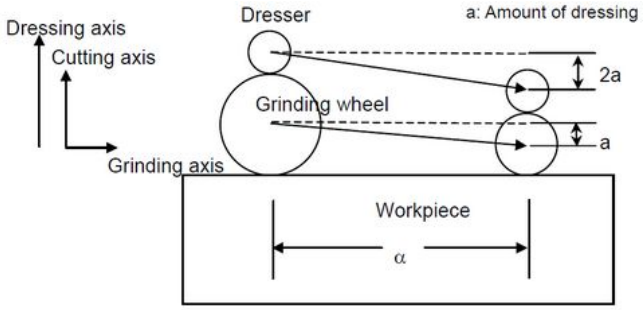
Specification	Description
A02B-0372-J770	501iS-A Continuous High-Speed Skip
A02B-0373-J770	501i-A Continuous High-Speed Skip
A02B-0374-J770	502iS-A Continuous High-Speed Skip
A02B-0375-J770	502i-A Continuous High-Speed Skip
A02B-0377-J770	503i-A Continuous High-Speed Skip

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

100

Interpolation Functions



Continuous Dressing

Features

The Continuous Dressing function allows continuous dressing during grinding canned cycles (G75, G77, G78, G79). Grinding and dresser cutting are compensated continuously according to the amount of continuous dressing set by parameters.

Benefits

- Automated production for large volume grinding
- Simplifies programming
- Improves overall machining productivity

Ordering Information

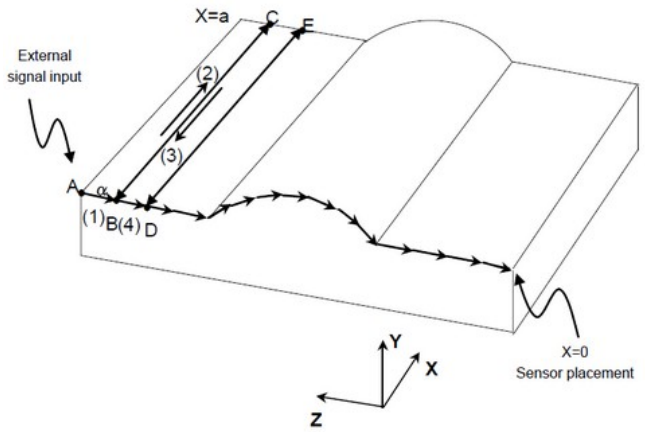
Specification	Description
A02B-0372-J630	501iS-A Continuous Dressing
A02B-0373-J630	501i-A Continuous Dressing
A02B-0374-J630	502iS-A Continuous Dressing
A02B-0375-J630	502i-A Continuous Dressing
A02B-0377-J630	503i-A Continuous Dressing

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

101

Interpolation Functions



Infeed Control

Features

The Infeed Control function can be used on grinding machines. Every time an external signal is input, the machine is moved by a fixed amount along the programmed profile in the specified Y-Z plane.

Benefits

- Automatically repeat cutting motion from an external signal such as push button from operator panel
- Simplifies programming
- Improves overall machining productivity

Ordering Information

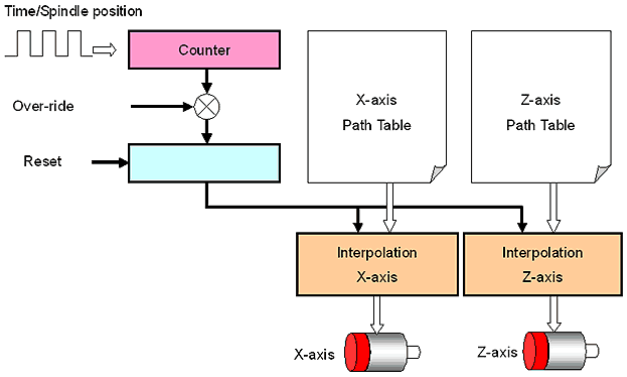
Specification	Description
A02B-0372-J631	501iS-A Infeed Control
A02B-0373-J631	501i-A Infeed Control
A02B-0374-J631	502iS-A Infeed Control
A02B-0375-J631	502i-A Infeed Control
A02B-0377-J631	503i-A Infeed Control

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

102

Interpolation Functions



Path Table Operation (PTO)

Features

The Path Table Operation function is an advanced machining method which interpolates each axis synchronized with the spindle, axis position or the time based on Tables.

It realizes free motions unbound from the NC program block, and can be used in applications such as swiss lathes or crankshaft pin-milling machines.

Benefits

- Adds advanced Path Table Operation function to the CNC
- Allows complex interpolations for advanced machining operations
- Provides a high surface quality on complex parts
- Improves overall machining productivity

Ordering Information

Specification	Description
A02B-0372-S886	501iS-A Path Table Operation
A02B-0373-S886	501i-A Path Table Operation
A02B-0374-S886	502iS-A Path Table Operation
A02B-0375-S886	502i-A Path Table Operation
A02B-0377-S886	503i-A Path Table Operation

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Tool Offset Function for Path Table Operation

Features

This function provides the capability to specify Tool Offset with the path table operation of X-axis, Z-axis and Y-axis.

The value of tool geometry offset and tool wear offset in total is compensated when both tool geometry offset number and tool wear offset number are specified. When one side of the tool geometry offset number or the tool wear offset number is specified, only the specified tool offset is done.

Benefits

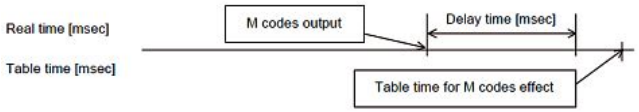
- Provides tool offset function to Path Table Operation
- Simplifies the programming
- Increases the productivity of the machine

Ordering Information

Specification	Description
A02B-0372-R524	501iS-A Path Table Operation Position Compensation
A02B-0373-R524	501i-A Path Table Operation Position Compensation
A02B-0374-R524	502iS-A Path Table Operation Position Compensation
A02B-0375-R524	502i-A Path Table Operation Position Compensation
A02B-0377-R524	503i-A Path Table Operation Position Compensation

104

Interpolation Functions



Delay Time Setting Function of Auxiliary Function Output for PTO

Features

The Path Table Operation can output M codes, based on the Auxiliary Function Table synchronized with the time, the axis position or the spindle position.

When the Auxiliary Function Table is synchronized with the time, the output of the M codes are realized in real-time since the M codes outputted can be commanded with a "Delay Time".

The Path Table Operation outputs M codes earlier compared to the table time which takes in consideration the "Delay Time". Three M-codes can be output at once. The ordered M code is outputted according to each delay time.

Benefits

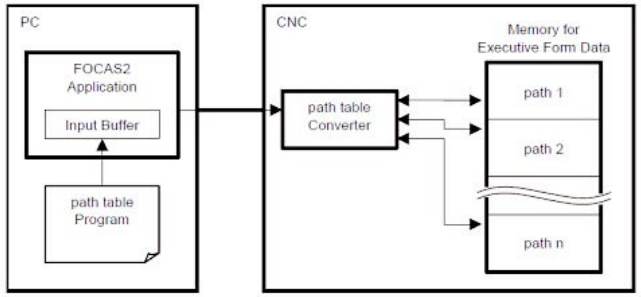
- Provides additional time synchronization for the auxiliary function
- Simplifies the programming
- Increases the productivity of the machine

Ordering Information

Specification	Description
A02B-0372-R528	501iS-A Delay Time Setting Function of Auxiliary Function Output in Path Table Operation
A02B-0373-R528	501i-A Delay Time Setting Function of Auxiliary Function Output in Path Table Operation
A02B-0374-R528	502iS-A Delay Time Setting Function of Auxiliary Function Output in Path Table Operation
A02B-0375-R528	502i-A Delay Time Setting Function of Auxiliary Function Output in Path Table Operation
A02B-0377-R528	503i-A Delay Time Setting Function of Auxiliary Function Output in Path Table Operation

105

Interpolation Functions



Path Table Direct Conversion Function

Features

When a path table program in being executed on the machine, the Path Table Direct Conversion function can directly convert a path table program into another machining process.

It is not necessary to convert all path table programs for all planned machining process before the start of the operation; incremental path table programs can be converted at the same time the machining takes place. This reduces set-up time for the machine operation.

In addition, since it is also possible to delete path table program of a process that finished execution, the data memory of the CNC can be used efficiently.

Benefits

- Efficient management of path programs
- Reduction of memory requirement in the CNC
- Increase of machine efficiency and productivity

Ordering Information

Specification	Description
A02B-0372-R545	501iS-A Path Table Operation Edit Support
A02B-0373-R545	501i-A Path Table Operation Edit Support
A02B-0374-R545	502iS-A Path Table Operation Edit Support
A02B-0375-R545	502i-A Path Table Operation Edit Support
A02B-0377-R545	503i-A Path Table Operation Edit Support

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

106

Interpolation Functions

Incremental Command for Path Table Operation

Features

In Path Table Operation, reference value or axis position are only specified in absolute commands.

The Incremental Command for Path Table Operation function provides the possibility to specify the reference values and each axis position corresponding to the reference values (time, axis position or spindle position) in incremental commands.

Benefits

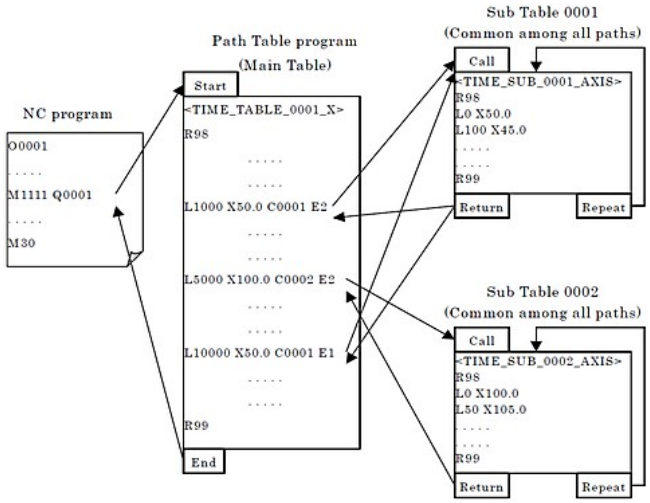
- Possibility to change the mode of definition of the table
- Increases programming flexibility
- Improves overall machining productivity

Ordering Information

Specification	Description
A02B-0372-R580	501iS-A Path Table Operation Time Compensation
A02B-0373-R580	501i-A Path Table Operation Time Compensation
A02B-0374-R580	502iS-A Path Table Operation Time Compensation
A02B-0375-R580	502i-A Path Table Operation Time Compensation
A02B-0377-R580	503i-A Path Table Operation Time Compensation

107

Interpolation Functions



Sub-Table Call for Path Table Operation

Features

When the same shape is machined repeatedly in Path Table Operation (PTO), it can be separated as a Sub Table by this function.

A Sub Table can be called from Path Table programs (Main Table) in arbitrary paths. Moreover, it is possible to execute the same Sub Table repeatedly by specifying the repeat count when the Sub Table is called.

The function simplifies the way Path Table programs are made and also reduces the memory usage allocated to Path Table programs.

Benefits

- Reduction of the memory usage allocated to Path Tables
- Simplifies the programming of repetitive operations
- Increase of the flexibility of Path Table Operation for complex systems
- Increase of the productivity of the machine

Ordering Information

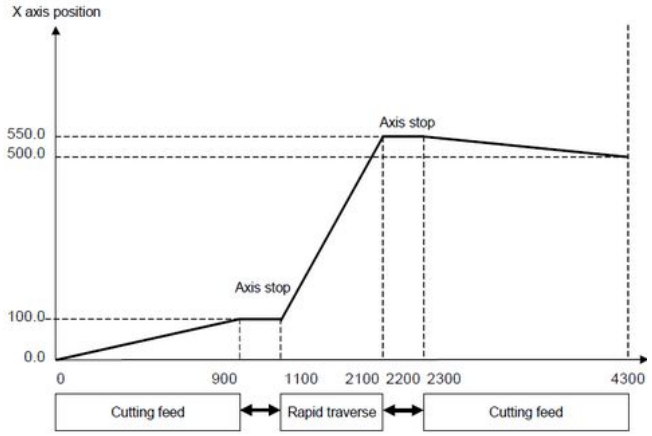
Specification	Description
A02B-0372-R618	501iS-A Path Table Operation - Table Expansion
A02B-0373-R618	501i-A Path Table Operation - Table Expansion
A02B-0374-R618	502iS-A Path Table Operation - Table Expansion
A02B-0375-R618	502i-A Path Table Operation - Table Expansion
A02B-0377-R618	503i-A Path Table Operation - Table Expansion

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

108

Interpolation Functions



Cutting/Rapid Switching Function for Path Table Operation

Features

In a regular NC program, separate parameters can be used to define cutting feed and rapid traverse. The parameters are switched according to the state of cutting feed / rapid traverse.

In the standard Path Table Operation (PTO) mode, parameters cannot be switched between cutting fieed and rapid traverse since only one cutting feed is supported.

In Path Table Operation mode, this function enables a switching between cutting feed and rapid traverse.

In path table operation, parameters such as backlash compensation can be switched because this function enables switching between cutting feed and rapid traverse. Both high-accuracy in cutting feed and high-speed in rapid traverse can be achieved as a consequence of an optimal parameter settings.

Cutting feed is specified by R60 command, and rapid traverse is specified by R61 command.

Example of program

```
TIME_TABLE_0001_X
R98;
L0 X0.0;
L900 X100.0;
L1100 X100.0 R61;
L2100 X550.0;
L2300 X550.0 R60;
L4300 X500.0;
:
R99;
```

Benefits

- Higher accuracy in Path Table Operation mode
- Decrease of the cycle time in Path Table Operation
- Overall increase of the productivity

Ordering Information

Specification	Description
A02B-0372-R668	501iS-A Path Table Operation Axis Control Expansion

Specification	Description
A02B-0373-R668	501i-A Path Table Operation Axis Control Expansion
A02B-0374-R668	502iS-A Path Table Operation Axis Control Expansion
A02B-0375-R668	502i-A Path Table Operation Axis Control Expansion
A02B-0377-R668	503i-A Path Table Operation Axis Control Expansion

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

110
Interpolation Functions

Path Table Operation Execution Format Data Capacity 60MB

Features

This option expands the size of the DRAM area that stores Path Table Execution data from 7 MB to 60MB. This allows the operation of large path table programs, especially for high precision parts.
This option is only available on CPU Card G.

Benefits

- Expands the application range of the path table operation function

Ordering Information

Specification	Description
A02B-0372-R727#60M	501iS-A Path Table Operation Execution Data Size 60 MB
A02B-0373-R727#60M	501i-A Path Table Operation Execution Data Size 60 MB
A02B-0374-R727#60M	502iS-A Path Table Operation Execution Data Size 60 MB
A02B-0375-R727#60M	502i-A Path Table Operation Execution Data Size 60 MB
A02B-0377-R727#60M	503i-A Path Table Operation Execution Data Size 60 MB

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

111

Interpolation Functions

Path Table Operation Execution Data Size 20Mbyte

Features

This function expands the DRAM area size which stores the data for path table operation from 7 MB to 20 MB. This allows the operation of large path table programs.

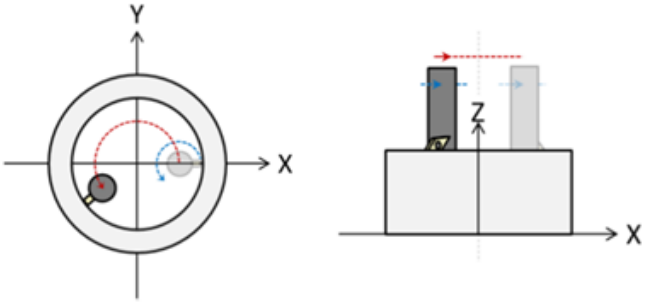
Benefits

- Expands the application range of the path table operation function

Ordering Information

Specification	Description
A02B-0372-R727#20M	501iS-A Path Table Operation Execution Data Size 20 MB
A02B-0373-R727#20M	501iS-A Path Table Operation Execution Data Size 20 MB
A02B-0374-R727#20M	502iS-A Path Table Operation Execution Data Size 20 MB
A02B-0375-R727#20M	502i-A Path Table Operation Execution Data Size 20 MB
A02B-0377-R727#20M	503i-A Path Table Operation Execution Data Size 20 MB

112
Interpolation Functions



Orbit Cutting

Features

Orbit Cutting adds turning functionality to machining centers. It synchronizes the orientation of the tool with the tool position on the XY plane. Orbit Cutting keeps the cutting edge of the tool always perpendicular to the surface of the workpiece.

Orbit Cutting enables you to machine your part on one machine, no transfer from a machining center to a lathe is necessary anymore. You can achieve the required surface quality with Orbit Cutting on a machining center.

Benefits

- Milling and turning on one machine
- Perform boring machining of different diameters with just one tool
- Simplifies programming

Ordering Information

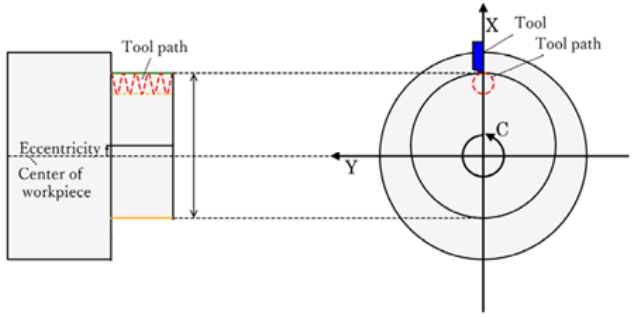
Specification	Description
A02B-0372-R083	501iS-A Orbit Cutting
A02B-0373-R083	501i-A Orbit Cutting
A02B-0374-R083	502iS-A Orbit Cutting
A02B-0375-R083	502i-A Orbit Cutting
A02B-0377-R083	503i-A Orbit Cutting

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

113

Interpolation Functions



Eccentric Turning

Features

Eccentric Turning controls a spindle and two linear axes so that the cirular interpolation of the linear axes are synchronized with the spindle rotation. With this function, it is possible to turn e.g. a pin that is not centered on the center of the workpiece. Eccentric turning can be realized easily with a G code, simplifying the programming for eccentric turning.

Benefits

- Simple programming of eccentric features on lathes

Ordering Information

Specification	Description
A02B-0372-R082	501iS-A Eccentric Turning
A02B-0373-R082	501i-A Eccentric Turning
A02B-0374-R082	502iS-A Eccentric Turning
A02B-0375-R082	502i-A Eccentric Turning
A02B-0377-R082	503i-A Eccentric Turning

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

114

Interpolation Functions

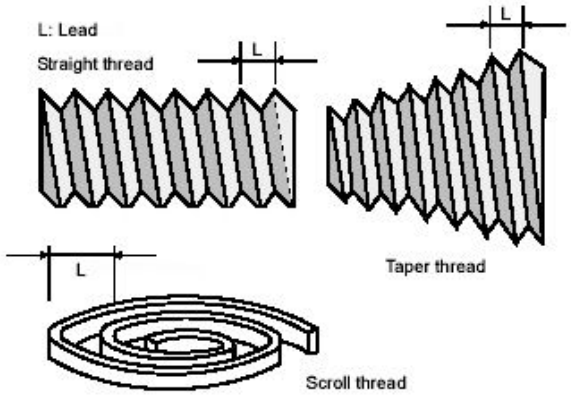
Thread Cutting

The following section contains functions related to Thread Cutting.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

115
Thread Cutting



Thread Cutting, Synchronous Cutting

Features

When feeding the tool in synchronization with the spindle rotation a threading of the specified lead can be performed with the Thread Cutting / Synchronous Cutting function.

In addition to straight threads, taper threads and scroll threads can be cut with equal leads. The spindle encoder is used to accurately initiate axis motion.

This function is a basic function in FANUC Series 0i-F Plus (all Types except 0i-MF Plus Type 5).

Benefits

- Allows thread cutting on large holes, with single point tooling
- Accurate machining on multiple threading passes

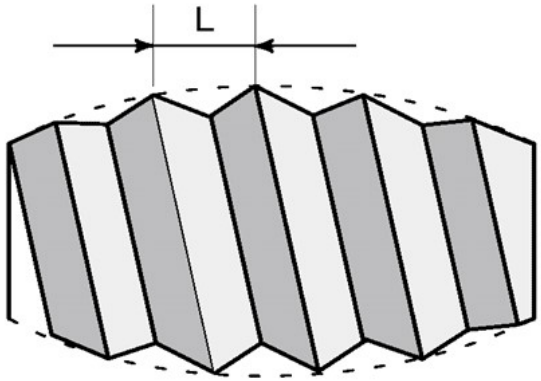
Ordering Information

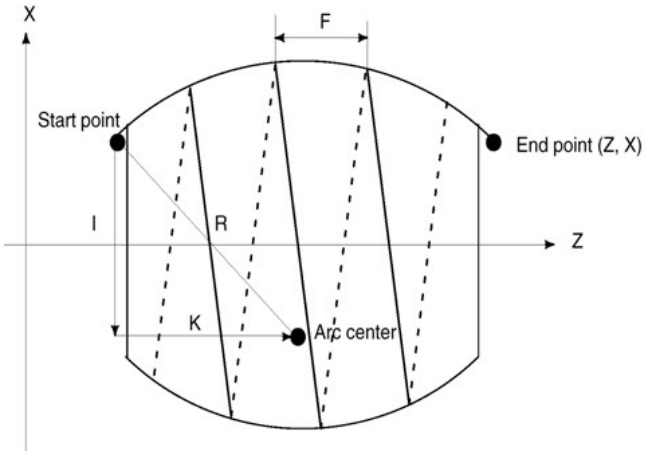
Specification	Description
A02B-0372-J824	501iS-A Thread Cutting / Synchronous Cutting
A02B-0373-J824	501i-A Thread Cutting / Synchronous Cutting
A02B-0374-J824	502iS-A Thread Cutting / Synchronous Cutting
A02B-0375-J824	502i-A Thread Cutting / Synchronous Cutting
A02B-0377-J824	503i-A Thread Cutting / Synchronous Cutting

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

116
Thread Cutting





Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Circular Thread Cutting

Features

Allows threading of circular surfaces such as cylinder. Easy to program with simple G code (G35 and G36)

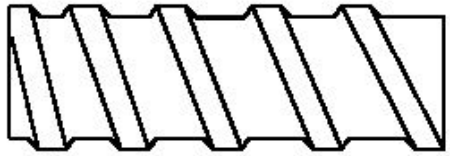
Benefits

- Adds advanced capabilities for thread cutting to the CNC
- Simplifies programming
- Improves overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J731	501iS-A Circular Thread Cutting
A02B-0373-J731	501i-A Circular Thread Cutting
A02B-0374-J731	502iS-A Circular Thread Cutting
A02B-0375-J731	502i-A Circular Thread Cutting

117
Thread Cutting



Variable lead screw

Variable Lead Thread Cutting

Features

This function allows while specifying an increment or a decrement value for a lead per screw revolution a variable lead threading to be performed.

This function is a basic function in FANUC Series 0i-TF Plus.

Benefits

- Adds additional advanced threading capabilities to the CNC
- Simplifies programming
- Improves overall machining productivity

Ordering Information

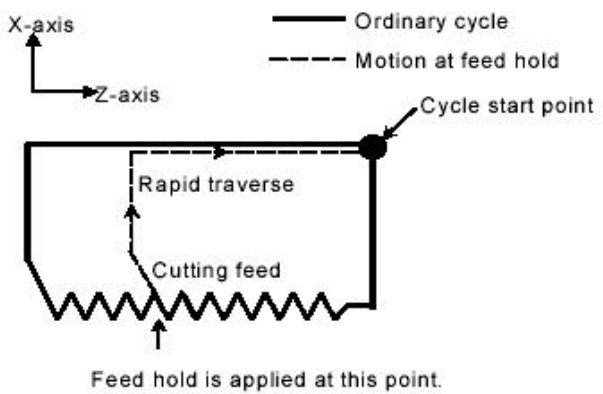
Specification	Description
A02B-0372-J827	501iS-A Variable Lead Thread Cutting
A02B-0373-J827	501i-A Variable Lead Thread Cutting
A02B-0374-J827	502iS-A Variable Lead Thread Cutting
A02B-0375-J827	502i-A Variable Lead Thread Cutting
A02B-0377-J827	503i-A Variable Lead Thread Cutting

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

118

Thread Cutting



Thread Cutting Retract

Features

Threading Retract (Canned Cycle)

Feed hold may be applied during threading. In this case, the tool immediately retracts with chamfering and returns to the start point on the second axis (X-axis), then the first axis (Z-axis) on the plane.

The amount of chamfering during retraction is the same as that of chamfering at the end point.

Threading Retract (Multiple Repetitive Cycle)

If feed hold is applied during threading in the multiple repetitive threading cycle (G76), chamfering for threading is performed and the tool returns to the threading cycle start point and stops. If a cycle start operation is performed here, machining restarts with the threading cycle to which feed hold was applied.

The amount of chamfering during retraction is the same as that of chamfering at the end point.

This function is a basic function in FANUC Series 0i-TF Plus.

Benefits

- Adds additional modes to the thread cutting operation
- Simplifies programming and restart
- Improves overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J825	501iS-A Thread Cutting Retract
A02B-0373-J825	501i-A Thread Cutting Retract
A02B-0374-J825	502iS-A Thread Cutting Retract
A02B-0375-J825	502i-A Thread Cutting Retract
A02B-0377-J825	503i-A Thread Cutting Retract

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

119
Thread Cutting

Thread Start Position Compensation for Changing Spindle Speed

Features

The thread cutting is correctly performed by this function even if the spindle override is changed in the interval of the thread cutting performing.

The spindle override can be changed only while the thread cutting is not performed.

Benefits

- Reduction of the cycle time
- Increase of the machine productivity

Ordering Information

Specification	Description
A02B-0372-S946	501iS-A Thread Start Position Compensation in Changing Spindle Speed Function
A02B-0373-S946	501i-A Thread Start Position Compensation in Changing Spindle Speed Function
A02B-0374-S946	502iS-A Thread Start Position Compensation in Changing Spindle Speed Function
A02B-0375-S946	502i-A Thread Start Position Compensation in Changing Spindle Speed Function
A02B-0377-S946	503i-A Thread Start Position Compensation in Changing Spindle Speed Function

120
Thread Cutting

Threading Start Position Shift Function for Path Table Operation

Features

In Path Table Operation, this function can command the spindle position at the start of threading with a custom macro common variable.

In this case, the spindle position can be changed simply by changing a variable value, and it is unnecessary to reconvert the Path Table programs.

Benefits

- Adds the capability to use macro variable position the spindle on threading operation
- Simplifies programming and avoids the conversion of the table when a value is changed
- Increases productivity of the machine

Ordering Information

Specification	Description
A02B-0372-R599	501iS-A Threading Start Position Shift Function for Path Table Operation
A02B-0373-R599	501i-A Threading Start Position Shift Function for Path Table Operation
A02B-0374-R599	502iS-A Threading Start Position Shift Function for Path Table Operation
A02B-0375-R599	502i-A Threading Start Position Shift Function for Path Table Operation
A02B-0377-R599	503i-A Threading Start Position Shift Function for Path Table Operation

121

Interpolation Functions

Polygon Turning by Cs Contour Control

Features

Polygon Turning For Cs Contour Control enables the following feature: Polygon Turning by ISO program (G51.2) is available on the condition that tool rotary axis is controlled by a servo motor and workpiece axis is controlled by a serial spindle motor, which is controlled by Spindle Control with Cs Contour Control.

Ordering Information

Specification	Description
A02B-0377-R570	503i-A Polygon Turning by CS Contour Control

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Feed Functions

This section of the catalogue contains the functions related to the CNC motion (feed functions) enabling the control of the movement of the axes in the machine.

Feed functions, like Advanced Preview Control, AI Contour Control I and II provide high-speed contouring capabilities. Acceleration / deceleration options protect the machine from the shocks of sudden starts and stops. They work in concert with the AI Contour Control functions to provide high-speed, high-precision machining capabilities.

Some of the feed functions detailed in the catalogue:

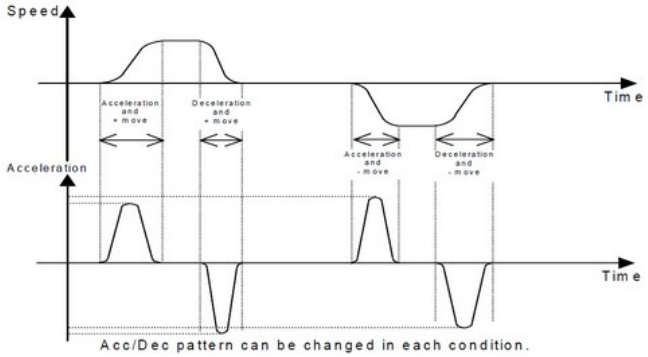
- Optimum torque acceleration / deceleration
- Positioning by optimum acceleration
- Bell-shaped acc / dec after cutting feed interpolation
- Advanced Preview Control
- AI Contour Control
- High Speed Processing
- Jerk Control
- Etc.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

123

Feed Functions



Optimum Torque Acceleration/Deceleration

Features

This Optimum Torque Acceleration / Deceleration function enables optimal Rapid Traverse acceleration / deceleration during AI Contour Control I (AICC-I), AI Contour Control II (AICC-II), AI High Precision Contour Control (AI HPCC) and AI Nano High Precision Contour Control (AI Nano HPCC) modes.

The machine axis friction, gravity, and servomotor characteristics all have an impact on the acceleration / deceleration performance of each machine axis. In addition, the servomotor torque required for axis acceleration / deceleration differs according to the axis movement direction and whether the axis is accelerating or decelerating.

With this function, it is possible to set appropriate CNC parameters defining individual axis direction-dependant acceleration and deceleration limits. During AICC-I, AICC-II, AI HPCC and AI NANO HPCC modes, the CNC automatically optimizes the rapid traverse acceleration and deceleration rates in accordance to these parameters settings, and the current direction and acceleration mode of the machine axes. The Optimum Torque Acceleration/ Deceleration function optimizes the capability of each motor / axis performance resulting in faster axis positioning (rapid traverse) and reduced overall cycle time.

Benefits

- Optimization of the rapid traverse performance of each axis
- Reduction of the axis positioning time and overall machining time.
- Overall improvement of the machining productivity

Ordering Information

Specification	Description
A02B-0372-S675	501iS-A Optimum Torques Acceleration / Deceleration
A02B-0373-S675	501i-A Optimum Torques Acceleration / Deceleration
A02B-0374-S675	502iS-A Optimum Torques Acceleration / Deceleration
A02B-0375-S675	502i-A Optimum Torques Acceleration / Deceleration
A02B-0377-S675	503i-A Optimum Torques Acceleration / Deceleration

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Positioning by Optimum Acceleration

Features

When a rapid traverse command is specified during automatic operation, the Positioning by Optimum Acceleration function can be used to adjust the rapid traverse rate, time constant, and loop gain, according to the amount of travel for the block.

This reduces the time required for positioning and position check, therefore reducing the overall cycle time.

Benefits

- Optimization of rapid traverse (G00) positioning
- Reduction of machining cycle time
- Improvement of the productivity of the machine

Ordering Information

Specification	Description
A02B-0372-J693	501iS-A Position by Optimum Acceleration
A02B-0373-J693	501i-A Position by Optimum Acceleration
A02B-0374-J693	502iS-A Position by Optimum Acceleration
A02B-0375-J693	502i-A Position by Optimum Acceleration
A02B-0377-J693	503i-A Position by Optimum Acceleration

2nd Feedrate Override

Features

The Second Feedrate Override function allows cutting feedrates that have been overridden once to be overridden a second time.

The override is done in a percentage from 0 to 254% in increments of 1%. The value is set from the PMC. No override can be performed on functions such as threading and tapping in which override is inhibited. This function is used for controlling feedrate in adaptive control, etc.

Benefits

- Adds additional override capabilities to the CNC
- Simplifies programming
- Improves overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J810	501iS-A 2nd Feedrate Override
A02B-0373-J810	501i-A 2nd Feedrate Override
A02B-0374-J810	502iS-A 2nd Feedrate Override
A02B-0375-J810	502i-A 2nd Feedrate Override
A02B-0377-J810	503i-A 2nd Feedrate Override

One-Digit F-Code Feed

Features

The One-Digit F-Code Feed function provides the ability to preset 9 feed rates that are stored in parameters and activated by programming F1 through F9.

The feed rate corresponding to the specified number is set. When F0 is commanded, rapid traverse rate is set. If the manual pulse generator is rotated with the one-digit F code feed selection signal set to 1, the feed rate corresponding to the currently selected number is increased or decreased. A set or modified feed rate is preserved while the power is turned off.

The current feed rate is displayed on the screen.

This function is a basic function in FANUC Series 0i-MF Plus (Type 0, 1 and 3) and 0i-LF Plus.

Benefits

- Adds preset capabilities to manage/control easily feedrates sets to the CNC
- Simplifies programming
- Improves overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J820	501iS-A One-Digit F Code Feed
A02B-0373-J820	501i-A One-Digit F Code Feed
A02B-0374-J820	502iS-A One-Digit F Code Feed
A02B-0375-J820	502i-A One-Digit F Code Feed
A02B-0377-J820	503i-A One-Digit F Code Feed

127
Feed Functions

Inverse Time Feed

Features

The G code for inverse time feed is a modal G code and belongs to group 05 (includes G code for feed per revolution and G code for feed per minute). The Inverse Time Feed function (G93 mode) allows the feedrate of the tool to be specified by the move distance of the block and inverse time (FRN) where:

- **Linear interpolation (G01)**
  FRN=1/Time (min) = Speed/Distance
  Speed: mm/ min (metric input), inch/ min (inch input)
  Distance: mm (metric input), inch (inch input)
- **Circular interpolation (G02, G03)**
  FRN=1/Time (min) = Speed/Circle radius
  Speed: mm/ min (metric input), inch/ min (inch input)
  Circle radius: mm (metric input), inch (inch input)

This function is a basic function in FANUC Series 0i-MF Plus (Type 0, Type 1).

Benefits

- Adds inverse time capabilities to the CNC
- Simplifies programming
- Improves overall machining productivity

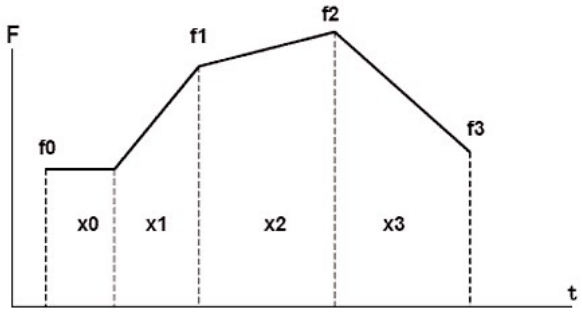
Ordering Information

Specification	Description
A02B-0372-J715	501iS-A Inverse Time Feed
A02B-0373-J715	501i-A Inverse Time Feed
A02B-0374-J715	502iS-A Inverse Time Feed
A02B-0375-J715	502i-A Inverse Time Feed
A02B-0377-J715	503i-A Inverse Time Feed

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

128
Feed Functions



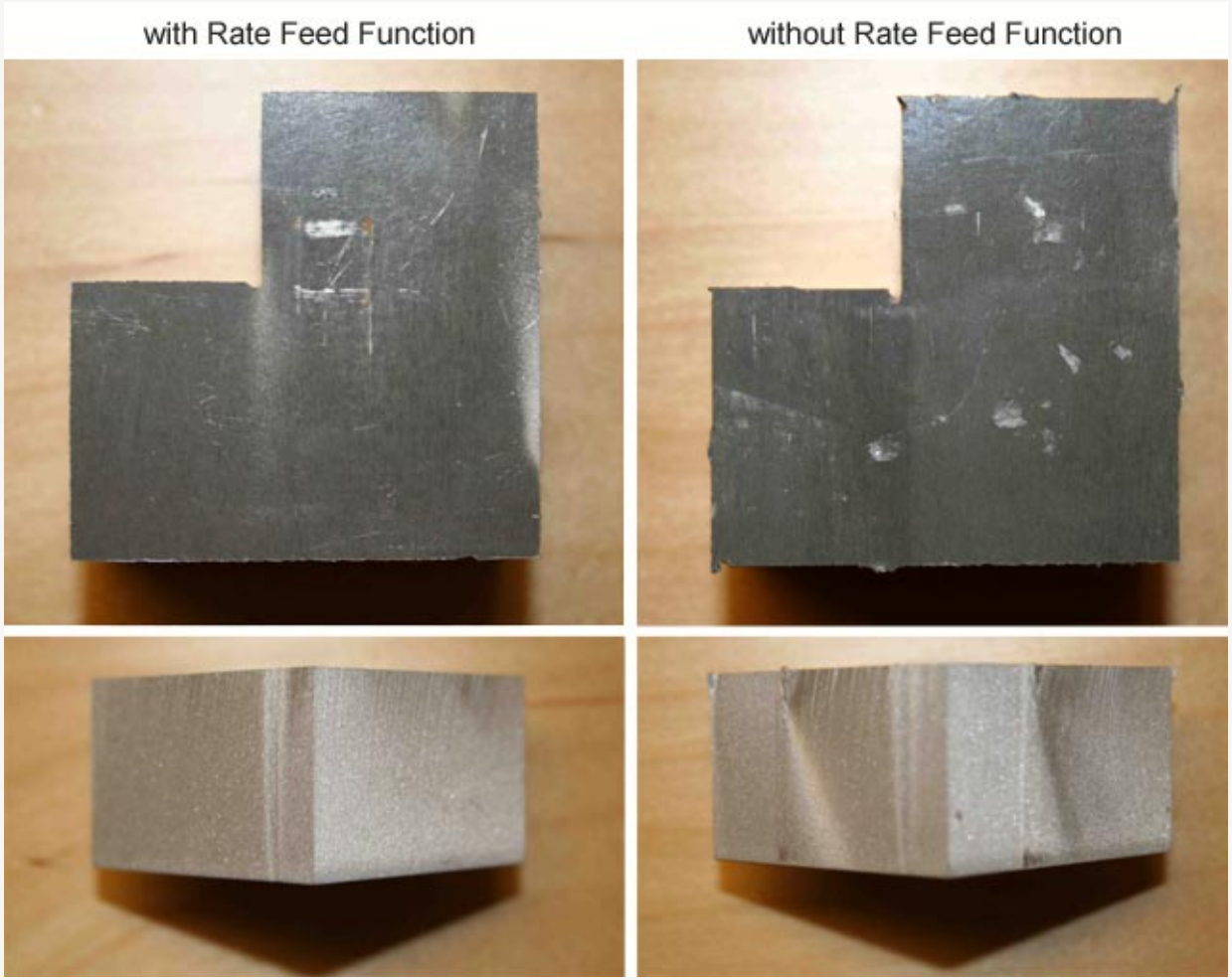

```
N10   G01    Xx0   Ff0   ;
N20   G93.2  Xx1   Ff1   ;
N30          Xx2   Ff2   ;
N40          Xx3   Ff3   ;
```

Rate Feed

Features

This function enables to continually increase / decrease (linear) the feedrate within a block. While considering the feedrate of the previous block as the start value and specifying the value of the feedrate at the end of the block, the feedrate is changed linearly from start value to the end value within the block commanded.

Example of application



129

On water jet cutting machines, the water jet following error is essential to smoothly adjust the feedrate / to take corners and thus improve the cutting behaviour. Without this function it would be necessary to command a lot of tiny blocks to adapt the feedrate profile as needed.

Benefits

- Possibility to program continuously smooth speed characteristics depending on the curvature of the workpiece to be machined
- Improvement of the cutting behaviour for water jet applications
- Improvement of the slide motion resulting in bether part quality for press forming applications
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-R635	501iS-A Rate Feed Function
A02B-0373-R635	501i-A Rate Feed Function
A02B-0374-R635	502iS-A Rate Feed Function
A02B-0375-R635	502i-A Rate Feed Function
A02B-0377-R635	503i-A Rate Feed Function

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Speed Control with Acceleration in Circular Interpolation

Features

When high-speed cutting is performed in circular, helical or spiral interpolation, the actual tool path has an error with respect to the programmed path.

The feedrate of circular interpolation is automatically clamped by the permissible acceleration specified by the parameter for decreasing the shape error of radius direction.

Benefits

- Diminution of the tool-path error in circular, helical and spiral interpolation
- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J809	501iS-A Speed Control with Acceleration in Circular Interpolation
A02B-0373-J809	501i-A Speed Control with Acceleration in Circular Interpolation
A02B-0374-J809	502iS-A Speed Control with Acceleration in Circular Interpolation
A02B-0375-J809	502i-A Speed Control with Acceleration in Circular Interpolation
A02B-0377-J809	503i-A Speed Control with Acceleration in Circular Interpolation

131

Feed Functions

AI Contour Control II

Features

AI Contour Control II^{+} is used to enable high-precision machining at optimal machining speeds. This function suppresses path errors due to acceleration / deceleration delay, servo positioning delay, and mechanical and electro-mechanical machine performance constraints.

Without this function, machining profile errors would increase proportionally with the programmed path feedrate. In practice, this function is useful when cutting on complex part forms involving sudden cutter direction changes such as are found in die / mold machining.

This function is a basic function in FANUC Series 0i-MF Plus (Type 0, 1 and 3) and 0i-LF Plus.

Benefits

- **Higher Speed With Full Precision**
  AI Contour Control II automatically adjusts feedrates before sudden direction changes, preventing overshoot and maintaining perfect path accuracy even at high speeds. This enables you to run complex part programs faster without sacrificing quality. The result is shorter cycle times and consistently precise machining.
- **Superior Accuracy on Complex Forms**
  By suppressing servo lag, acceleration delays, and mechanical limitations, the function keeps the cutter exactly on the intended contour. This is especially valuable for die#mold, aerospace, and medical parts with tight tolerances and intricate geometries. You achieve cleaner finishes, fewer deviations, and less need for manual rework.
- **Eliminates Corner Clipping and Path Errors**
  The system anticipates upcoming blocks and adjusts motion smoothly, preventing the cutter from cutting inside corners or drifting off-path. This ensures dimensional fidelity regardless of sharp direction changes or micro#segmented toolpaths. It helps protect the integrity of high#value parts and reduces scrap rates.
- **Maximized Productivity Through Fast Processing**
  High#speed look#ahead and accelerated block processing prevent data starvation during dense, micro#step programs. The machine keeps moving smoothly, avoiding feed dwells and maintaining continuous, efficient machining. This increases throughput and makes high#resolution CAM output practical on the shop floor.
- **Stable Operation Across Multiple#Path Machining**
  AI Contour Control II supports multi#path and multi#axis environments, automatically optimizing speed and motion across all axes. This reduces vibration, improves surface quality, and stabilizes performance during aggressive cutting. You gain more reliable machining and longer tool and machine life, strengthening overall ROI.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Ordering Information

Specification	Description
A02B-0372-S808	501iS-A AI Contour Control II (AICC II)
A02B-0373-S808	501i-A AI Contour Control II (AICC II)
A02B-0374-S808	502iS-A AI Contour Control II (AICC II)
A02B-0375-S808	502i-A AI Contour Control II (AICC II)
A02B-0377-S808	503i-A AI Contour Control II (AICC II)

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Look-Ahead Blocks Expansion

Features

When performing High-Speed Processing with AI Contour Control II, this function expands the CNC look-ahead capability to 1,000 CNC Part Program Blocks.

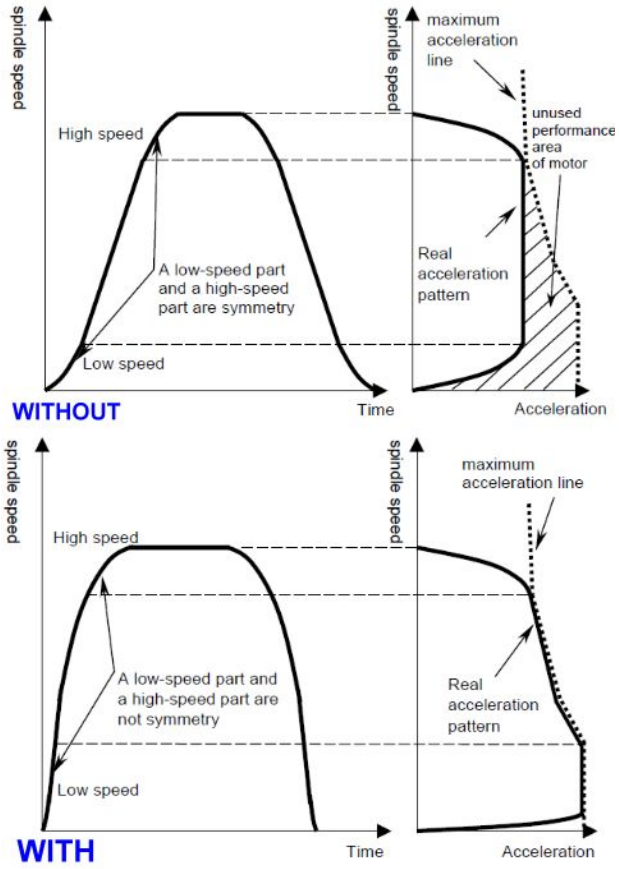
Benefits

- Enables a higher-precision machining on cutting complex part-forms that are defined by many, tiny, program blocks such as are found in die/mold machining.
- The more look-ahead blocks the control can preview, the greater the chance it has of predicting a cutter direction change.

Ordering Information

Specification	Description
A02B-0372-S815	501iS-A Look-Ahead Blocks Expansion
A02B-0373-S815	501i-A Look-Ahead Blocks Expansion
A02B-0374-S815	502iS-A Look-Ahead Blocks Expansion
A02B-0375-S815	502i-A Look-Ahead Blocks Expansion

Optimum Torque Acceleration/Deceleration for Rigid Tapping



Features

The Optimum Torque Acceleration / Deceleration for Rigid Tapping function can flexibly set the acceleration and deceleration of the cutting in the rigid tapping according to the torque characteristic of the spindle motor and the machine characteristic such as the friction.

The acceleration and deceleration performance (hereafter the maximum acceleration line) which can be output is usually not symmetric in a low-speed part and a high-speed part because of the torque characteristic of the spindle motor and the machine characteristic.

The conventional acceleration and deceleration (linear / bell-shaped) has a symmetric acceleration and deceleration. The acceleration/deceleration of this function is realized so that the real acceleration pattern may approach the maximum acceleration line as much as possible. The performance of the motor is drawn out to its maximum by this, and the cutting time can be shortened.

However, when the rigid tapping is used in an acceleration constant range of the spindle motor, shortening the cutting time cannot be expected. It is possible to execute the rigid tapping with the acceleration and deceleration along the maximum acceleration line by setting the acceleration line pattern in the parameter of each gear. The acceleration and deceleration of pulling out uses the same acceleration line pattern as them of the cutting.

Benefits

- Optimization of the rigid tapping processing
- Increase of the tapping and cutting performation of the machine
- Increase of the overall productivity of the machine

Ordering Information

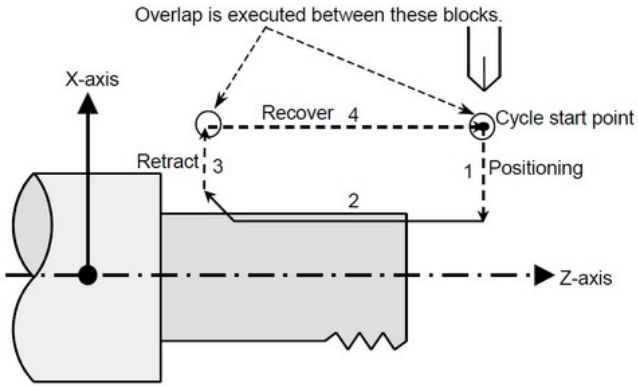
Specification	Description
A02B-0372-R533	501iS-A Optimum Acceleration / Deceleration for Rigid Tapping
A02B-0373-R533	501i-A Optimum Acceleration / Deceleration for Rigid Tapping
A02B-0374-R533	502iS-A Optimum Acceleration / Deceleration for Rigid Tapping
A02B-0375-R533	502i-A Optimum Acceleration / Deceleration for Rigid Tapping
A02B-0377-R533	503i-A Optimum Acceleration / Deceleration for Rigid Tapping

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

135

Feed Functions



Programmable Rapid Traverse Overlap

Features

Rapid Traverse Overlap function reduces cycle time by starting the next rapid traverse block before the previous rapid traverse block ends, when continuous blocks with rapid traverse command are given.

Here is an overview to the two added functions of Programmable Rapid Traverse Overlap:

- Programmable rapid traverse overlap: the amount of rapid traverse overlap can be changed by setting the feed rate reduction ratio to a system variable in a part program. This enables an optimal overlapping effect for each rapid traverse path of the machining program.
- Rapid traverse overlap between threading cycle blocks: shortened cycle times become possible by overlapping rapid traverse blocks during the threading cycle. As shown in the right figure, rapid traverse overlap is executed between "3.Retract and 4.Return" and between "4.Return and 1.Positioning".

Benefits

- Opitimization of the cycle time of high volume production machines
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-R502	501iS-A Programmable Rapid Traverse Overlap
A02B-0373-R502	501i-A Programmable Rapid Traverse Overlap
A02B-0374-R502	502iS-A Programmable Rapid Traverse Overlap
A02B-0375-R502	502i-A Programmable Rapid Traverse Overlap
A02B-0377-R502	503i-A Programmable Rapid Traverse Overlap

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Time Constant of Acc./Dec. After Interpolation Switching Function by Signal

Features

This function enables to switch the time constant of acceleration/deceleration after interpolation for rapid traverse and cutting feed by input signals of the PMC. It is possible to switch between three different time constants for rapid traverse and three different time constants for cutting feed.

Benefits

- Use the proper time constant for acceleration/deceleration after interpolation according to the current processing conditions

Ordering Information

Specification	Description
A02B-0372-S992	501iS-A Time Constant of Acc. / Dec. after Interpolation Switching Function by Signal
A02B-0373-S992	501i-A Time Constant of Acc. / Dec. after Interpolation Switching Function by Signal
A02B-0374-S992	502iS-A Time Constant of Acc. / Dec. after Interpolation Switching Function by Signal
A02B-0375-S992	502i-A Time Constant of Acc. / Dec. after Interpolation Switching Function by Signal
A02B-0377-S992	503i-A Time Constant of Acc. / Dec. after Interpolation Switching Function by Signal

137
Functions

Program Input

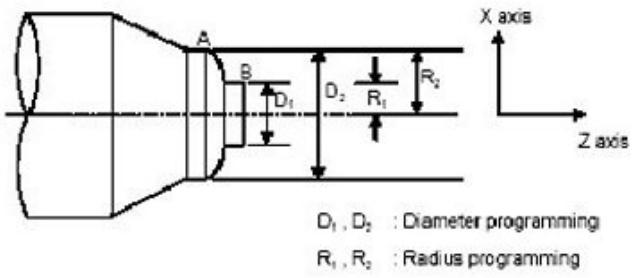
This section of the catalogue contains the functions related to the programming and operation of the CNC.
Some of the functions detailed in the catalogue:

- Skip functions
- Coordinate systems
- Custom Macro
- Special cycles
- Tilted Working Plane
- Macro Executor and C-Executor
- FANUC PICTURE
- FANUC Auto HMI
- Etc.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

138
Program Input



Dynamic Switching of Diameter/Radius Specification

Features

The Dynamic Switching of Diameter/Radius Specification function enables the user to switch between diameter and radius programming by using a PMC signal or G code.

When turning is performed, the cross section of a workpiece is usually a circle. The size of the circle may be specified by its diameter or radius. When the diameter is specified, it is called diameter programming and when the radius is specified, it is called radius programming. Whether to use radius programming or diameter programming is chosen for each axis by setting a parameter.

There may be cases where some coordinates or program items for an axis in diameter programming mode should preferably be handled in radius programming mode. This function enables the user to switch between diameter programming and radius programming by using a signal or G code command. The user can thus handle coordinates, program items, and other settings for an axis in diameter programming mode as well as in radius programming mode.

Benefits

- Addition of flexibility to the programming
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-S630	501iS-A Dynamic Switching of Diameter / Radius Specification
A02B-0373-S630	501i-A Dynamic Switching of Diameter / Radius Specification
A02B-0374-S630	502iS-A Dynamic Switching of Diameter / Radius Specification
A02B-0375-S630	502i-A Dynamic Switching of Diameter / Radius Specification
A02B-0377-S630	503i-A Dynamic Switching of Diameter / Radius Specification

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

139
Program Input

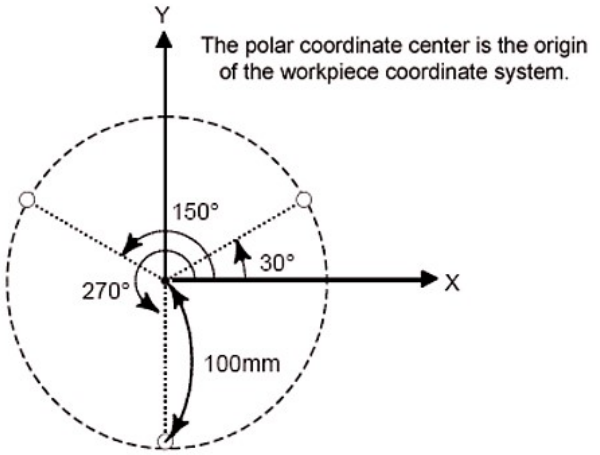
Polar Coordinate Command

Features

When machining using arc based coordinates, it is usually easier to specify a move in terms of an angular displacement and a radius.

By turning on the Polar Coordinate Command function, the programmer can choose to command moves that employ polar coordinates in any segment of his program. He can also cancel polar coordinate commands and revert to the traditional Cartesian command system when those are more appropriate.

This function is a basic function in FANUC Series 0i-MF Plus and 0i-LF Plus.



Benefits

- Ease of programming coordinates on arcs and circles.
- Transposition of angles and radii dimensions direct from blueprints.

Ordering Information

Specification	Description
A02B-0372-J818	501iS-A Polar Coordinate Command
A02B-0373-J818	501i-A Polar Coordinate Command
A02B-0374-J818	502iS-A Polar Coordinate Command
A02B-0375-J818	502i-A Polar Coordinate Command
A02B-0377-J818	503i-A Polar Coordinate Command

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

140
Program Input

Addition of Workpiece Coordinate System 48 Pairs

Features

Besides the six workpiece coordinate systems based on G54 to G59 (standard workpiece coordinate systems), up to 48 additional workpiece coordinate systems can be used optionally. As with the workpiece coordinate system based on G54 to G59, the following workpiece origin offset setting and modification methods are available:

- MDI-based method
- Program-based method
- Setting based on programmable data input (G10L2Pp)
- Setting based on custom macros

This function is a basic function in FANUC Series 0i-MF Plus and 0i-LF Plus.

Benefits

- Increase of the flexibility of the machining
- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J895	501iS-A Addition of Workpiece Coordinate System - 48 Pairs
A02B-0373-J895	501i-A Addition of Workpiece Coordinate System - 48 Pairs
A02B-0374-J895	502iS-A Addition of Workpiece Coordinate System - 48 Pairs
A02B-0375-J895	502i-A Addition of Workpiece Coordinate System - 48 Pairs
A02B-0377-J895	503i-A Addition of Workpiece Coordinate System - 48 Pairs

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

141
Program Input

Addition of Workpiece Coordinate System 300 Pairs

Features

Besides the six workpiece coordinate systems based on G54 to G59 (standard workpiece coordinate systems), up to 300 additional workpiece coordinate systems can be used optionally. As with the workpiece coordinate system based on G54 to G59, the following workpiece origin offset setting and modification methods are available:

- MDI-based method
- Program-based method
- Setting based on programmable data input (G10L2Pp)
- Setting based on custom macros

Benefits

- Increase of the flexibility of the machine
- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J919	501iS-A Addition of Workpiece Coordinate System - 300 Pairs
A02B-0373-J919	501i-A Addition of Workpiece Coordinate System - 300 Pairs
A02B-0374-J919	502iS-A Addition of Workpiece Coordinate System - 300 Pairs
A02B-0375-J919	502i-A Addition of Workpiece Coordinate System - 300 Pairs
A02B-0377-J919	503i-A Addition of Workpiece Coordinate System - 300 Pairs

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

142
Program Input

Positioning in Machine Coordinate System with Feedrate

Features

Conventionally machine coordinate system setting (G53) is performed only at a rapid traverse rate.
With this function, the machine coordinate system setting is available at a feed rate.

Example:

G53.2 G01 IP_ F_;
IP_: Dimension word
F_: Feed rate

Benefits

- Increase of the setting of coordinate system
- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-R553	501iS-A Tool Positioning in Machine Coordinate System with Feedrate
A02B-0373-R553	501i-A Tool Positioning in Machine Coordinate System with Feedrate
A02B-0374-R553	502iS-A Tool Positioning in Machine Coordinate System with Feedrate
A02B-0375-R553	502i-A Tool Positioning in Machine Coordinate System with Feedrate
A02B-0377-R553	503i-A Tool Positioning in Machine Coordinate System with Feedrate

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

143

Program Input

Direct Drawing Dimension Programming

Features

The Direct Drawing Dimension Programming is a function that simplifies part programming on the shop floor.

Angles of straight lines, chamfering values, corner rounding values, and other dimensional values on machining drawings can be programmed by directly inputting these values.

In addition, chamfering and corner rounding can be inserted between straight lines having an arbitrary angle.

This function is a basic function in FANUC Series 0i-TF Plus.

Benefits

- Addition of programming functions to the CNC
- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J870	501iS-A Direct Drawing Dimension Programming
A02B-0373-J870	501i-A Direct Drawing Dimension Programming
A02B-0374-J870	502iS-A Direct Drawing Dimension Programming
A02B-0375-J870	502i-A Direct Drawing Dimension Programming
A02B-0377-J870	503i-A Direct Drawing Dimension Programming

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

G-Code System B/C

Features

This option allows to choose between three types of G-code systems that are available for lathe system CNC: A, B and C. The G-code system can be selected by parameter setting. The following table outlines the differences between the G-code systems.

G-Code System			Function
A	B	C	
G20	G20	G70	Inch input
G21	G21	G71	Metric input
G32	G33	G33	Thread cutting
G50	G92	G92	Coordinate system setting or max. spindle speed clamp
G50.3	G92.1	G92.1	Workpiece coordinate system preset
-	G50	G50	Scaling cancel
-	G51	G51	Scaling
G70	G70	G72	Finishing cycle
G71	G71	G73	Stock removal in turning
G72	G72	G74	Stock removal in facing
G73	G73	G75	Pattern repeating cycle
G74	G74	G76	End face peck drilling cycle
G75	G75	G77	Outer diameter / internal diameter drilling cycle
G76	G76	G78	Multiple-thread cutting cycle
G71	G71	G72	Traverse grinding cycle
G72	G72	G73	Traverse direct sizing/ grinding cycle
G73	G73	G74	Oscillation grinding cycle
G74	G74	G75	Oscillation direct sizing/ grinding cycle
G90	G77	G20	Outer diameter / internal diameter cutting cycle
G92	G78	G21	Threading cycle
G94	G79	G24	End face turning cycle
G98	G94	G94	Feed per minute
G99	G95	G95	Feed per revolution
-	G90	G90	Absolute programming

G-Code System			Function
A	B	C	
-	G91	G91	Incremental programming
-	G98	G98	Canned cycle: return to initial level
-	G99	G99	Canned cycle: return to R point level

If G-code system A is used, absolute or incremental programming is specified not by G-code (G90/G91), but by address word (X/U, Z/W, C/H, Y/V). Only the initial level is provided at the return point of canned cycle for drilling.

This function is a basic function in FANUC Series 0i-TF Plus.

Benefits

- Increase of the programming flexibility of the CNC
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J871	501iS-A G-Code System B / C
A02B-0373-J871	501i-A G-Code System B / C
A02B-0374-J871	502iS-A G-Code System B / C
A02B-0375-J871	502i-A G-Code System B / C
A02B-0377-J871	503i-A G-Code System B / C

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

146
Program Input

Lathe / Machining Center G-Code System Switching Function

Features

This function switches over G code system of each path for lathe and machining center by certain programming commands (M codes).The optimum program command and function for each processing, the turning processing and the milling processing, is available by switching mode.

Note: tool offset for Milling and Turning function (R595) and Designation of Designation of Machine Control, Type Multiple System (S838/C) is required.

Benefits

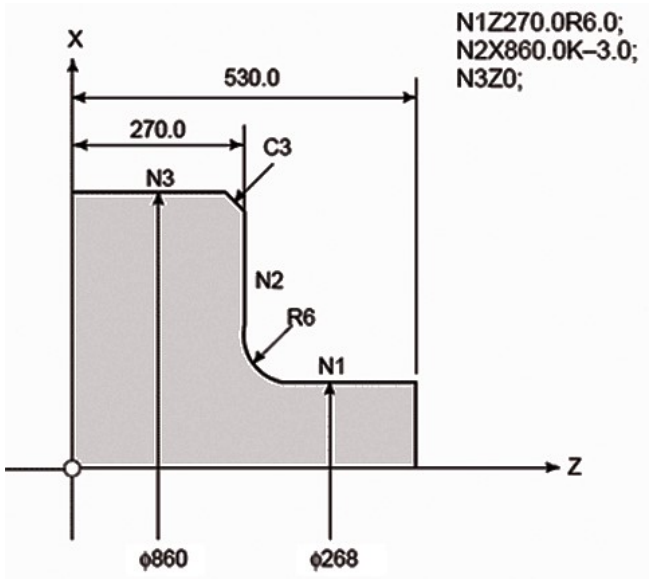
- Increase of the programming flexibility
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-R597	501iS-A Lathe / Machining Center G-Code System Switching Function
A02B-0373-R597	501i-A Lathe / Machining Center G-Code System Switching Function
A02B-0374-R597	502iS-A Lathe / Machining Center G-Code System Switching Function
A02B-0375-R597	502i-A Lathe / Machining Center G-Code System Switching Function
A02B-0377-R597	503i-A Lathe / Machining Center G-Code System Switching Function

147

Program Input



Chamfering / Corner Rounding

Features

The Chamfering / Corner Radius function is used on turning ('T' type) controls to insert a defined 45-degree chamfer or radius between two single-axis linear move program blocks that intersect at right angles.

It allows the programmer to enter the hypothetical corner intersection coordinates without having to calculate the start and end points of the chamfer or radius.

This function is a basic function in FANUC Series 0i-TF Plus.

Benefits

- Simplifies programming of chamfers and radii between right angle linear moves
- Simplifies blueprint programming
- Easy shop-floor changes to add radii and chamfers to existing programs

Ordering Information

Specification	Description
A02B-0372-J875	501iS-A Chamfering / Corner R
A02B-0373-J875	501i-A Chamferring / Corner R
A02B-0374-J875	502iS-A Chamfering / Corner R
A02B-0375-J875	502i-A Chamfering / Corner R
A02B-0377-J875	503i-A Chamferring / Corner R

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Optional Chamfering / Corner Rounding

Features

The Optional Chamfering / Corner Radius function is used on milling ('M' type) controls to insert a defined chamfer or radius between any two linear or circular program moves.

It allows programming of geometry end-coordinates is if chamfer or corner rounding were not required. Then, chamfers or radii can easily be applied by appending to the first of the program blocks either a (comma),C_ %value% or (comma),R_ %value%.

This function is a basic function in FANUC Series 0i-MF Plus and 0i-LF Plus.

Benefits

- Simplifies programming of chamfers and radii
- Simplifies blueprint programming
- Easy shop floor changes to add or change radii and chamfers on existing programs without changing the program block end-coordinates.

Ordering Information

Specification	Description
A02B-0372-S615	501iS-A Optional Chamfering / Corner R
A02B-0373-S615	501i-A Optimal Chamferring Corner R
A02B-0374-S615	502iS-A Optional Chamfering / Corner R
A02B-0375-S615	502i-A Optional Chamfering / Corner R
A02B-0377-S615	503i-A Optimal Chamferring Corner R

149

Program Input

Addition of Custom Macro Common Variables 1000

Features

The Addition of Custom Macro Common Variables 1000 function provides the possibility to use the custom macro common variables #150-#199, #550-#999, and #98000-#98499 in addition to custom macro common variables #100-#149 and #500-#549.

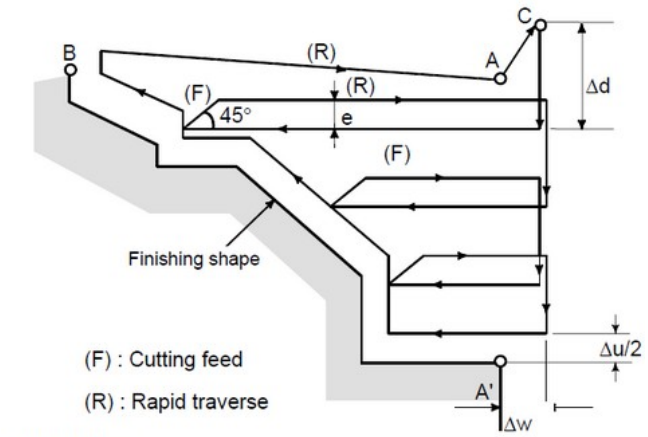
Benefits

- Allows permanent data retention
- No need to re-write data
- Keep calibration data with the job
- No need to use same variable numbers for interim calculations
- Facilitates debugging of Macro B program

Ordering Information

Specification	Description
A02B-0372-R687	501iS-A Addition of Custom Macro Common Variables - 1000
A02B-0373-R687	501iS-A Addition of Custom Macro Common Variables - 1000
A02B-0374-R687	502iS-A Addition of Custom Macro Common Variables - 1000
A02B-0375-R687	502i-A Addition of Custom Macro Common Variables - 1000
A02B-0377-R687	503i-A Addition of Custom Macro Common Variables - 1000

150
Program Input



G71 U(Δd) R(e);
G71 P(ns) Q(nf) U(Δu) W(Δw) F(f) S(s) T(t);
N(ns). . . .
. . . . . .
F_
S_
T_
N(nf) . . . . ;

The move command of a finished shape of A to A' to B is specified in the blocks from sequence number ns to nf.

Multi-Repetitive Cycles

Features

Multiple Repetitive Cycles are a series of seven additional Canned Cycles for Turning applications.
G70, G71, G72, G73, G74, G75 and G76 ease the programming of complex machining cycles.

- G71 - Stock Removal in Turning. Type I figures only, no pockets.
- G72 - Stock Removal in Facing. Type I figures only, no pockets.
- G73 - Pattern Repeating.
- G70 - Finishing
- G74 - End Face Peck Drilling Cycle.
- G75 - Outer Diameter / Internal Diameter Drilling Cycle.
- G76 - Multiple Threading Cycle.

This function is a basic function in FANUC Series 0i-TF Plus.

Benefits

- Simplification of the CNC Programming
- Increase of the productivity of the machine

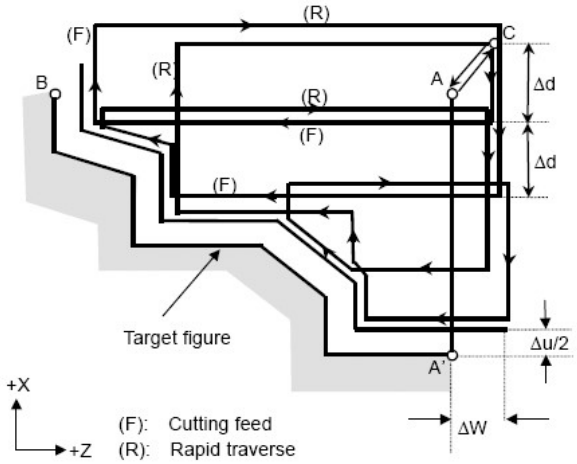
Ordering Information

Specification	Description
A02B-0372-J877	501iS-A Multiple Repetitive Cycles
A02B-0373-J877	501i-A Multiple Repetitive Cycles
A02B-0374-J877	502iS-A Multiple Repetitive Cycles
A02B-0375-J877	502i-A Multiple Repetitive Cycles
A02B-0377-J877	503i-A Multiple Repetitive Cycles

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

151
Program Input



Multi-Repetitive Cycles II

Features

Multiple Repetitive Cycles II are an enhanced version of the Multiple Repetitive Cycles I, G71 and G72, that enable the programmer to define pockets on the work piece to be machined.

With Multiple Repetitive Cycles II, the tool cuts the work piece along the target figure (comp. picture).

This function is a basic function in FANUC Series 0i-TF Plus.

Benefits

- Simplification of the Programming of the cycles
- Increase of the productivity of the machine

Ordering Information

Specification	Description
A02B-0372-J889	501iS-A Multiple Repetitive Cycles II
A02B-0373-J889	501i-A Multiple Repetitive Cycles II
A02B-0374-J889	502iS-A Multiple Repetitive Cycles II
A02B-0375-J889	502i-A Multiple Repetitive Cycles II
A02B-0377-J889	503i-A Multiple Repetitive Cycles II

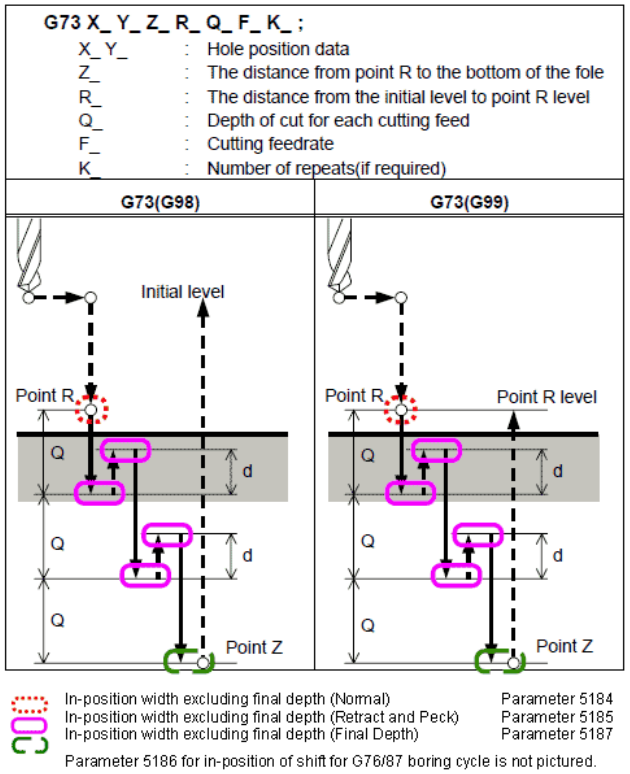
Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

152

Program Input

High-Speed peck Drilling Cycle (G73)



In-Position Check Switching Function for Drilling Canned Cycle

Features

Provides four dedicated in-position zone settings that are defined for use during drilling canned cycles. Three settings may be set to utilize larger in-position zones for moves within drilling canned cycles that do not require fine positioning. Cycle time is reduced by not spending excess time applying higher accuracy positioning when it is not required.

In-position zone setting for final depth of the drilling canned cycle is set separately, facilitating high accuracy positioning to meet part specifications.

Benefits

- Reduces execution time of Drilling Canned Cycles
- Allows tighter In-Position zone to be used for final depth, without adverse affect on other drilling/positioning moves during the canned cycle
- Tool life during drilling cycles may be improved by more efficient operation

Ordering Information

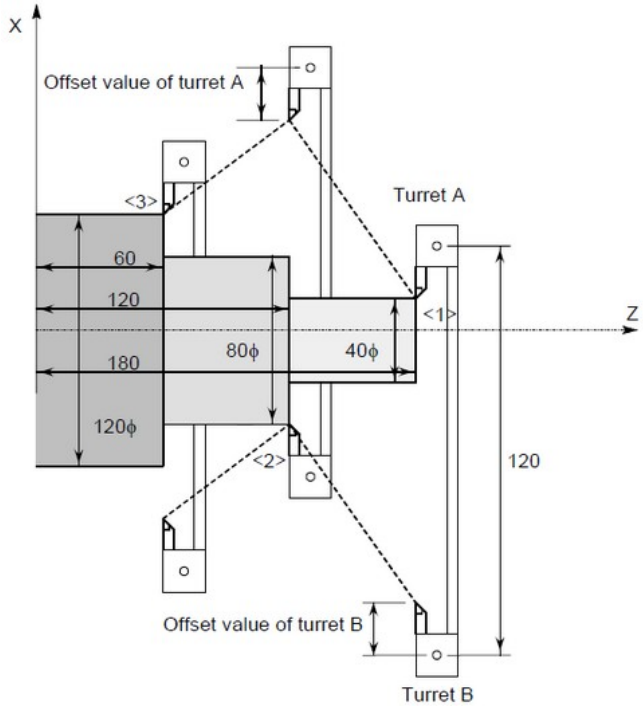
Specification	Description
A02B-0372-R648	501iS-A In-Position Check Switching Function for Drilling Canned Cycle
A02B-0373-R648	501i-A In-Position Check Switching Function for Drilling Canned Cycle
A02B-0374-R648	502iS-A In-Position Check Switching Function for Drilling Canned Cycle
A02B-0375-R648	502i-A In-Position Check Switching Function for Drilling Canned Cycle
A02B-0377-R648	503i-A In-Position Check Switching Function for Drilling Canned Cycle

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

153
Program Input

Mirror Image for Double Turret



Features

By applying mirror image to the X-axis with a G code, a machining program for the opposite tool post can be created for symmetric cutting as if the program were created in the coordinate system on the same side.

When G68 is designated, the coordinate system is shifted to the double turret side, and the X-axis sign is reversed from the programmed command to perform symmetrical cutting. To use this function, set the distance between the two tool posts to a parameter.

Programming example

X.40.0 Z180.0 T0101	Position tool post A at '1'
G68	Shift the coordinate system by the distance A to B (120mm), and turn mirror image on
X80.0 Z120.0 T0202	Position tool post B at '2'
G69	Shift the coordinate system by the distance B to A, and cancel mirror image.
X120.0 Z60.0 T0101	Position tool post A at '3'

This function is a basic function in FANUC Series 0i-TF Plus (Type 0, Type 1).

Benefits

- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

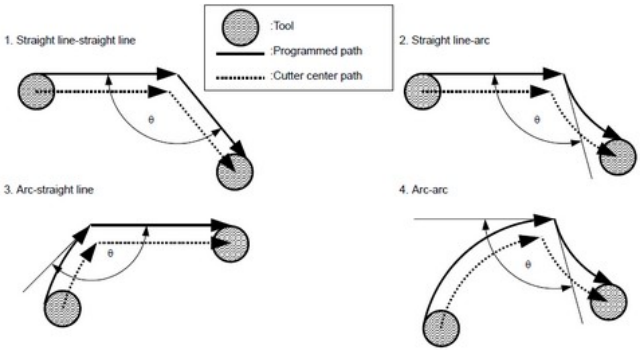
Specification	Description
A02B-0372-J881	501iS-A Mirror Image for Double Turret
A02B-0373-J881	501i-A Mirror Image for Double Turret
A02B-0374-J881	502iS-A Mirror Image for Double Turret
A02B-0375-J881	502i-A Mirror Image for Double Turret
A02B-0377-J881	503i-A Mirror Image for Double Turret

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

154

Program Input



Automatic Corner Override

Features

During cutter compensation, the cutting feed is over-ridden at corners while maintaining material removal rates.
This function is a basic function in FANUC Series 0i-MF Plus and 0i-LF Plus.

Benefits

- Improved tool life
- Improved surface finish
- Improved accuracy

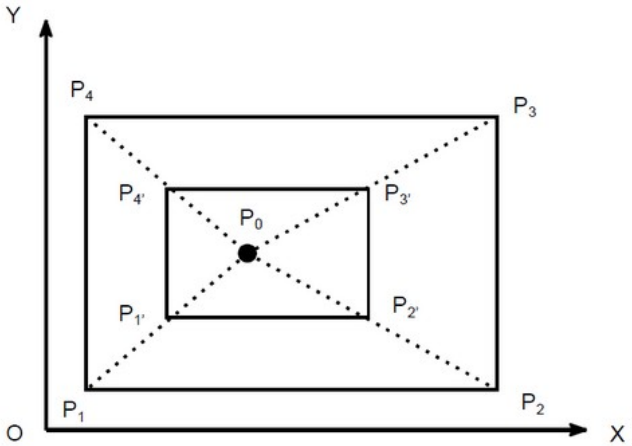
Ordering Information

Specification	Description
A02B-0372-J891	501iS-A Automatic Corner Override
A02B-0373-J891	501i-A Automatic Corner Override
A02B-0374-J891	502iS-A Automatic Corner Override
A02B-0375-J891	502i-A Automatic Corner Override
A02B-0377-J891	503i-A Automatic Corner Override

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

155
Program Input



P_0 : Scaling center
P_1 to P_4 : Programmed figure
$P_{1'}$ to $P_{4'}$: Scaled figure

Scaling

Features

Scaling is the function that allows the programmed shape to be magnified or reduced in size.

The dimensions specified with X_, Y_, and Z_ can each be scaled up or down with the same or different rates of magnification. The magnification rate can be specified in the program. Unless specified in the program, the magnification rate specified in the parameter is applied.

This function is a basic function in FANUC Series 0i-MF Plus and 0i-LF Plus.

Benefits

- Reduce program size
- Flexibility in programming
- Easy changes on shop floor
- Programming convenience

Ordering Information

Specification	Description
A02B-0372-J892	501iS-A Scaling
A02B-0373-J892	501i-A Scaling
A02B-0374-J892	502iS-A Scaling
A02B-0375-J892	502i-A Scaling
A02B-0377-J892	503i-A Scaling

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

156
Program Input

Scaling for each Axis

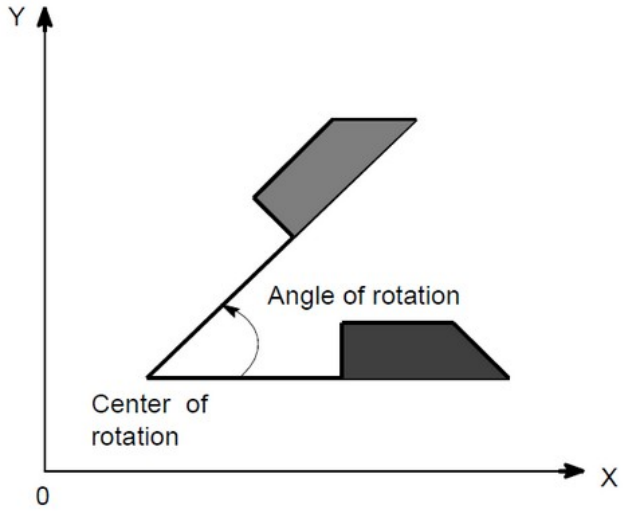
Features

Scaling for each Axis applies independent scaling for each axis to movements controlled by automatic operation or manual operation.

Ordering Information

Specification	Description
A02B-0377-R555	503i-A Scaling for each Axis

157
Program Input



Coordinate System Rotation

Features

Programmed shape can be rotated by specifying the pivot point and desired angle.
This function is a basic function in FANUC Series 0i-F Plus.

Benefits

- Minimize set up time
- Reduce program size
- Flexibility in programming
- No need to line up fixtures/Vise jaws perfectly

Ordering Information

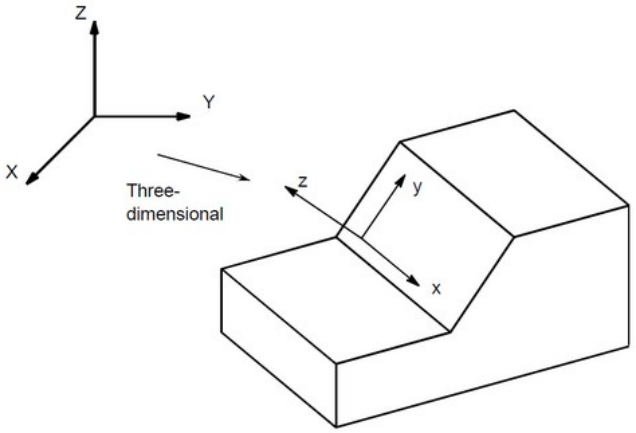
Specification	Description
A02B-0372-J893	501iS-A Coordinate System Rotation
A02B-0373-J893	501i-A Coordinate System Rotation
A02B-0374-J893	502iS-A Coordinate System Rotation
A02B-0375-J893	502i-A Coordinate System Rotation
A02B-0377-J893	503i-A Coordinate System Rotation

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

158

Program Input



3-Dimensional Coordinate System Conversion

Features

Coordinate conversion about an axis can be carried out if the center of rotation, direction of the axis of rotation, and angular displacement are specified.

This function is very useful in three-dimensional machining by a die-sinking, or similar, machine. For example, by executing a program created on the XY plane after applying 3 Dimensional Coordinate Conversion, machining can be performed on an arbitrary plane in a three-dimensional space.

By specifying rigid tapping in the 3-dimensional coordinate conversion mode, a tapping operation can be performed in the angle direction specified by the 3-dimensional coordinate conversion command (3-dimensional rigid tapping).

Benefits

- Addition of 3D Coordinate Conversion to the CNC
- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

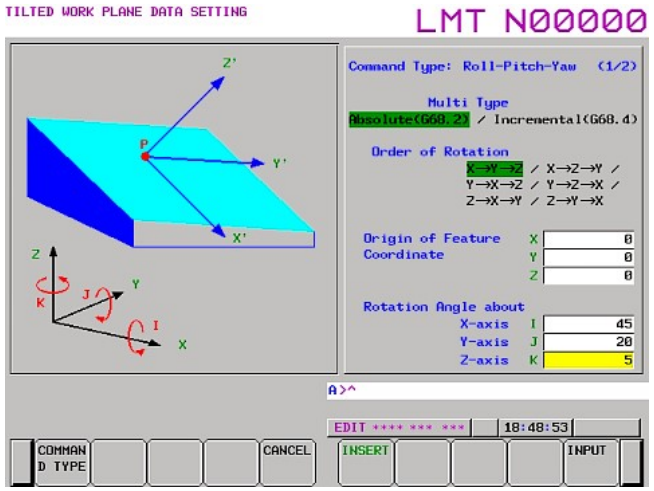
Specification	Description
A02B-0372-J713	501iS-A 3-D Coordinate System Conversion
A02B-0373-J713	501i-A 3-D Coordinate System Conversion
A02B-0374-J713	502iS-A 3-D Coordinate System Conversion
A02B-0375-J713	502i-A 3-D Coordinate System Conversion
A02B-0377-J713	503i-A 3-D Coordinate System Conversion

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

159

Program Input



Tilted Working Plane (TWP)

Features

Tilted Working Plane is used on 5 axes milling machines to define a plane, tilted relatively to the machine table. When a figure such as a hole or pocket is cut on a plane, tilted relatively to the reference surface of the workpiece, this function defines a coordinate system (referred to a "feature coordinate system") tied to the plane.

When specifying a position in such a coordinate system, a program can be created in a much easier way. A feature coordinate system is defined on a workpiece coordinate system. See the figure below for the relationship between a feature coordinate system and workpiece coordinate system.

This function is applicable to the "table type" machine configuration of the Robodrill.

Tilted Working Plane Command with Guidance

With this enhancement of the "Tilted Working Plane" command, the following commands can be programmed using a specific graphical screen:

- Euler's Angle
- Roll-Pitch-Yaw
- Three points
- Two vectors
- Projection angles

The guidance screen for tilted working plane command creates a tilted working plane command block after the machine operator has entered tilted working plane data on an interactive screen. With this function, a complicated tilted working plane command block can be easily created.

Benefits

- Addition of TWP command to the CNC
- Simplification of the programming for 5 axis machines
- Improvement of the overall machining productivity

Ordering Information

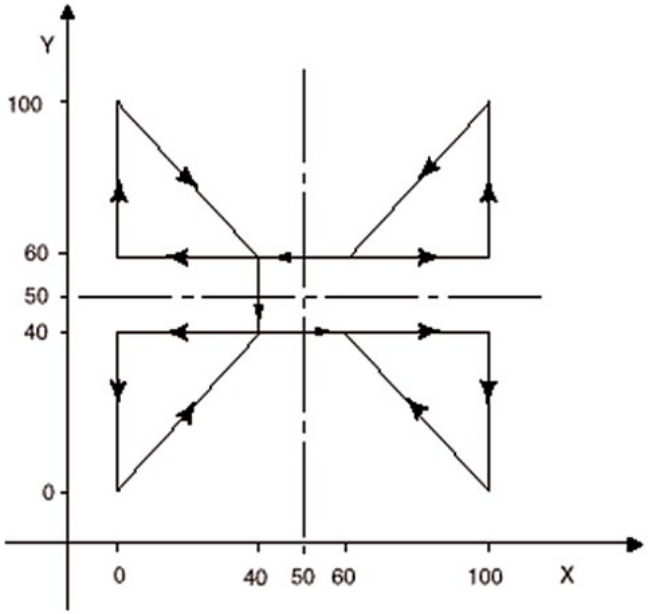
Specification	Description
A02B-0372-R522	501iS-A Tilted Working Plane Indexing Command with Guidance
A02B-0373-R522	501i-A Tilted Working Plane Indexing Command with Guidance

Specification	Description
A02B-0374-R522	502iS-A Tilted Working Plane Indexing Command with Guidance
A02B-0375-R522	502i-A Tilted Working Plane Indexing Command with Guidance
A02B-0377-R522	503i-A Tilted Working Plane Indexing Command with Guidance

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

161
Program Input



Programmable Mirror Image

Features

Programmed shape can be mirror imaged about the axis of symmetry.
This function is a basic function in FANUC Series 0i-F Plus.

Benefits

- Reduce Program size
- Flexibility in Programming
- Minimize math for creating programs
- Easy changes
- Real part programming convenience

Ordering Information

Specification	Description
A02B-0372-J880	501iS-A Programmable Mirror Image
A02B-0373-J880	501i-A Programmable Mirror Image
A02B-0374-J880	502iS-A Programmable Mirror Image
A02B-0375-J880	502i-A Programmable Mirror Image
A02B-0377-J880	503i-A Programmable Mirror Image

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Figure Copying

Features

Figure Copying is a function that allows machining to be repeated after moving or rotating the figure using a subprogram. This can save part program storage space as multiple parts can be defined in one part program

Benefits

- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J897	501iS-A Figure Copying
A02B-0373-J897	501i-A Figure Copying
A02B-0374-J897	502iS-A Figure Copying
A02B-0375-J897	502i-A Figure Copying
A02B-0377-J897	503i-A Figure Copying

163
Program Input

Embedded Macro

Features

This function protects a program created by a machine tool builder, by storing the program in an exclusive folder to embedded macros (hereinafter referred to as an MTB1 folder) and assigning an attribute to the folder.

At the same time, the following functions are available:

- An exclusive program memory capacity of 100K bytes (corresponding to about 260 m) is provided in addition the ordinary program memory capacity. The number of registerable programs remains unchanged from the ordinary number of registerable programs.
- Attributes such as edit lock and edit/display lock can be assigned to the MTB1 folder. In addition, a set values can be locked using an exclusive password.
- A program stored in the MTB1 folder can be called based on a M/T codes or G code; subprogram can be called using M code.
- Custom macro common variables (#200 to #499) are added.

Benefits

- Protection of programs

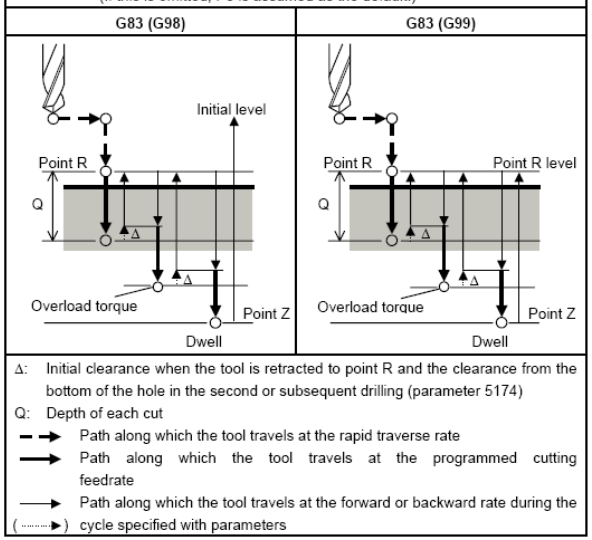
Ordering Information

Specification	Description
A02B-0372-S652	501iS-A Embedded Macro
A02B-0373-S652	501i-A Embedded Macro
A02B-0374-S652	502iS-A Embedded Macro
A02B-0375-S652	502i-A Embedded Macro
A02B-0377-S652	503i-A Embedded Macro

164
Program Input

G83 X_ Y_ Z_ R_ Q_ F_I_ K_P ;

X_ Y_ : Hole position data
Z_ : Distance from point R to the bottom of the hole
R_ : Distance from the initial level to point R
Q_ : Depth of each cut
F_ : Cutting feedrate
I_ : Forward or backward traveling speed (same format as F above)
(If this is omitted, the values in parameters No.5172 and No.5173 are assumed as defaults.)
K_ : Number of times the operation is repeated (if required)
P_ : Dwell time at the bottom of the hole
(If this is omitted, P0 is assumed as the default.)



Δ: Initial clearance when the tool is retracted to point R and the clearance from the bottom of the hole in the second or subsequent drilling (parameter 5174)
Q: Depth of each cut
Path along which the tool travels at the rapid traverse rate
Path along which the tool travels at the programmed cutting feedrate
Path along which the tool travels at the forward or backward rate during the cycle specified with parameters

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Small Hole Peck Drilling Cycle

Features

The Small Hole Peck Drilling Cycle performs a drilling operation that periodically retracts the tool above the parts surface (to a clearance position) to clear chips or flood the hole with coolant until the desired hole depth is reached.

This function is a basic function in FANUC Series 0i-MF Plus (Type 0, 1 and 3).

Benefits

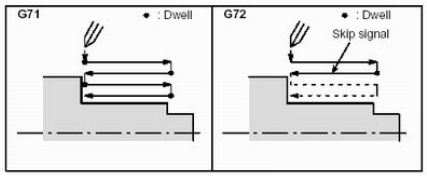
- Simplified Programming

Ordering Information

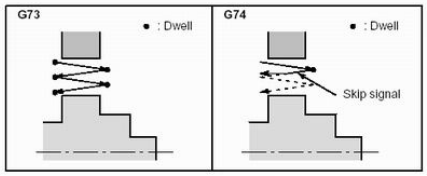
Specification	Description
A02B-0372-J896	501iS-A Small Hole Peck Drilling Cycle
A02B-0373-J896	501i-A Small Hole Peck Drilling Cycle
A02B-0374-J896	502iS-A Small Hole Peck Drilling Cycle
A02B-0375-J896	502i-A Small Hole Peck Drilling Cycle
A02B-0377-J896	503i-A Small Hole Peck Drilling Cycle

165
Program Input

Traverse grinding cycle (G71, G72)



Oscillating grinding cycle (73, G74)



Canned Cycle for Grinding

Features

Canned Cycles for Grinding provides an easier way for the programmer to create programs for grinding.

With a canned grinding cycle, repetitive operations peculiar to grinding can be specified in a single block with a G function. The repetitive machining specific to grinding can be specified by one block. Since four types of canned cycles are provided for grinding, programming is simplified.

Benefits

- Simplified Programming

Ordering Information

Specification	Description
A02B-0372-S974	501iS-A Canned Cycle for Grinding
A02B-0373-S974	501i-A Canned Cycle for Grinding
A02B-0374-S974	502iS-A Canned Cycle for Grinding
A02B-0375-S974	502i-A Canned Cycle for Grinding
A02B-0377-S974	503i-A Canned Cycle for Grinding

166
Program Input

Extended P-Code Variables Size

Features

This function increases the total number of available P-code variables and extended P-code variables for Macro Executor.

Benefits

- Increase the processing capabilities of Macro Executor

Ordering Information

Specification	Description
A02B-0372-J739#1M	501iS-A Extended P-Code Variables Size 1 MB
A02B-0372-J739#256K	501iS-A Extended P-Code Variables Size 256 kB
A02B-0372-J739#512K	501iS-A Extended P-Code Variables Size 512 kB
A02B-0373-J739#1M	501i-A Extended P-Code Variables Size 1 MB
A02B-0373-J739#256K	501i-A Extended P-Code Variables Size 256 kB
A02B-0373-J739#512K	501i-A Extended P-Code Variables Size 512 kB
A02B-0374-J739#1M	502iS-A Extended P-Code Variables Size 1 MB
A02B-0374-J739#256K	502iS-A Extended P-Code Variables Size 256 kB
A02B-0374-J739#512K	502iS-A Extended P-Code Variables Size 512 kB
A02B-0375-J739#1M	502i-A Extended P-Code Variables Size 1 MB
A02B-0375-J739#256K	502i-A Extended P-Code Variables Size 256 kB
A02B-0375-J739#512K	502i-A Extended P-Code Variables Size 512 kB
A02B-0377-J739#1M	503i-A Extended P-Code Variables Size 1 MB
A02B-0377-J739#256K	503i-A Extended P-Code Variables Size 256 kB
A02B-0377-J739#512K	503i-A Extended P-Code Variables Size 512 kB

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Motion Script

Features

Motion Script enables to command operations that will be performed depending on conditions, such as controlling peripheral axes, in a macro program. Motion Script commands are executed simultaneously with NC axis control commands. Therefore, even in the middle of an NC axis command, operations such as movement commands for peripheral axes can be performed depending on the machine status.

Benefits

- Shorten cycle time

Ordering Information

Specification	Description
A02B-0372-S842	501iS-A Motion Script
A02B-0373-S842	501i-A Motion Script
A02B-0374-S842	502iS-A Motion Script
A02B-0375-S842	502i-A Motion Script
A02B-0377-S842	503i-A Motion Script

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Built-In FOCAS Application

Features

Built-in FOCAS Application is a function for FANUC Series 500i. This function allows the execution of C language applications on the CNC. The program is compiled on a PC and input into the CNC. It is then loaded at the startup of the CNC and executed. A subset of FOCAS3 functions can be called from the application.

Since the application executes native code, it can perform a large amount of calculation processing very fast. In addition, since the execution cycle of the application is guaranteed, the machine status can be obtained periodically and used for control such as monitoring and changing PMC signals.

Benefits

- Periodically executing high-load calculation processing
- Convenient application program development on the PC
- Easy installation on the CNC device

Ordering Information

Specification	Description
A02B-0372-R110	501iS-A Built-In FOCAS Application
A02B-0373-R110	501i-A Built-In FOCAS Application
A02B-0374-R110	502iS-A Built-In FOCAS Application
A02B-0375-R110	502i-A Built-In FOCAS Application
A02B-0377-R110	503i-A Built-In FOCAS Application

FANUC PICTURE2 Extension

Features

FANUC PICTURE2 Extension is a function that allows to run FANUC PICTURE2 applications using screen parts of the 500i-A operation screen on the CNC.

Benefits

- Improves the functionality of FANUC PICTURE2

Ordering Information

Specification	Description
A02B-0372-R925	501iS-A Fanuc Picture 2 Extension
A02B-0373-R925	501i-A Fanuc Picture 2 Extension
A02B-0374-R925	502iS-A Fanuc Picture 2 Extension
A02B-0375-R925	502i-A Fanuc Picture 2 Extension
A02B-0377-R925	503i-A Fanuc Picture 2 Extension

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

170
Functions

Integrated Operation & Programming Guidance Functions

FANUC products and solutions reflect over 50 years of experience in machine tools, conversational / interactive programming and part programming on the shop floor. The straightforward design of the operation screens allows fast, simple and user friendly operation.

Without particular knowledge of G-code programming, it is possible to generate part programs, just by answering simple questions.

Enhanced simulation capabilities are also provided to verify the part programs without moving the axes.

Interactive programming solutions detailed in this catalogue:

- MANUAL GUIDE i for Series 30i and Series 0i CNC
- MANUAL GUIDE 0i for Series 0i CNC
- TURN MATE i for Series 0i CNC

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

171

Integrated Operation & Programming Guidance Functions

iHMI

The following section contains functions related to iHMI, FANUC's new user interface.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

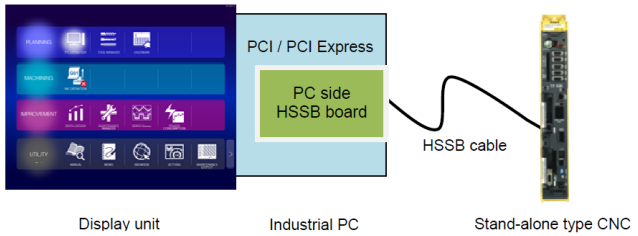
172
iHMI

iHMI2

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

iHMI Driver for IPC



Features

iHMI can be installed on 3rd party Industrial PCs. You can use iHMI on displays with arbitrary display sizes and integrate iHMI into customer specific operator consoles. The iHMI Driver for IPC option is necessary in that case.

Benefits

- Use displays with arbitrary display sizes
- Integrate iHMI into customer specific operator consoles

Ordering Information

Specification	Description
A02B-0372-R907	501iS-A iHMI 2 Driver for IPC
A02B-0373-R907	501i-A iHMI 2 Driver for IPC
A02B-0374-R907	502iS-A iHMI 2 Driver for IPC
A02B-0375-R907	502i-A iHMI 2 Driver for IPC
A02B-0377-R907	503i-A iHMI 2 Driver for IPC

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Machining Program Preview

Ordering Information

Specification	Description
A02B-0372-R904	501iS-A Machining Program Preview
A02B-0373-R904	501i-A Machining Program Preview
A02B-0374-R904	502iS-A Machining Program Preview
A02B-0375-R904	502i-A Machining Program Preview
A02B-0377-R904	503i-A Machining Program Preview

Machining Cycle Function

Ordering Information

Specification	Description
A02B-0372-R938	501iS-A Machining Cycle Function
A02B-0373-R938	501i-A Machining Cycle Function
A02B-0374-R938	502iS-A Machining Cycle Function
A02B-0375-R938	502i-A Machining Cycle Function
A02B-0377-R938	503i-A Machining Cycle Function

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Measurement Cycle Function

Ordering Information

Specification	Description
A02B-0372-R939	501iS-A Measurement Cycle Function
A02B-0373-R939	501i-A Measurement Cycle Function
A02B-0374-R939	502iS-A Measurement Cycle Function
A02B-0375-R939	502i-A Measurement Cycle Function
A02B-0377-R939	503i-A Measurement Cycle Function

177
Functions

Auxiliary / Spindle Speed Functions

This section of the catalogue contains the functions related to auxiliary and spindle functions in the CNC.
Some of the functions detailed in the catalogue:

- Analogue spindle control
- Spindle orientation
- Spindle synchronous control
- Multi-spindlecontrol
- Spindle CS contour control
- High precision learning control
- Etc.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

178

Auxiliary / Spindle Speed Functions

2nd Auxiliary Function

Features

The 2nd Auxiliary Function provides a second part programming code called "code B" to activate Auxiliary functions.

Up to eight digits, selectable by a parameter setting and a strobe signal are sent to the PMC. Only one B code is allowed per block.

This function is a basic function in FANUC Series 0i-F Plus (Type 0, 1 and 3).

Benefits

- Allows programming of B code to do M code functions
- Sometime B codes provide ease of use for operation and programming
- Typical application Turn on coolant command
  Pallet 1=M08, Pallet 2=B08
- No change in cycle time

Ordering Information

Specification	Description
A02B-0372-J920	501iS-A 2nd Auxiliary Function
A02B-0373-J920	501i-A 2nd Auxiliary Function
A02B-0374-J920	502iS-A 2nd Auxiliary Function
A02B-0375-J920	502i-A 2nd Auxiliary Function
A02B-0377-J920	503i-A 2nd Auxiliary Function

179

Auxiliary / Spindle Speed Functions

Auxiliary Function Output in Moving Axis

Features

The Auxiliary Function Output in Moving Axis provides a way when specifying absolute coordinate values and auxiliary function (M, B) at the G50.9 block, that auxiliary functions are output to PMC when the absolute coordinate enters the specified area in movement block. G50.9 can be specified in 2 blocks continuously.

In other words, the auxiliary function output point in the movement block can be specified in two. Code signals and strobe signals are output to the same signal address as usual auxiliary function.

Benefits

- Simplification of the programming

Ordering Information

Specification	Description
A02B-0372-S889	501iS-A Auxiliary Function Output in Moving Axis
A02B-0373-S889	501i-A Auxiliary Function Output in Moving Axis
A02B-0374-S889	502iS-A Auxiliary Function Output in Moving Axis
A02B-0375-S889	502i-A Auxiliary Function Output in Moving Axis
A02B-0377-S889	503i-A Auxiliary Function Output in Moving Axis

180

Auxiliary / Spindle Speed Functions

Waiting Function by Specifying Start Point

Features

Control based on M codes is normally used to make one path to wait on the other during machining. When a M code for waiting is specified in a block of a path during automatic operation, the other path waits for the same M code to be specified before staring the execution of the next block.

With the Waiting Function by Specifying Start Point function, by specifying a start point with a waiting M code, the absolute coordinate value of that path or the other path can be used as the condition for waiting.

Benefits

- Simplification of the programming

Ordering Information

Specification	Description
A02B-0372-S888	501iS-A Waiting Function by Specifying Point
A02B-0373-S888	501i-A Waiting Function by Specifying Point
A02B-0374-S888	502iS-A Waiting Function by Specifying Point
A02B-0375-S888	502i-A Waiting Function by Specifying Point
A02B-0377-S888	503i-A Waiting Function by Specifying Point

181

Auxiliary / Spindle Speed Functions

Constant Surface Speed Control

Features

When a surface speed (in m/min or feet/min) is specified with an S code (a numeric value following S), the spindle speed is controlled so that the surface speed is kept constant with respect to the change in tool position.

This function is a basic function in FANUC Series 0i-F Plus.

Benefits

- Spindle speed adjusted automatically to maintain constant amount of material
- Typical example are surface grinders: as diameter increases speed reduces thereby improving surface finish, reducing tool wear while maintaining constant material removal rate

Ordering Information

Specification	Description
A02B-0372-J855	501iS-A Constant Surface Speed Control
A02B-0373-J855	501i-A Constant Surface Speed Control
A02B-0374-J855	502iS-A Constant Surface Speed Control
A02B-0375-J855	502i-A Constant Surface Speed Control
A02B-0377-J855	503i-A Constant Surface Speed Control

182

Auxiliary / Spindle Speed Functions

Actual Spindle Speed Output

Features

The actual spindle speed calculated from the spindle motor position coder feedback signal is output in 16-bit binary code. This function is a basic function in FANUC Series 0i-TF Plus (Type 0, 1 and 3).

Benefits

- Simplification of the programming

Ordering Information

Specification	Description
A02B-0372-J856	501iS-A Actual Spindle Speed Output
A02B-0373-J856	501i-A Actual Spindle Speed Output
A02B-0374-J856	502iS-A Actual Spindle Speed Output
A02B-0375-J856	502i-A Actual Spindle Speed Output
A02B-0377-J856	503i-A Actual Spindle Speed Output

Spindle Synchronous Control

Features

In a machine having two or more spindles (such as a multi-path lathe), this function provides a way to synchronize the spindles together.

When a workpiece is switched between two spindles during spindle rotation, or when the spindle speeds of two spindles are accelerated or decelerated while the spindles are holding a workpiece, the spindles can be rotated at the same speed. This is spindle speed synchronization.

When a workpiece is transfered from one spindle to the other, the rotations of the two spindles can be made in phase to each other, matching the angular displacement. This is called phase synchronization.

Benefits

- Simplification of the handling of the spindle in multi-spindle lathes

Ordering Information

Specification	Description
A02B-0372-J858	501iS-A Spindle Synchronous Control
A02B-0373-J858	501i-A Spindle Synchronous Control
A02B-0374-J858	502iS-A Spindle Synchronous Control
A02B-0375-J858	502i-A Spindle Synchronous Control
A02B-0377-J858	503i-A Spindle Synchronous Control

Multi-Spindle Control

Features

In addition to the first spindle, the second to fourth, sixth or eighth spindle, can be controlled using an S command from the CNC. The maximum number of spindle is dependant on the CNC capabilities / type.

Spindle commands are specified using a single S command as conventionally done. A spindle is selected depending on the signal from the PMC or the address P command.

Gear change between two stages can be made for additional spindles in the same manner as for the first spindle. Parameter setting provides the possiblity to set a maximum spindle speed for each spindle and clamp the speed of each spindle at the corresponding maximum spindle speed.

The position coder interfaces for the second to fourth spindles can be selected and added. The additional position coders are selected by signals from the PMC.

This function is a basic function in FANUC Series 0i-TF Plus.

Benefits

- Simplification of the programming
- Increase of the throughput of the machine
- Overall increase of the productivity of the machine

Ordering Information

Specification	Description
A02B-0372-J859	501iS-A Multi-Spindle Control
A02B-0373-J859	501i-A Multi-Spindle Control
A02B-0374-J859	502iS-A Multi-Spindle Control
A02B-0375-J859	502i-A Multi-Spindle Control
A02B-0377-J859	503i-A Multi-Spindle Control

Arbitrary Position Reference Setting for Cs Axis

Features

When a reference position return command (G28 or a manual reference position return) is executed for the first time since a serial spindle is placed in the Cs contour control mode, an arbitrary position can be set as the reference position by parameter setting.

In this case, the system performs reference position return, assuming that the current position is the reference position, so the system does not move the spindle to position it to the reference position.

Because the reference position return operation does not involve positioning to the spindle position specific to the spindle, this function can reduce the cycle time.

Benefits

- Reduction of the cycle time
- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-S664	501iS-A Arbitrary Position Reference Setting for CS Axis
A02B-0373-S664	501i-A Arbitrary Position Reference Setting for CS Axis
A02B-0374-S664	502iS-A Arbitrary Position Reference Setting for CS Axis
A02B-0375-S664	502i-A Arbitrary Position Reference Setting for CS Axis
A02B-0377-S664	503i-A Arbitrary Position Reference Setting for CS Axis

M-Code Group Check Function

Features

The M code group check function checks if a combination of multiple M codes (up to three M codes) contained in a block is correct.

This function has two purposes:

- To detect if any of the multiple M codes specified in a block include an M code that must be specified alone
- To detect if any of the multiple M codes specified in a block include M codes that belong to the same group.

In either of these cases, alarm is issued.

Benefits

- Addition of check function to avoid programming mistakes
- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J922	501iS-A M-Code Group Check
A02B-0373-J922	501i-A M-Code Group Check
A02B-0374-J922	502iS-A M-Code Group Check
A02B-0375-J922	502i-A M-Code Group Check
A02B-0377-J922	503i-A M-Code Group Check

187

Auxiliary / Spindle Speed Functions

Spindle Control with Servo Motor

Features

This function allows to execute spindle rotation commands and spindle-speed functions such as rigid tapping, with a servo motor. It handles the servo motor used as a live tool axis as a single spindle. The option for spindle serial output and multi-spindle control function is necessary to use this function.

Spindle speed control with servo motor

Allows to perform speed control with rotation commands (S commands), using a servo motor as a live tool. At the switching between rotation commands and positioning commands, no reference position return is necessary.

Live tool indexing function

There are two types of live tool indexing functions:

- Execution of the commands in the next block without waiting for the completion of live tool indexing
- Execution of the next block after waiting for the completion of live tool indexing.

The type that does not wait for completion allows the user to specify commands for other axes before issuing the next command for the live tool indexing command axis. It also allows the user to check to see if live tool indexing has completed before issuing the next command for the live tool indexing command axis.

Rigid tapping with servo motor

Allows to perform rigid tapping with a servo motor as a rotation axis. The option for rigid tapping and canned cycle is necessary to use rigid tapping with servo motor.

Benefits

- Simplification of the machine structure
- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J978	501iS-A Spindle Control with Servo Motor
A02B-0373-J978	501i-A Spindle Control with Servo Motor

Specification	Description
A02B-0374-J978	502iS-A Spindle Control with Servo Motor
A02B-0375-J978	502i-A Spindle Control with Servo Motor
A02B-0377-J978	503i-A Spindle Control with Servo Motor

189

Auxiliary / Spindle Speed Functions

Spindle Control with Cs Contour Control

Features

This function allows the execution of spindle rotation commands and spindle-speed functions such as rigid tapping, with a Cs contour control axis.

A speed control with rotation commands (S commands) is possible, using a Cs contour control axis. At the switching between rotation commands and positioning commands, no reference position return is necessary.

Benefits

- Increase of the flexibility of the spindle control
- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J985	501iS-A Spindle Control Function with CS Contour Control
A02B-0373-J985	501i-A Spindle Control Function with CS Contour Control
A02B-0374-J985	502iS-A Spindle Control Function with CS Contour Control
A02B-0375-J985	502i-A Spindle Control Function with CS Contour Control
A02B-0377-J985	503i-A Spindle Control Function with CS Contour Control

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

190

Auxiliary / Spindle Speed Functions

Cs Contour Control Speed Command Switching Function

Features

Cs Contour Control Speed Command Switching Function improves the functions Spindle Control with Servo Motor and Spindle Control with Cs Contour Control in the following ways:

1. Switching between positioning control and speed control becomes faster
2. The in-position width for speed control can be set separately
3. The in-position check for speed control and position control can be disabled by signal

Benefits

- Reduce cycle time when switching between speed control and position control

Ordering Information

Specification	Description
A02B-0372-R530	501iS-A CS Contour Control Speed Command Switching Function
A02B-0373-R530	501i-A CS Contour Control Speed Command Switching Function
A02B-0374-R530	502iS-A CS Contour Control Speed Command Switching Function
A02B-0375-R530	502i-A CS Contour Control Speed Command Switching Function
A02B-0377-R530	503i-A CS Contour Control Speed Command Switching Function

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

191

Auxiliary / Spindle Speed Functions

Flexible Path Spindle Assignment (Spindle Switching Function)

Features

The Spindle Switching function can realize the spindle control in arbitrary combination of spindle motors and commands to a spindle.

The combination of spindle motors and commands can be switched by the signals of the spindle switching function.

Benefits

- Increase of the flexibility of the machine
- Simplification of programming
- Overall increase of the machining productivity

Ordering Information

Specification	Description
A02B-0372-R515	501iS-A Flexible Path Spindle Assignment
A02B-0373-R515	501i-A Flexible Path Spindle Assignment
A02B-0374-R515	502iS-A Flexible Path Spindle Assignment
A02B-0375-R515	502i-A Flexible Path Spindle Assignment
A02B-0377-R515	503i-A Flexible Path Spindle Assignment

Spindle Flexible Ratio Synchronous Control

Features

Spindle Flexible Ratio Synchronous Control enables the use of parameters and signals to reduce the switching time between position control and velocity control in Spindle Control by Servo Motor or Cs Contouring Control.

Benefits

- Reduce cycle time

Ordering Information

Specification	Description
A02B-0372-R556	501iS-A Spindle Flexible Ratio Synchronous Control
A02B-0373-R556	501i-A Spindle Flexible Ratio Synchronous Control
A02B-0374-R556	502iS-A Spindle Flexible Ratio Synchronous Control
A02B-0375-R556	502i-A Spindle Flexible Ratio Synchronous Control
A02B-0377-R556	503i-A Spindle Flexible Ratio Synchronous Control

193
Functions

Tool Functions / Tool Compensation

This section of the catalogue contains the functions related to Tool Management and Tool compensation.
Some of the functions detailed in the catalogue:

- Tool offset
- Tool Center Point control (TCP
- Smooth TCP
- Automatic compensation
- Geometry compensation
- Tool wear compensation
- Advanced Tool Management
- Wheel wear compensation
- Etc.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Tool Offset Pairs

Features

This function enhances the maximum number of tool offset to a higher maximum value. The tool offset number is specified with the last three digits in T-code value. The tool offset number is specified with the remaining digits after excluding the three digits used to specify the tool offset number.

The maximum size of the tool offset depends on the type of CNC. Refer to the ordering information table for further details.

Tool Offset, 400 Pairs is a basic function in 0i-LF Plus.

Benefits

- Increase of the tool capability of the CNC
- Increase of the flexibility of the machine

Ordering Information

Specification	Description
A02B-0372-J927#1K	501iS-A Tool Offset Pairs - 1000 Pairs
A02B-0372-J927#200	501iS-A Tool Offset Pairs - 200 Pairs
A02B-0372-J927#400	501iS-A Tool Offset Pairs - 400 Pairs
A02B-0373-J927#1K	501i-A Tool Offset Pairs - 1000 Pairs
A02B-0373-J927#200	501i-A Tool Offset Pairs - 200 Pairs
A02B-0373-J927#400	501i-A Tool Offset Pairs - 400 Pairs
A02B-0374-J927#1K	502iS-A Tool Offset Pairs - 1000 Pairs
A02B-0374-J927#200	502iS-A Tool Offset Pairs - 200 Pairs
A02B-0374-J927#400	502iS-A Tool Offset Pairs - 400 Pairs
A02B-0374-S622#1K	502iS-A Addition of Tool Offset Memory 1000 Pairs
A02B-0375-J927#1K	502i-A Tool Offset Pairs - 1000 Pairs
A02B-0375-J927#200	502i-A Tool Offset Pairs - 200 Pairs
A02B-0375-J927#400	502i-A Tool Offset Pairs - 400 Pairs
A02B-0375-S622#1K	502i-A Addition of Tool Offset Memory 1000 Pairs
A02B-0377-J927#1K	503i-A Tool Offset Pairs - 1000 Pairs
A02B-0377-J927#200	503i-A Tool Offset Pairs - 200 Pairs
A02B-0377-J927#400	503i-A Tool Offset Pairs - 400 Pairs
A02B-0377-S622#1K	503i-A Addition of Tool Offset Memory 1000 Pairs

Tool Offset Memory B

Features

Tool Offset Memory B provides separate offsets for geometry compensation and wear compensation. There is no difference between cutter compensation (D code) and tool length compensation (H code).

Setting Example for Tool Compensation Memory B

Offset Number	Compensation Value (Geometry)	Compensation Value (Wear)	Common to D and H Codes
001	10100	0,100	for D code
002	20200	0,200	for D code
003	100000	0,100	for H code
...	...	...	...

Benefits

- Addition of the Tool Offset Memory B to the CNC
- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-S616	501iS-A Tool Offset Memory B
A02B-0373-S616	501i-A Tool Offset Memory B
A02B-0374-S616	502iS-A Tool Offset Memory B
A02B-0375-S616	502i-A Tool Offset Memory B
A02B-0377-S616	503i-A Tool Offset Memory B

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Tool Offset Memory C

Features

Tool Offset Memory C provides for geometry compensation and wear compensation in separate tool compensation memory. Geometry compensation and wear compensation can thus be set separately. Separate memories are prepared for cutter compensation (for D code) and for tool length compensation (for H code).

Setting Example for Tool Compensation Memory C

Offset Number	D Code		H Code	
	Compensation Value (Geometry)	Compensation Value (Wear)	Compensation Value (Geometry)	Compensation Value (Wear)
001	10000	0,100	100000	0,100
002	20000	0,200	200000	0,300
...	...	...	...	...

This function is a basic function in FANUC Series 0i-MF Plus.

Benefits

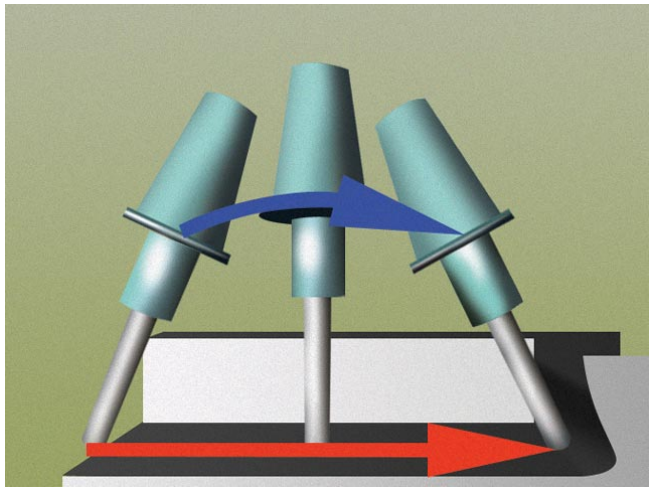
- Addition of the Tool Offset Memory C to the CNC
- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J937	501iS-A Tool Offset Memory C
A02B-0373-J937	501i-A Tool Offset Memory C
A02B-0374-J937	502iS-A Tool Offset Memory C
A02B-0375-J937	502i-A Tool Offset Memory C
A02B-0377-J937	503i-A Tool Offset Memory C

197

Tool Functions / Tool Compensation



Tool Center Point Control

Features

On a 5-axis machine having two rotary axes that turn a tool or table, this function performs tool length compensation constantly, even in the middle of a block, and exerts control so that the tool center point moves along the specified path.

Benefits

- **Consistent Accuracy in Every Tool Orientation**
  Tool Center Point Control continuously compensates tool length and orientation, ensuring that the cutter tip follows the exact programmed path—even during complex 5#axis rotations. This eliminates positional deviation when the tool tilts or swivels. The result is higher#precision machining and reduced risk of geometry errors on multi#surface parts.
- **Simpler CAM Programming and Faster Setup**
  By allowing both table#fixed and workpiece#fixed coordinate systems, programmers can work directly in a stable reference frame aligned with the part. This removes the need for manual transformations or complex kinematic calculations. Workflows become faster, easier, and less error#prone, accelerating NC program creation and onboarding of new jobs.
- **Universal Compatibility Across 5#Axis Machines**
  The function works seamlessly with rotary tool, rotary table, and mixed#type configurations, offering consistent behavior regardless of machine kinematics. Manufacturers can standardize processes across different machines and avoid machine#specific programming workarounds. This improves flexibility and simplifies production planning.
- **Higher Quality on Complex Geometries**
  Because the tool tip maintains a constant feed and follows the commanded contour precisely, surface finishes remain consistent—even on steep, curved, or dynamically changing surfaces. This reduces the need for hand finishing or secondary operations. Customers achieve more reliable part quality and tighter tolerances on advanced 5#axis components.
- **Improved Efficiency and Machine Utilization**
  With accurate control during G00, G01, G02/G03, and helical interpolation, toolpaths run smoothly without requiring excessive slowdowns or safety offsets. Machines can cut closer to optimal speeds while maintaining safe, predictable motion. This boosts throughput, increases spindle#on time, and contributes to a stronger overall ROI.

Ordering Information

Specification	Description
A02B-0372-S677	501iS-A Tool Center Point Control (TCP)
A02B-0373-S677	501i-A Tool Center Point Control (TCP)
A02B-0374-S677	502iS-A Tool Center Point Control (TCP)

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

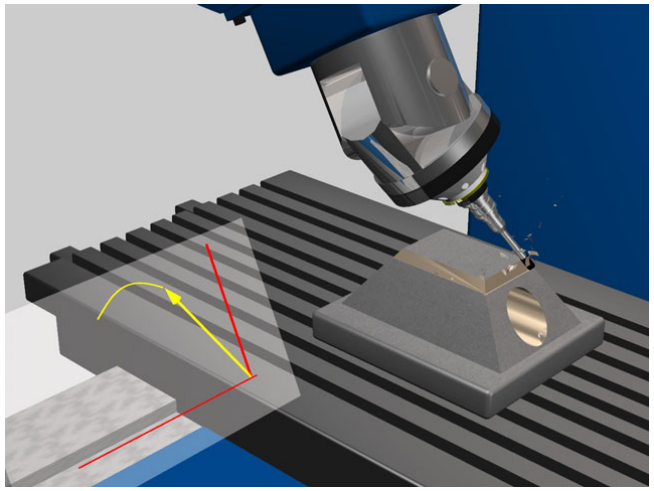
Specification	Description
A02B-0375-S677	502i-A Tool Center Point Control (TCP)
A02B-0377-S677	503i-A Tool Center Point Control (TCP)

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

199

Tool Functions / Tool Compensation



Tool Posture Control

Features

The function of Tool Posture Control, former Tool Posture Control of Tool Center Point Control for 5-Axis Machining, is in a way an extension of Tool Center Point Control, which controls the path of the tool centre point on a straight line.

Additionally the control of the tool is linked to the vector between the start and end point such that unintentional stock removal by the side of the cutting tool is avoided. Tool Posture Control is mainly used in side cutting, if pockets or forms with varying angles are being milled.

Benefits

- Usage of different tool cutter radius for side cutting in 5-axis machining
- Higher machining flexibility
- Machining of complex 5-axis parts (e.g. pyramids and cons)

Ordering Information

Specification	Description
A02B-0372-S994	501iS-A Tool Posture Control
A02B-0374-S994	502iS-A Tool Posture Control

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

200

Tool Functions / Tool Compensation

Y-Axis Offset

Features

Y-Axis Offset function is used in turning controls equipped with a third linear axis. When the Y axis, one of the basic three axes, is used with a lathe system, this function performs Y axis offset.

If the tool geometry / wear offset options are provided, both tool geometry offset and tool wear offset are effective to Y axis offset.

This function is a basic function in FANUC Series 0i-TF Plus.

Benefits

- Addition of an additional offset capability for the Y axis
- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J934	501iS-A Y-Axis Offset
A02B-0373-J934	501i-A Y-Axis Offset
A02B-0374-J934	502iS-A Y-Axis Offset
A02B-0375-J934	502i-A Y-Axis Offset
A02B-0377-J934	503i-A Y-Axis Offset

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

201

Tool Functions / Tool Compensation

4th/5th Axis Offset

Features

This function performs the tool offset for the 4th and the 5th axis following the basic three axes X, Z, Y. The number of tool offset pairs are 32 pairs, the same as for the X, Z, Y axis.

It is possible to divide into a tool wear offset and a tool geometry offset by specifying a option. The number of 32 pairs can be optionally extended to 64, 99, 400, 999, 2000 pairs. The number of maximum pairs depends on the CNC type.

Benefits

- Addition of tool offsef for the 4th and 5th axis
- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

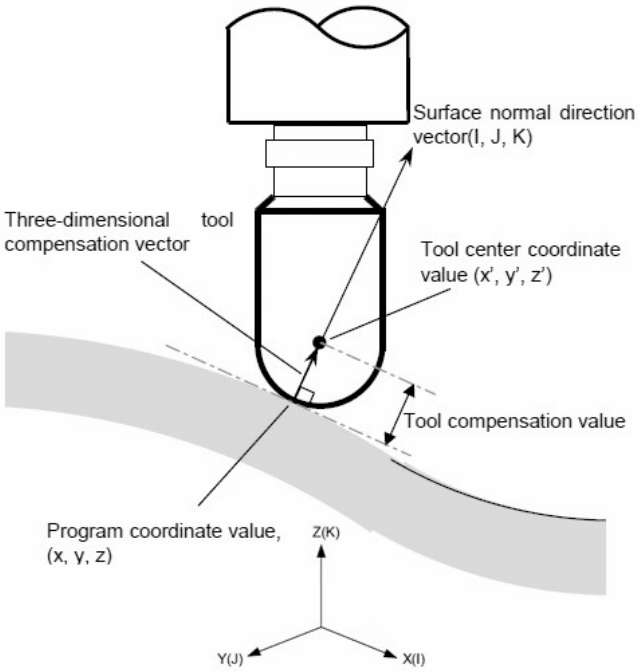
Specification	Description
A02B-0372-R517	501iS-A 4th / 5th Axis Offset
A02B-0373-R517	501i-A 4th / 5th Axis Offset
A02B-0374-R517	502iS-A 4th / 5th Axis Offset
A02B-0375-R517	502i-A 4th / 5th Axis Offset
A02B-0377-R517	503i-A 4th / 5th Axis Offset

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

202

Tool Functions / Tool Compensation



3-Dimensional Tool Compensation

Features

The 3-Dimensional Tool Compensation function, used on machines having three basic orthogonal axes, calculates a compensation vector perpendicular to the machining surface as a three-dimensional compensation vector.

Typically, this function is used for ball-nosed cutters on 3-axis machines.

This function is different from the similar 5-axis compensation functions.

Benefits

- Programming uncompensated surface coordinates of free-form 3D sculptured surfaces typically in Die and Mold applications
- 3–dimensional compensation for ball-nosed cutters
- Can easily change to a different sized ball-nosed cutter without re-calculating the part surface coordinates

Ordering Information

Specification	Description
A02B-0372-J727	501iS-A 3-D Tool Compensation
A02B-0373-J727	501i-A 3-D Tool Compensation
A02B-0374-J727	502iS-A 3-D Tool Compensation
A02B-0375-J727	502i-A 3-D Tool Compensation
A02B-0377-J727	503i-A 3-D Tool Compensation

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

203

Tool Functions / Tool Compensation

Tool Geometry/Wear Compensation

Features

The Tool Geometry/Wear Compensation function changes the tool compensation memory configuration depending on whether the tool geometry and wear compensation functions are provided or not.

The following data items in tool compensation memory are affected:

- X- and Z-axis compensation values in tool offset
- Compensation value R when tool nose radius compensation is provided
- Y-axis compensation value when Y-axis offset is provided

When the tool geometry and wear compensation functions are not provided, there is no distinction between geometry compensation memory and wear compensation memory.

Therefore, a sum of the geometry compensation value and wear compensation value is set in compensation memory. When the tool geometry and wear compensation functions are provided, geometry compensation memory and wear compensation memory are prepared separately. In this case, geometry compensation values and wear compensation values can be set separately.

This function is a basic function in FANUC Series 0i-TF Plus.

Benefits

- Addition of copmpensation capabilities to the CNC
- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J931	501iS-A Tool Geometry / Wear Compensation
A02B-0373-J931	501i-A Tool Geometry / Wear Compensation
A02B-0374-J931	502iS-A Tool Geometry / Wear Compensation
A02B-0375-J931	502i-A Tool Geometry / Wear Compensation
A02B-0377-J931	503i-A Tool Geometry / Wear Compensation

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

204

Tool Functions / Tool Compensation

2nd Geometry Tool Offset

Features

The 2nd Geometry Tool Offset function provides compensation for the difference in tool mounting position or in selected position; the second geometry tool offset can be provided in addition to tool offset.

Data that can be set for second geometry tool offset is the compensation values for the X-, Z-, and Y-axes.

Benefits

- Addition of offset compensation
- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J980	501iS-A 2nd Geometry Tool Offset
A02B-0373-J980	501i-A 2nd Geometry Tool Offset
A02B-0374-J980	502iS-A 2nd Geometry Tool Offset
A02B-0375-J980	502i-A 2nd Geometry Tool Offset
A02B-0377-J980	503i-A 2nd Geometry Tool Offset

205

Tool Functions / Tool Compensation

High-Speed Measuring Position Reach Signal Input

Features

Measurement can be made using the high-speed measuring position reached signals HAE1 to HAE8 (connected directly to the CNC). This procedure is provided instead of the standard measuring position reached signals. Up to eight signal inputs can be used with the high-speed measuring position reached signals.

When using the standard function through the PMC, the delay and variation in detecting the input of a measuring position reached signal is 0 to 2 ms on the CNC side, excluding the PMC side.

A delay and variation in detecting the input of a high-speed measuring position reached signal can be reduced to 0.1 ms or lower, so that high-precision measurement can be made.

Benefits

- Automation of the tool length measurement
- Simplification of the machine operation
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-S998	501iS-A High-Speed Measuring Position Reach Signal Input
A02B-0373-S998	501i-A High-Speed Measuring Position Reach Signal Input
A02B-0374-S998	502iS-A High-Speed Measuring Position Reach Signal Input
A02B-0375-S998	502i-A High-Speed Measuring Position Reach Signal Input
A02B-0377-S998	503i-A High-Speed Measuring Position Reach Signal Input

206

Tool Functions / Tool Compensation

Tool Length / Work Zero Point Measurement

Features

Tool Length /Work Zero Point Measurement function has been designed to simplify the procedure of tool length measurement.

This function facilitates the machining setup, resulting in a reduced machining setup time. The function eases the measurement of the workpiece origin offset. With this function, the operator can program a T / M code or a reference position return by specifying a manual numerical command on the tool length offset measurement screen.

Benefits

- Automation of the tool length measurement
- Simplification of the machine operation
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J668	501iS-A Tool Length / Work Zero Point Measurement
A02B-0373-J668	501i-A Tool Length / Work Zero Point Measurement
A02B-0374-J668	502iS-A Tool Length / Work Zero Point Measurement
A02B-0375-J668	502i-A Tool Length / Work Zero Point Measurement
A02B-0377-J668	503i-A Tool Length / Work Zero Point Measurement

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

207

Tool Functions / Tool Compensation

Direct Input of Offset Value Measured B

Features

The Direct Input of Offset Value Measured B function provides the capability to input offset values using a touch probe. Using the touch probe and by manually making the tool contact the touch probe, it is possible to set the offset amount of that tool automatically in the tool offset amount memory.

It is also possible to set the workpiece coordinate system shift amount automatically. The tool setter function for single-turret / two-spindle lathes is also available, which allows to use the direct input of the tool offset value measured B for each spindle in a single-turret / two-spindle lathe.

This function is a basic function in FANUC 0i-F Plus (Type 0, 1 and 3).

Benefits

- Automation of the tool offset
- Simplification of the machine operation
- Improvement of the overall machining productivity

Ordering Information

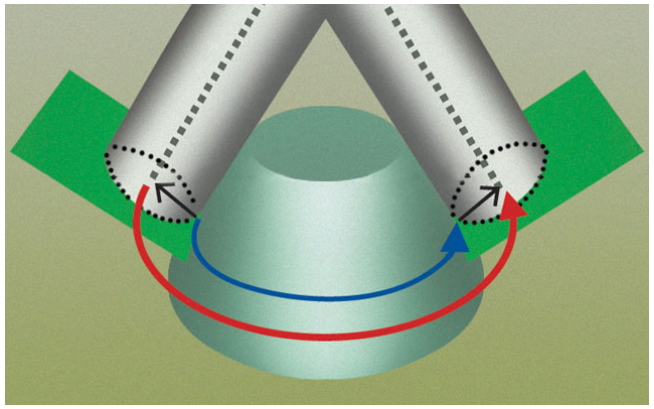
Specification	Description
A02B-0372-J933	501iS-A Direct Input of Offset Value Measured B
A02B-0373-J933	501i-A Direct Input of Offset Value Measured B
A02B-0374-J933	502iS-A Direct Input of Offset Value Measured B
A02B-0375-J933	502i-A Direct Input of Offset Value Measured B
A02B-0377-J933	503i-A Direct Input of Offset Value Measured B

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

208

Tool Functions / Tool Compensation



3-Dimensional Cutter Compensation

Features

The 3-Dimensional Cutter Compensation function, formerly called Tool Radius Compensation for 5 Axis Machining, supports part programming of surface coordinates of full 5-Axes complex contours.

It allows the definition of the diameter of the tool at the control level rather than compensating for the tool radius in the part-program.

For machines having multiple rotary axes to freely control the orientation of a tool axis, this function calculates a tool vector from the positions of these rotary axes. This function then calculates a compensation vector in a plane perpendicular to the tool vector and applies three-dimensional cutter offset. This allows for full 5-Axes surface coordinate contouring of complex parts and for any adjustment of the tooling diameter to be maintained at the control level.

Benefits

- Usage of different tool cutter radius for side cutting in 5-axis machining
- Higher machining flexibility
- Machining of complex 5-axis parts (e.g. pyramids and cons)
- Ability to adjust the tool diameter at the control
- Ability to offset part using machine work piece offsets
- Part Programming verses machine programming
- Program is easily transferable to similar machines
- No need to repost programs when tool diameter changes
- Saves on tooling costs. Easily use reground tooling

Ordering Information

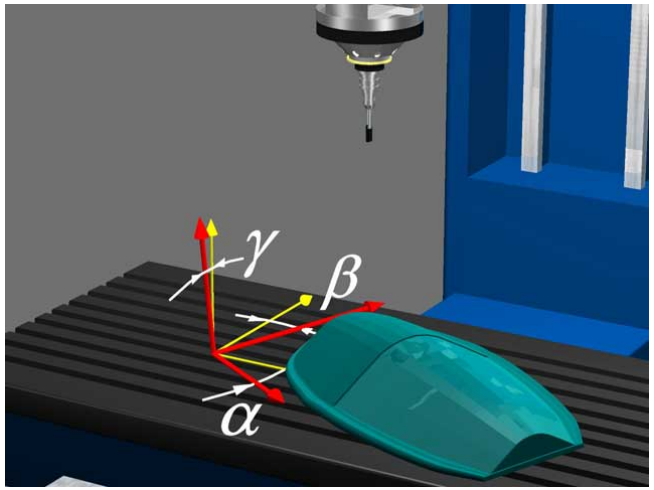
Specification	Description
A02B-0372-S667	501iS-A 3-Dimensional Cutter Compensation
A02B-0373-S667	501i-A 3-Dimensional Cutter Compensation
A02B-0374-S667	502iS-A 3-Dimensional Cutter Compensation
A02B-0375-S667	502i-A 3-Dimensional Cutter Compensation
A02B-0377-S667	503i-A 3-Dimensional Cutter Compensation

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

209

Tool Functions / Tool Compensation



Workpiece Setting Error Compensation

Features

With large workpieces, it is often the case that a workpiece is clamped for the first or second machining stage and is then, perhaps, removed for measurement.

It must then be re-clamped before machining is continued and position errors are unavoidable. The Workpiece Setting Error Compensation feature detects this through measuring cycles that determine the error and automatically corrects prior to initiating the standard part program.

Benefits

- Shortens set-up time
- More efficient production process
- Better quality
- Avoiding potential operators errors

Ordering Information

Specification	Description
A02B-0372-S993	501iS-A Workpiece Setting Error Compensation
A02B-0373-S993	501i-A Workpiece Setting Error Compensation
A02B-0374-S993	502iS-A Workpiece Setting Error Compensation
A02B-0375-S993	502i-A Workpiece Setting Error Compensation
A02B-0377-S993	503i-A Workpiece Setting Error Compensation

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

210

Tool Functions / Tool Compensation

Direct Input of Offset Value Measured B for 2-Spindle Lathe

Features

In lathe with two touch sensors, each tool offset and workpiece origin offset for two workpiece coordinate systems can be automatically calculated. The lathe, which has a back spindle, has a different workpiece coordinate system for each spindle.

Benefits

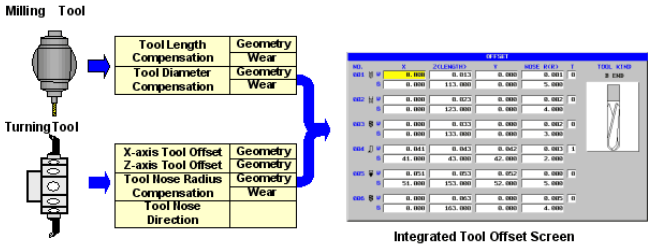
- For 2 workpiece coordinate system, each tool offset and workpiece origin offset can be automatically calculated

Ordering Information

Specification	Description
A02B-0372-J686	501iS-A Direct Input of Offset Value Measured B for 2-Spindle Lathe
A02B-0373-J686	501i-A Direct Input of Offset Value Measured B for 2-Spindle Lathe
A02B-0374-J686	502iS-A Direct Input of Offset Value Measured B for 2-Spindle Lathe
A02B-0375-J686	502i-A Direct Input of Offset Value Measured B for 2-Spindle Lathe
A02B-0377-J686	503i-A Direct Input of Offset Value Measured B for 2-Spindle Lathe

211

Tool Functions / Tool Compensation



Tool Offset for Milling and Turning Function

Features

The Tool Offset Screen for Compound Machine function has been designed to meet the requirements of compound machine tools to manage both offset data of milling and turning tools on one offset screen, which simplifies the tool offset data management of compound machines.

Features:

- Manages and displays offset data of both milling and turning tools on an Integrated Tool Offset Screen
- Manages and displays geometry and wear compensation data on an Integrated Tool Offset Screen
- Displays tool shape in graphic for easy operation. Designates tool shape on the dedicated screen

Limitation

The following functions cannot be used with this function:

- Tool position offset (G45~G48)
- Tool position offset B
- Changing Active Offset Value with Manual Move
- Basic operation package 2
- Manual Guide i
- Tool offset data cannot be protected by '8-level data protection function'

Benefits

- Addition of tool management capabilities for compound machines
- Simplification of the setup and tool management
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-R595	501iS-A Tool Offset for Milling and Turning Function
A02B-0373-R595	501i-A Tool Offset for Milling and Turning Function
A02B-0374-R595	502iS-A Tool Offset for Milling and Turning Function

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

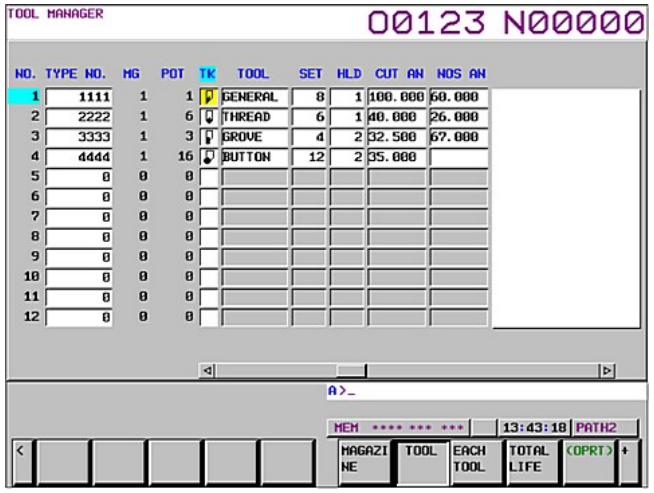
Specification	Description
A02B-0375-R595	502i-A Tool Offset for Milling and Turning Function
A02B-0377-R595	503i-A Tool Offset for Milling and Turning Function

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

213

Tool Functions / Tool Compensation



Tool Geometry Size Data - Additional Tool Type

Features

This function supports to use the tool kind for the lathe system even if it is used in the machining center type path.

As a result, when the compound machining is executed in the machining center type path, the tool geometry size data can be used for it.

Benefits

- Simplifies the management of tools for compound machines

Ordering Information

Specification	Description
A02B-0372-R685	501iS-A Addition of Tool Kind in Built-in 3-D Interference Check
A02B-0373-R685	501i-A Addition of Tool Kind in Built-in 3-D Interference Check
A02B-0374-R685	502iS-A Addition of Tool Kind in Built-in 3-D Interference Check
A02B-0375-R685	502i-A Addition of Tool Kind in Built-in 3-D Interference Check
A02B-0377-R685	503i-A Addition of Tool Kind in Built-in 3-D Interference Check

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

214

Tool Functions / Tool Compensation

Tool Management Function

Features

The Tool Management Functions provide a framework and tables to manage machine tooling data. Various expansion functions improve the flexibility for machine-specific tool management customization, facilitate the management of special tools, and simplify loading of tools.

The following functions are presented on the following pages:

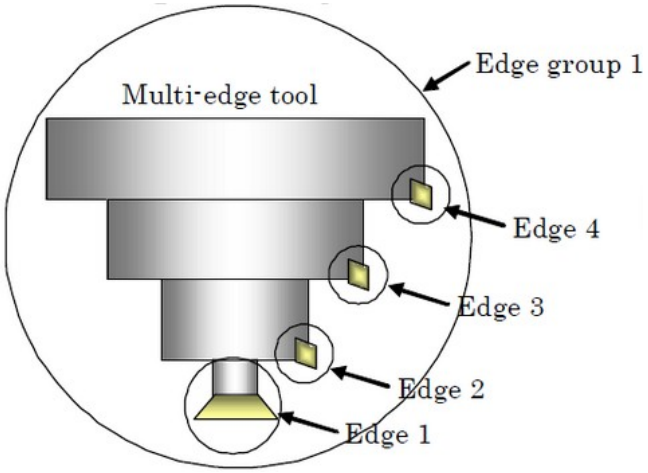
- Tool Pairs for Tool Management Function
- Tool Attachment/Detachment Management Function
- Tool Management Expansion
- Tool Management Expansion B
- Tool Management Function for Multi-Edge Tools
- Tool Management Function for Oversize Tools

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

215

Tool Management Function



Tool Management Function for Multi-Edge Tools

Features

When using the Tool Management Function for Multi-Edge Tools to machine parts with a multi-edge tools (tools which has more than one edge), the tool life management is carried out for individual edges separately.

Unlike the conventional tool management function, which assigns an individual tool management data item to each tool, the multi-edge tool management function assigns an individual tool management data item to each edge.

Benefits

- Simplifies the management of multi-edge tools on complex machining centers
- Increase of the flexibility of the tool changer
- Simplification of the programming of the tool changer handling

Ordering Information

Specification	Description
A02B-0372-R681	501iS-A Tool Management Function for Multi-Edge Tools
A02B-0373-R681	501i-A Tool Management Function for Multi-Edge Tools
A02B-0374-R681	502iS-A Tool Management Function for Multi-Edge Tools
A02B-0375-R681	502i-A Tool Management Function for Multi-Edge Tools
A02B-0377-R681	503i-A Tool Management Function for Multi-Edge Tools

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

216

Tool Management Function

Tool Management Function Tool Name Command

Ordering Information

Specification	Description
A02B-0372-S831	501iS-A Tool Management Function: Tool Name Command
A02B-0373-S831	501i-A Tool Management Function: Tool Name Command
A02B-0374-S831	502iS-A Tool Management Function: Tool Name Command
A02B-0375-S831	502i-A Tool Management Function: Tool Name Command
A02B-0377-S831	503i-A Tool Management Function: Tool Name Command

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

217
Functions

Accuracy Compensation Functions

Machine Compensation Functions are options that allow the CNC to compensate for mechanical inaccuracies in the machine.

Some of the functions detailed in the catalog:

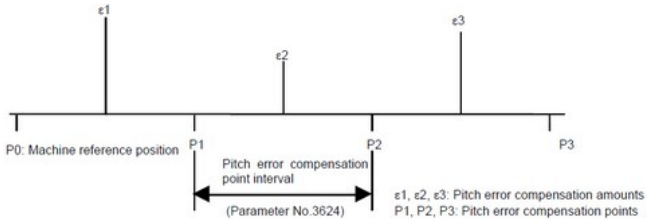
- Backlash Compensation
- Pitch Error Compensation
- Inclination Compensation
- Straightness Compensation
- 3-Dimensional Error Compensation
- 3-Dimensional Machine Compensation
- AI Thermal Displacement Compensation
- etc.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

218

Accuracy Compensation Functions



Interpolation Type Pitch Error Compensation

Features

The Interpolation Type Pitch Error Compensation function outputs divided compensation pulses between compensation points in such a way that a smoother pitch error compensation can be realized.

The compensation amount at each error compensation point is divided into pulses in the interval between that point and the next point on the travel axis and output, as shown in the figure.

The Stored Pitch Error Compensation function is required to be able to use this function, and can be used with Bi-Directional Pitch Error Compensation.

Benefits

- Increase of the precision of the compensation
- Improvement of machine precision
- Increase of production quality and overall machine productivity

Ordering Information

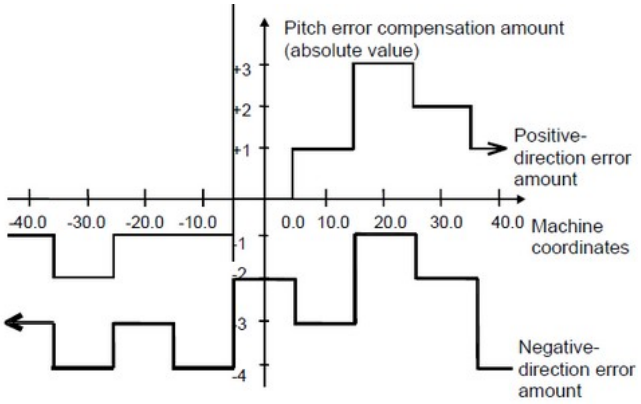
Specification	Description
A02B-0372-R333	501iS-A Interpolation Type Pitch Error Compensation
A02B-0373-R333	501i-A Interpolation Type Pitch Error Compensation
A02B-0374-R333	502iS-A Interpolation Type Pitch Error Compensation
A02B-0375-R333	502i-A Interpolation Type Pitch Error Compensation
A02B-0377-R333	503i-A Interpolation Type Pitch Error Compensation

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

219

Accuracy Compensation Functions



Bi-Directional Pitch Error Compensation

Features

The Bi-Directional Pitch Error Compensation function allows different pitch error compensation amounts to be set for travel in the positive direction and in the negative direction, so that pitch error compensation can be performed differently in the two directions.

The Stored Pitch Error Compensation function, as a comparison, does not distinguish between the directions of travel.

In addition, when the direction of travel is reversed, the compensation amount is automatically calculated from the pitch error compensation data to perform compensation in the same way as in backlash compensation. This reduces the difference between the paths in the positive and negative directions.

The total number of compensation points is 2048. It requires the option Stored Pitch Error Compensation.

Benefits

- Compensation of the errors in 2 different directions
- Improvement of machine precision
- Increase of production quality and overall machine productivity

Ordering Information

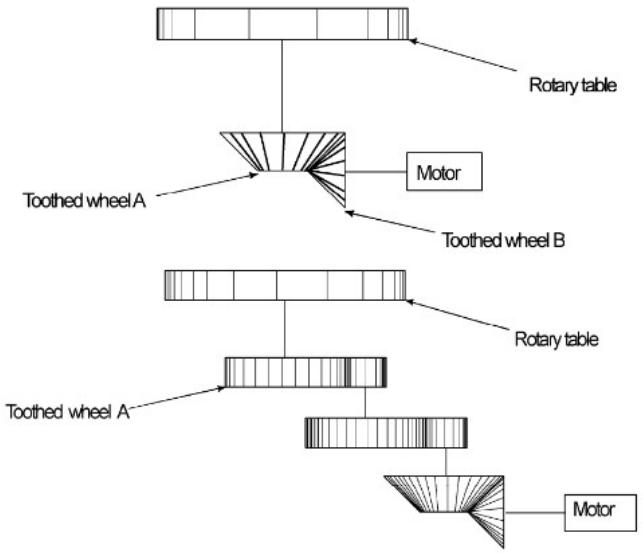
Specification	Description
A02B-0372-S656	501iS-A Bi-Directional Pitch Error Compensation
A02B-0373-S656	501i-A Bi-Directional Pitch Error Compensation
A02B-0374-S656	502iS-A Bi-Directional Pitch Error Compensation
A02B-0375-S656	502i-A Bi-Directional Pitch Error Compensation
A02B-0377-S656	503i-A Bi-Directional Pitch Error Compensation

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

220

Accuracy Compensation Functions



Periodical Secondary Pitch Error Compensation

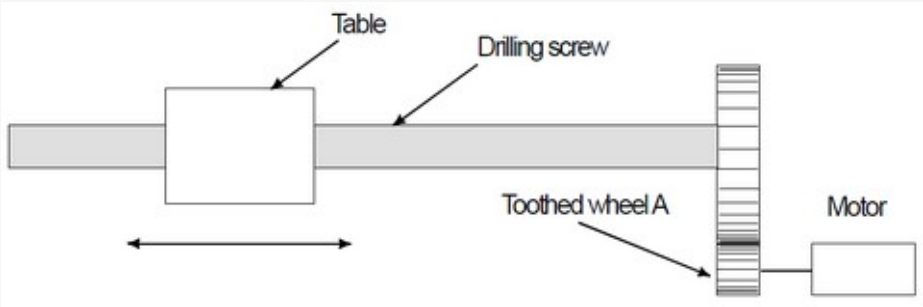
Features

The Periodical Secondary Pitch Error Compensation is used when there is a gear between the motor and shaft of the axis of travel.

To compensate for pitch errors, the compensation for the pitch error due to the rotation of the gear is superimposed on the compensation for the pitch error per rotation of the rotary table. If the gear between the rotary table and the servo motor is of a single stage, as shown below, the stored pitch error compensation is used for the compensation for the pitch error of the toothed wheel A and Periodical Secondary Pitch Error compensation is used for the pitch error of the toothed wheel B.

If there is a multiple-stage gear, as shown below, the stored pitch error compensation is used for toothed wheel A and Periodical Secondary Pitch Error compensation is used for the cyclic pitch error that occurs in each pitch error compensation interval of toothed wheel A.

Although a rotary table is used as an example here, Periodical Secondary Pitch Error compensation can be used in the same way when the machine is moved along a linear axis using a gear. For example, in a configuration such as that shown below, stored pitch error compensation is used for the compensation for the pitch error of the drilling hole and Periodical Secondary Pitch Error compensation is used for the compensation for the pitch error of toothed wheel A.



Benefits

- Increase of the precision is geared systems such as rotation tables
- Improvement of machine precision
- Increase of production quality and overall machine productivity

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Ordering Information

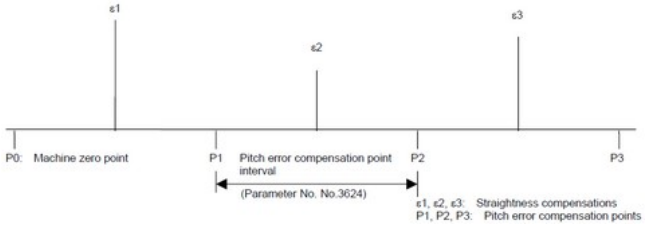
Specification	Description
A02B-0372-S634	501iS-A Periodical Secondary Pitch Error Compensation
A02B-0373-S634	501i-A Periodical Secondary Pitch Error Compensation
A02B-0374-S634	502iS-A Periodical Secondary Pitch Error Compensation
A02B-0375-S634	502i-A Periodical Secondary Pitch Error Compensation
A02B-0377-S634	503i-A Periodical Secondary Pitch Error Compensation

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

222

Accuracy Compensation Functions



Interpolation Type Straightness Compensation

Features

The Interpolation Straightness Compensation function outputs divided compensation pulses between compensation points so that smoother straightness compensation can be realized.

In conventional straightness compensation, for each interval between pitch error compensation points set by parameters, the amount of all straightness compensation at the compensation point is output and compensation is performed. This function equally divides the amount of compensation for each interval between pitch error compensation points for compensation data set using 128 straightness compensation points and outputs it as a compensation pulse.

Benefits

- Increase of the precision of the compensation for parallel axes
- Improvement of machine precision
- Increase of production quality and overall machine productivity

Ordering Information

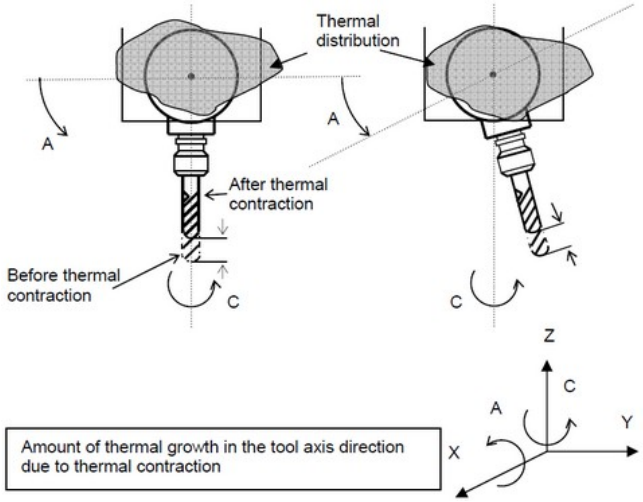
Specification	Description
A02B-0372-R334	501iS-A Interpolation Type Straightness Compensation
A02B-0373-R334	501i-A Interpolation Type Straightness Compensation
A02B-0374-R334	502iS-A Interpolation Type Straightness Compensation
A02B-0375-R334	502i-A Interpolation Type Straightness Compensation
A02B-0377-R334	503i-A Interpolation Type Straightness Compensation

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

223

Accuracy Compensation Functions



Thermal Growth Compensation Along Tool Vector

Features

The Thermal Growth Compensation Along Tool Vector function is used in five-axis machine applications where the tool is controlled by two rotary axes.

The compensation for thermal expansion or shrinkage of the tool can be applied along the tool vector specified with the rotation axes.

This function compensates for the thermal tool displacement set along the tool vector by setting the displacement as the input signal from the PMC or another unit.

Benefits

- Compensation of thermal effects on 5-axis machines
- Improvement of machine precision
- Increase of production quality and overall machine productivity

Ordering Information

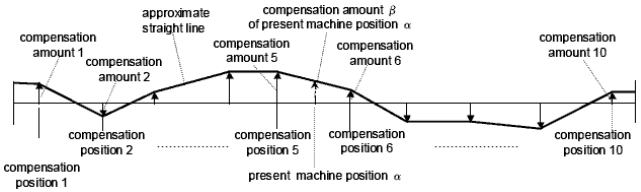
Specification	Description
A02B-0372-S860	501iS-A Thermal Growth Compensation along Tool Vector
A02B-0373-S860	501i-A Thermal Growth Compensation along Tool Vector
A02B-0374-S860	502iS-A Thermal Growth Compensation along Tool Vector
A02B-0375-S860	502i-A Thermal Growth Compensation along Tool Vector
A02B-0377-S860	503i-A Thermal Growth Compensation along Tool Vector

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

224

Accuracy Compensation Functions



3-Dimensional Machine Position Compensation

Features

The 3-Dimensional Machine Position Compensation function compensate machine position errors that occur during processing along an approximate straight line formed with specified compensation point in a machine coordinate and a compensation amount related to it.

Compensation of this function is carried out along nine approximate straight lines formed with ten compensation points and compensation amounts related to the respective compensation points.

Compensation amounts can be rewritten by the PMC window function or programmable parameter input (G10 L52), in addition, the rewritten value immediately becomes effective. Therefore, this function can be applied to compensation for those machine position errors that occurs during processing.

Benefits

- Compensation of large machine tools
- Improvement of machine precision
- Increase of production quality and overall machine productivity

Ordering Information

Specification	Description
A02B-0372-R581	501iS-A 3-Dimensional Machine Position Compensation
A02B-0373-R581	501i-A 3-Dimensional Machine Position Compensation
A02B-0374-R581	502iS-A 3-Dimensional Machine Position Compensation
A02B-0375-R581	502i-A 3-Dimensional Machine Position Compensation
A02B-0377-R581	503i-A 3-Dimensional Machine Position Compensation

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

225

Accuracy Compensation Functions

3-Dimensional Rotary Error Compensation

Features

The 3D Rotary Error Compensation improves the correction of geometric machine errors by including not only linear axes but also any rotary axes that are used in the machining envelope.

In contrast to most compensation options, this function is able to process three-dimensional measurement data for the overall machine volume and makes it ideal for five-axis machines.

Benefits

- Greater Cutting Accuracy and Precision

Ordering Information

Specification	Description
A02B-0372-R649	501iS-A 3-Dimensional Rotary Error Compensation
A02B-0373-R649	501i-A 3-Dimensional Rotary Error Compensation
A02B-0374-R649	502iS-A 3-Dimensional Rotary Error Compensation
A02B-0375-R649	502i-A 3-Dimensional Rotary Error Compensation
A02B-0377-R649	503i-A 3-Dimensional Rotary Error Compensation

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

226
Functions

Hobbing / Electronic Gear Box

This section of the catalogue contains the functions related to hobbing functions and Electronic Gear Box (EGB) functions for gear cutting and gear grinding machines.

Some of the functions detailed in the catalogue:

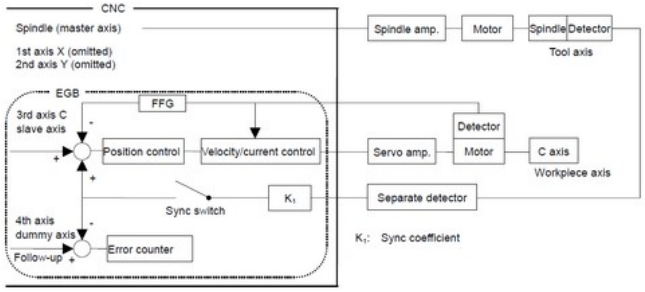
- Electronic Gear Box
- Skip function for Electronic Gear Box
- Spindle Electronic Gear Box
- Phase synchronization
- Etc.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

227

Hobbing / Electronic Gear Box



Electronic Gear Box (EGB)

Features

This function enables fabrication of high-precision gears, screws, and other components by rotating the workpiece in synchronization with a rotating tool or by moving the tool in synchronization with a rotating workpiece.

The rate of synchronization can be specified with a program. The synchronization of tool and workpiece axes with this function adopts a system in which the synchronization is directly controlled by digital servo, so that the workpiece axis can follow up the speed fluctuations on the tool axis with no error, thereby allowing fabrication of high-precision cogwheels.

Benefits

- Addition of the Electronic Gear Box (EGB) function to the CNC
- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-J779	501iS-A Electronic Gear Box (EGB)
A02B-0373-J779	501i-A Electronic Gear Box (EGB)
A02B-0374-J779	502iS-A Electronic Gear Box (EGB)
A02B-0375-J779	502i-A Electronic Gear Box (EGB)
A02B-0377-J779	503i-A Electronic Gear Box (EGB)

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

228

Hobbing / Electronic Gear Box

Flexible Synchronization Control

Features

The Flexible Synchronous Control function applies to hobbing machines and other machines that require synchronization of multiple sets of axes with various gear ratios.

This function allows up to four individual sets to be synchronized independently. This can implement features specific to the hobbing machine such as synchronization between hobbing axis and a workpiece axis, Z-C synchronization in helical gear cutting, and Y-C synchronization in hobbing axis shift.

The specifications of Flexible Synchronous Control are as follows:

1. The master axis number, slave axis number, and gear ratio are set in parameters.
2. There are four groups of these parameters. Synchronization of four groups can be performed at the same time.
3. For multiple master axes, one slave axis can also be specified.
4. Synchronization is started and canceled by DI signals from the PMC. When DI signal switching is to be made during automatic operation, a parameter-set M code must be used.
5. The two Cs axes can also be used as a master axis and slave axis.
6. The two Cs axes can also be used as a master axis and slave axis.
7. Feedback pulses of the spindle operating as the Cs axis can be used for feed per revolution. The command format is G95P_;, where P_ is the axis number of Cs axis.

Benefits

- Addition of automatic synchronization to the Electronic Gear Box function
- Simplification of the programming
- Improvement of the overall machining productivity

Ordering Information

Specification	Description
A02B-0372-S709	501iS-A Flexible Synchronous Control
A02B-0373-S709	501i-A Flexible Synchronous Control
A02B-0374-S709	502iS-A Flexible Synchronous Control
A02B-0375-S709	502i-A Flexible Synchronous Control
A02B-0377-S709	503i-A Flexible Synchronous Control

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

229
Functions

Editing Operation

This section of the catalogue contains the functions related to the Editing Operations on the CNC.
Some of the functions detailed in the catalogue:

- Size of parts program
- Number of programs
- Encryption
- Background editing
- Etc.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

230
Editing Operation

Machining Time Stamp

Features

The execution times of the most recently executed ten programs can be displayed in hours, minutes, and seconds.

The calculated machining time can be inserted as a comment of the program to check the machining time on the program directory screen.

Run Hour and Parts Count Display Function is required.

Benefits

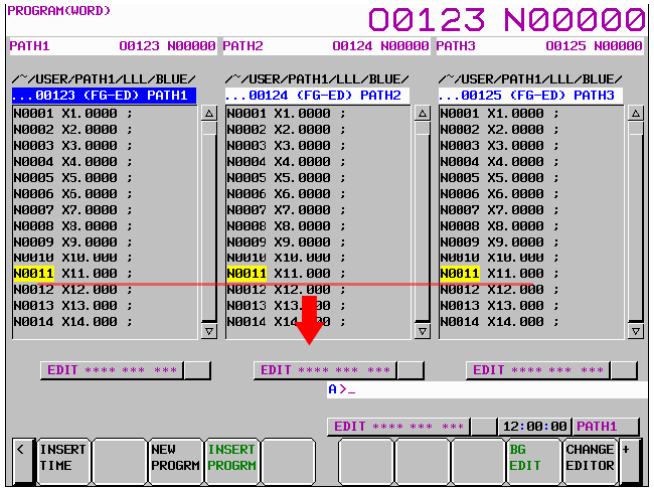
- Simplification of production efficiency tracking

Ordering Information

Specification	Description
A02B-0372-J964	501iS-A Machining Time Stamp
A02B-0373-J964	501i-A Machining Time Stamp
A02B-0374-J964	502iS-A Machining Time Stamp
A02B-0375-J964	502i-A Machining Time Stamp
A02B-0377-J964	503i-A Machining Time Stamp

231

Editing Operation



Multi-Path Editing Function

Features

In the simultaneous multi-path editing function, when the program of selected path is scrolled, other path programs that are displayed on the same screen can be scrolled simultaneously.

In this function, there are the synchronous scroll mode which scrolls all programs simultaneously displayed on the one screen and the single scroll mode which scrolls one program of the selected path. It is possible to switch between the synchronous scroll mode and the single scroll mode by the soft key operation easily.

In a synchronous scroll mode, when the cursor moves to the waiting M-code, the scroll of its path stops automatically until the cursor of the other path move to the same waiting M-code. So it is possible to edit the program confirming the waiting of each path program.

Moreover, the cursor of all paths in simultaneous editing can be moved to specified waiting M-code at a time by synchronous search.

Benefits

- Simplifies the operation of the machine
- Improves machining productivity

Ordering Information

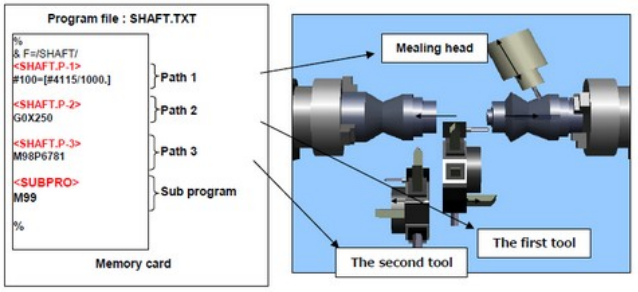
Specification	Description
A02B-0372-R615	501iS-A Multi-Path Editing Function
A02B-0373-R615	501i-A Multi-Path Editing Function
A02B-0374-R615	502iS-A Multi-Path Editing Function
A02B-0375-R615	502i-A Multi-Path Editing Function
A02B-0377-R615	503i-A Multi-Path Editing Function

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

232

Editing Operation



Example of complex machining center (One milling head and two tool posts)

Multi-Path Program Management Function

Features

The multi-path lathe and the complex machine that have several turrets or heads machine workpieces using two or more machining programs. With this function, multi-path programs, offset data, and parameters, etc. for one part machining are managed together by a folder.

In addition, batch creation, batch selection, simultaneous editing and batch Input / Output of the programs are enabled. As a result, this function makes it easy to handle such multi-path programs.

Benefits

- Simplifies the operation of the machine
- Improves machining productivity

Ordering Information

Specification	Description
A02B-0372-R684	501iS-A Multi-Path Program Management Function
A02B-0373-R684	501i-A Multi-Path Program Management Function
A02B-0374-R684	502iS-A Multi-Path Program Management Function
A02B-0375-R684	502i-A Multi-Path Program Management Function
A02B-0377-R684	503i-A Multi-Path Program Management Function

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

233
Functions

Setting and Display

This section of the catalogue contains the functions related to Display Functions which the CNC to display more than just the basic machine information.

Some of the functions detailed in the catalogue:

- Languages
- Machine operation menus
- Protection of data
- Graphic functions
- Etc.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Cycle Time Estimation 2 Library

Features

Cycle Time Estimation 2 is a function that can quickly estimate the execution cycle time of an NC program. It delivers estimations for cutting and rapid traverse times, time spent on the execution of auxiliary codes (e. g. M codes), as well as cutting and rapid traverse travel distances.

The accuracy of the estimation is higher than estimations made with 3rd party software. All estimations are calculated in consideration of the real machine's acceleration and deceleration. It is possible to estimate the machining time of complex programs, for example programs for 5-axis machining.

With Cycle Time Estimation 2, it is possible to quickly calculate the approximate cycle time by the Speed Priority mode, or to accurately estimate the cycle time by the Accuracy Priority mode. Cycle Time Estimation 2 uses the CNC GUIDE 2 engine with its Servo Model feature to provide precise estimations. It is also possible to estimate the cycle time of multi-path CNC programs.

It is possible to create custom applications that incorporate the Cycle Time Estimation 2 function, by using the "Cycle Time Estimation 2 Library". With this option it is possible for a custom application to use that library on a CNC.

Benefits

- Decrease processing time by optimizing programs
- Improve the utilization of machines by enhanced and reliable machine schedule planning

Ordering Information

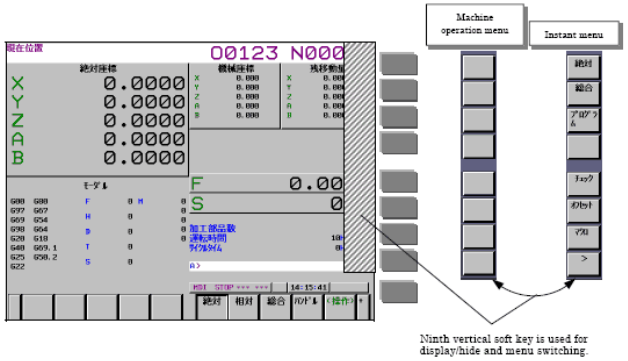
Specification	Description
A02B-0372-R872	501iS-A Cycle Time Estimate 2 Library
A02B-0373-R872	501i-A Cycle Time Estimate 2 Library
A02B-0374-R872	502iS-A Cycle Time Estimate 2 Library
A02B-0375-R872	502i-A Cycle Time Estimate 2 Library
A02B-0377-R872	503i-A Cycle Time Estimate 2 Library

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

235

Setting and Display



Machine Operation Menu

Features

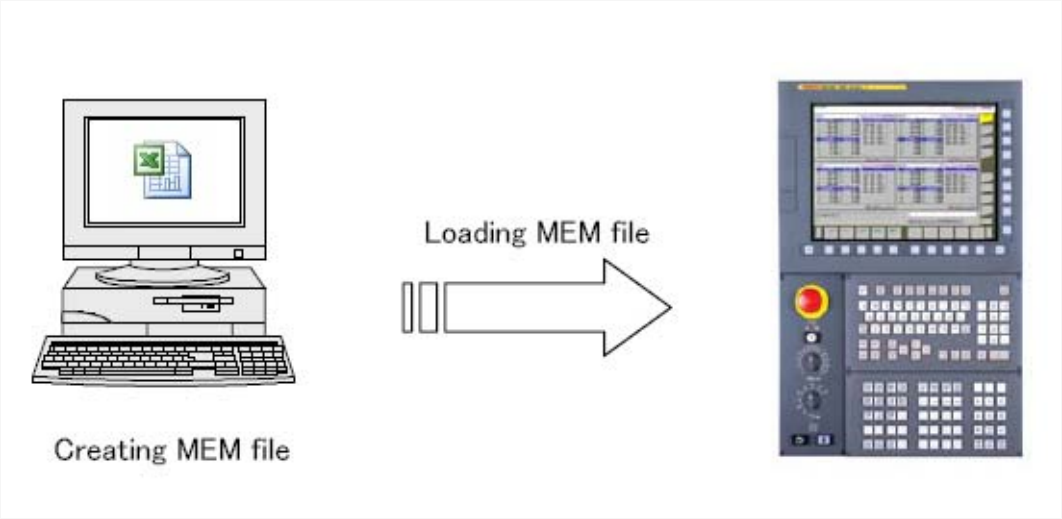
Machine Operation Menu Function

The soft keys displayed on the standard CNC screen can be used as menu keys for the machine operation.

The soft keys can be customized easily by the machine tool builder. A menu can have a hierarchy, and the indication of each soft key can be specified.

Customization data is created as a machine operation menu definition file and is stored in the CNC.

Machine Operation Menu Tool



When using the "Machine Operation Menu" making tool it is possible to define the machine operation menu and output the defined contents as MEM file.

Benefits

- Simplifies the operation of the machine
- Improves machining productivity

Ordering Information

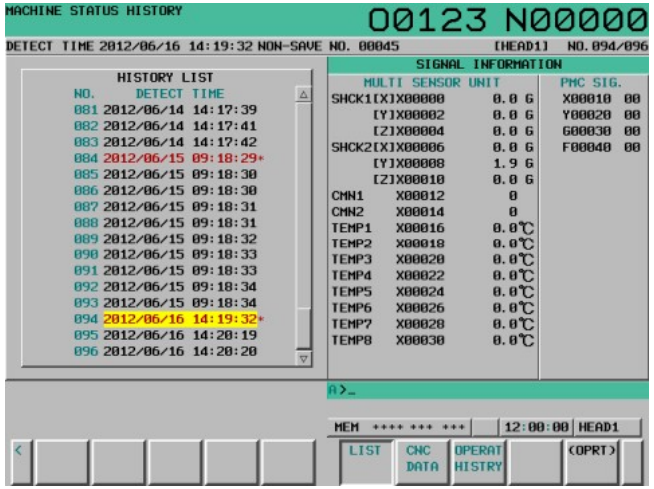
Specification	Description
A02B-0372-S844	501iS-A Machine Operation Menu Function
A02B-0373-S844	501i-A Machine Operation Menu Function
A02B-0374-S844	502iS-A Machine Operation Menu Function
A02B-0375-S844	502i-A Machine Operation Menu Function
A02B-0377-S844	503i-A Machine Operation Menu Function

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

237

Setting and Display



Machine State Monitoring Function

Features

This function monitors the state of the machine and when problems occur on the machine, it is possible to retrieve information such as the operation history, the position and the feedrate at the time of the problem and other useful information from the CNC memory.

The retrieved information can be used to investigate the cause of machine breakdown.

It is also possible to customize the function to monitor additional information such as shock value, abnormal load torque, the Multi-Sensor Unit (MSU) and unexpected disturbance torque detection.

When a problem occurs on the machine, such as a spindle collision, the ladder program notifies the CNC; when the CNC is notified it saves the information related to the event in the CNC memory for later retrieval.

The CNC can save a maximum of 100 events in its memory.

Benefits

- Collection of key data to help the investigation of problems on machine
- Reduction of the breakdown time and better support of the maintenance teams
- Overall increase of the productivity

Ordering Information

Specification	Description
A02B-0372-R717	501iS-A Machine State Monitoring Function
A02B-0373-R717	501i-A Machine State Monitoring Function
A02B-0374-R717	502iS-A Machine State Monitoring Function
A02B-0375-R717	502i-A Machine State Monitoring Function
A02B-0377-R717	503i-A Machine State Monitoring Function

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

238

Setting and Display

MDI Reset Key Invalidation

Features

There are some applications where the untimely interruption of a running NC program could lead to potentially dangerous situations. The MDI Reset Key Invalidation function prevents this. If the reset key on the MDI is pushed while executing a NC program, the reset is ignored and the execution of the NC program is not stopped.

Benefits

- Avoid potentially dangerous situations

Ordering Information

Specification	Description
A02B-0372-R549	501iS-A MDI Reset Key Invalidation Function
A02B-0373-R549	501i-A MDI Reset Key Invalidation Function
A02B-0374-R549	502iS-A MDI Reset Key Invalidation Function
A02B-0375-R549	502i-A MDI Reset Key Invalidation Function
A02B-0377-R549	503i-A MDI Reset Key Invalidation Function

239
Functions

Data Input/Output

This section of the catalogue contains the functions related to Data Input / Output.
Some of the functions detailed in the catalogue:

- RS232 interface
- Data Server
- Messaging
- Automatic Backup
- Etc.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

240
Data Input/Output

One Touch Macro Call

Features

This function enables the CNC to perform a complex macro operation at the push of a button.

By pressing a switch on the machine, the following three operations can be performed with minimum ladder modifications:

- Switching to the MEM mode.
- Execution of macro programs stored in memory.
- Return to the mode before execution. The program selected before execution is automatically selected.

This function is enabled only in the reset state. This means that this function cannot be used during automatic operation (during automatic operation halt and automatic operation stop periods as well).

This function is a basic function in FANUC Series 0i-MF Plus and 0i-LF Plus.

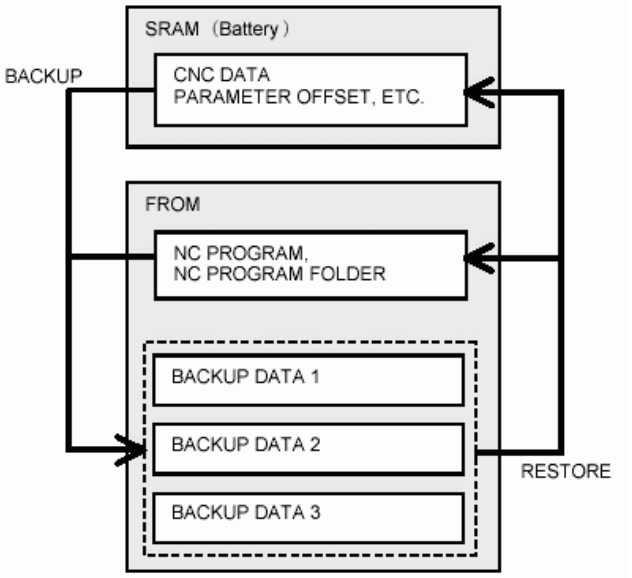
Benefits

- Simplification of the machine operation
- Improvement of the machining productivity

Ordering Information

Specification	Description
A02B-0372-S655	501iS-A One Touch Macro Call Function
A02B-0373-S655	501i-A One Touch Macro Call Function
A02B-0374-S655	502iS-A One Touch Macro Call Function
A02B-0375-S655	502i-A One Touch Macro Call Function
A02B-0377-S655	503i-A One Touch Macro Call Function

241
Data Input/Output



Automatic Data Backup

Features

Enables automatic backup of battery-backed SRAM memory contents to the control's Flash ROM memory. In the event of SRAM memory loss, maintenance personnel can immediately recover data from a saved backup.

This function is a basic function in FANUC Series 0i-F Plus.

Benefits

- Up to three backup copies can be made/maintained.
- Backup may be performed at set interval and/or when E-Stop occurs.
- One backup copy may be protected for saving of original data/settings.
- Backup of CNC part programs in FROM memory may be included.

Ordering Information

Specification	Description
A02B-0372-H510#B10	501iS-A Automatic Data Back-up - 1 Set NVRAM Data
A02B-0372-H510#B11	501iS-A Automatic Data Back-up - 1 Set NVRAM Data + CNC Programs
A02B-0372-H510#B20	501iS-A Automatic Data Back-up - 2 Sets NVRAM Data
A02B-0372-H510#B21	501iS-A Automatic Data Back-up - 2 Sets NVRAM Data + CNC Programs
A02B-0372-H510#B30	501iS-A Automatic Data Back-up - 3 Sets NVRAM Data
A02B-0372-H510#B31	501iS-A Automatic Data Back-up - 3 Sets NVRAM Data + CNC Programs
A02B-0373-H510#B10	501i-A Automatic Data Back-up - 1 Set NVRAM Data
A02B-0373-H510#B11	501i-A Automatic Data Back-up - 1 Set NVRAM Data + CNC Programs
A02B-0373-H510#B20	501i-A Automatic Data Back-up - 2 Sets NVRAM Data
A02B-0373-H510#B21	501i-A Automatic Data Back-up - 2 Sets NVRAM Data + CNC Programs
A02B-0373-H510#B30	501i-A Automatic Data Back-up - 3 Sets NVRAM Data
A02B-0373-H510#B31	501i-A Automatic Data Back-up - 3 Sets NVRAM Data + CNC Programs
A02B-0374-H510#B10	502iS-A Automatic Data Back-up - 1 Set NVRAM Data
A02B-0374-H510#B11	502iS-A Automatic Data Back-up - 1 Set NVRAM Data + CNC Programs
A02B-0374-H510#B20	502iS-A Automatic Data Back-up - 2 Sets NVRAM Data
A02B-0374-H510#B21	502iS-A Automatic Data Back-up - 2 Sets NVRAM Data + CNC Programs
A02B-0374-H510#B30	502iS-A Automatic Data Back-up - 3 Sets NVRAM Data
A02B-0374-H510#B31	502iS-A Automatic Data Back-up - 3 Sets NVRAM Data + CNC Programs
A02B-0375-H510#B10	502i-A Automatic Data Back-up - 1 Set NVRAM Data
A02B-0375-H510#B11	502i-A Automatic Data Back-up - 1 Set NVRAM Data + CNC Programs

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Specification	Description
A02B-0375-H510#B20	502i-A Automatic Data Back-up - 2 Sets NVRAM Data
A02B-0375-H510#B21	502i-A Automatic Data Back-up - 2 Sets NVRAM Data + CNC Programs
A02B-0375-H510#B30	502i-A Automatic Data Back-up - 3 Sets NVRAM Data
A02B-0375-H510#B31	502i-A Automatic Data Back-up - 3 Sets NVRAM Data + CNC Programs
A02B-0377-H510#B10	503i-A Automatic Data Back-up - 1 Set SRAM Data
A02B-0377-H510#B11	503i-A Automatic Data Back-up - 1 Set SRAM Data + CNC Programs
A02B-0377-H510#B20	503i-A Automatic Data Back-up - 2 Sets SRAM Data
A02B-0377-H510#B21	503i-A Automatic Data Back-up - 2 Sets SRAM Data + CNC Programs
A02B-0377-H510#B30	503i-A Automatic Data Back-up - 3 Sets SRAM Data
A02B-0377-H510#B31	503i-A Automatic Data Back-up - 3 Sets SRAM Data + CNC Programs

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

243

Functions

PMC System

This section of the catalogue contains the functions related to the Programmable Machine Controller (PMC) which is a Programmable Logic Controller integrated in the CNC.

Some of the functions detailed in the catalogue:

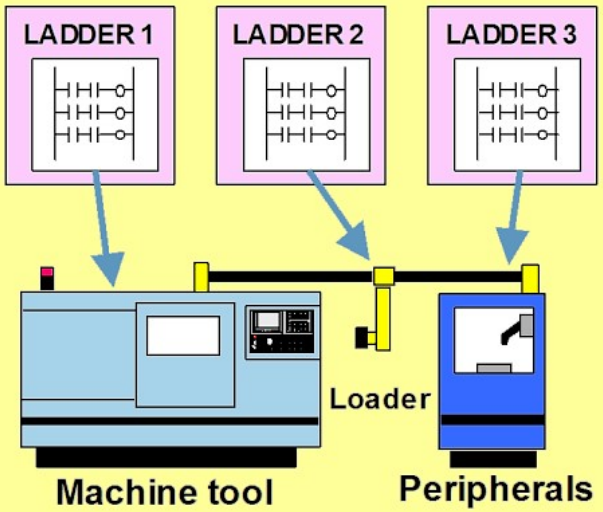
- General overview
- Multi-path PMC
- Symbols and messaging
- Step sequence
- Function Blocks
- Etc.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

244

PMC System



Multi-Path PMC Function

Features

The Programmable Machine Controller (PMC) usually runs one single program. In order to extend the processing capabilities of the PMC, it is possible to increase the number of concurrent PMC programs running at the same time to 3 or 5.

Each of the program or path can exchange data with the other paths using shared data and can control specific parts of the process. For instance, one path can be allocated to the machine itself, one to the auxiliary functions and the 3rd one to the loading / unloading system.

Benefits

- Increase of the processing and structuring capacity of the PMC
- Possibility to associate separate PMC paths with process sub-systems
- Simplification of the maintenance of the machine
- Possiibility to design the PMC programs with different developpers teams

Ordering Information

Specification	Description
A02B-0372-R855#3	501iS-A Multi-Path PMC Function - 3 Paths
A02B-0372-R855#5	501iS-A Multi-Path PMC Function - 5 Paths
A02B-0373-R855#3	501iS-A Multi-Path PMC Function - 3 Paths
A02B-0373-R855#5	501iS-A Multi-Path PMC Function - 5 Paths
A02B-0374-R855#3	502iS-A Multi-Path PMC Function - 3 Paths
A02B-0374-R855#5	502iS-A Multi-Path PMC Function - 5 Paths
A02B-0375-R855#3	502i-A Multi-Path PMC Function - 3 Paths
A02B-0375-R855#5	502i-A Multi-Path PMC Function - 5 Paths
A02B-0377-R855#3	503i-A Multi-Path PMC Function - 3 Paths
A02B-0377-R855#5	503i-A Multi-Path PMC Function - 5 Paths

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Nonvolatile PMC Extra Relay Function

Features

This function increases the number of nonvolatile relays available in the PMC to 10 kB

Benefits

- Increase of the capabilities to handle data to accomodate larger machines

Ordering Information

Specification	Description
A02B-0372-S984#10K	501iS-A Nonvolatile PMC Extra Relay Function
A02B-0373-S984#10K	501i-A Nonvolatile PMC Extra Relay Function
A02B-0374-S984#10K	502iS-A Nonvolatile PMC Extra Relay Function
A02B-0375-S984#10K	502i-A Nonvolatile PMC Extra Relay Function
A02B-0377-S984#10K	503i-A Nonvolatile PMC Extra Relay Function

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

246

PMC System

Nonvolatile PMC Data Table Area Expansion (40kB)

Features

This function increases the number of nonvolatile data table available in the PMC to 40 kB

Benefits

- Increase of the capabilities to handle data to accomodate larger machines

Ordering Information

Specification	Description
A02B-0372-S967#40K	501iS-A Nonvolatile PMC Data Table Area Expansion - 40 kB
A02B-0373-S967#40K	501i-A Nonvolatile PMC Data Table Area Expansion - 40 kB
A02B-0374-S967#40K	502iS-A Nonvolatile PMC Data Table Area Expansion - 40 kB
A02B-0375-S967#40K	502i-A Nonvolatile PMC Data Table Area Expansion - 40 kB
A02B-0377-S967#40K	503i-A Nonvolatile PMC Data Table Area Expansion - 40 kB

247

Functions

Machine Safety Functions

Machine Safety Functions are features that allow the machine tool builder to construct a machine that is inherently safe for the operator to run. Features such as Dual Check Safety allow the operator to safely setup for machining with the protection door open.

- Chuck and tail stock barrier prevents axis collisions with these machine parts.
- Stored stroke check acts like software over travel limit switches to insure that the machine is not run past the limits of travel.
- Interference check makes sure that multiple paths do not collide with each other.
- Key and Program Encryption prevent programs from being altered by unauthorized personnel.
- Protection of Data at Eight Levels allows different operators to have different authorizations for levels of operations that they are allowed to perform on the machine.

See the Description Manual for a complete list of functions relating to machine safety.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

248

Machine Safety Functions

Dual Check Safety (DCS)

Features

The Dual Check Safety (DCS) function provides the necessary set of tools and function to design safe machine tools. A high level of safety to for the machine operator can be reached using this function, especially when the machine tool is open, power is still applied, and the physical security provided by the protective doors is no longer available.

Hardware redundancy and self tests allow the CNC to detect abnormal function and the Dual Check Safety function will quickly shut off power to protect the operator.

Dual Check Safety is certified by TÜV Süd Product Service GmbH in accordance to the following standards:

- 2006/42/EC Machinery Directive
- 2006/95/EC Low-Voltage Directive
- ISO 13849-1 Category 3, PL=d Machine Safety
- EN 60204-1:2006
- EN 61000-6-2:2005
- IEC 61508-1:1998 SIL 1-2
- IEC 61508-2:2000 SIL 1-2
- IEC 61508-3:1998 SIL 1-2
- IEC 61508-4:1998 SIL 1-2
- EN 501 78:1997

Following Dual Check Safety functions have been certified by TÜV SÜD Product Service GmbH:

- Safety Reduced Speed Check (Servo)
- Safety Reduced Speed Check (Spindle)
- Safe End Position Check
- Serial Data Transmission Check
- Emergency Stop
- Safe I/O Signal Check
- Safe Parameter Check
- Safe Servo Position Error Check
- Safe Position Switch Function
- Programmable Safe I/O Function

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

- Safe Brake Function
- Safe Servo Stop (STO) Function
- Safe Spindle Stop Function
- Safety Speed Zero Monitoring
- Safety Spindle Speed Limit Override

Special function are also available to simplify the creation of the machine documentation; refer to the "Test Mode Function for Dual Check Safety" in the catalogue for more information.

Benefits

- Provides a high level of safety for the operator during operations with protection opened while power is still applied
- Quick restart of the machine tool operation following operator intervention
- Fewer external safety circuits required
- Overall cost reduction of the safety solution
- Certified to comply to the actual safety standards

Ordering Information

Specification	Description
A02B-0372-S661	501iS-A Dual Check Safety
A02B-0373-S661	501i-A Dual Check Safety
A02B-0374-S661	502iS-A Dual Check Safety
A02B-0375-S661	502i-A Dual Check Safety
A02B-0377-S661	503i-A Dual Check Safety

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

250
Functions

Option Packages and Kits

An option package thematically combines various functions in a meaningful way. This section of the catalogue contains information on availabe option packages.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

251

Option Packages and Kits

Turning Package 1

Features

The Turning Package 1 combines functions that are frequently used in turning applications. These functions are combined in the Turning Package 1:

- Polar Coordinate Interpolation
- Cylindrical Interpolation
- Variable Lead Thread Cutting
- Constant Surface Speed Control
- Direct Drawing Dimension Programming
- Chamfering / Corner Rounding
- Multiple Repetitive Cycles
- Multiple Repetitive Cycles II
- Tool Offest Pairs 200
- Tool Geometry/Wear Compensation

Benefits

- Select the options for turning applications easily

Ordering Information

Specification	Description
A02B-0372-R092	501iS-A Turning Package 1
A02B-0373-R092	501i-A Turning Package 1
A02B-0374-R092	502iS-A Turning Package 1
A02B-0375-R092	502i-A Turning Package 1
A02B-0377-R092	503i-A Turning Package 1

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

252

Option Packages and Kits

Turning Package 2

Features

The Turning Package 2 combines functions that are frequently used in advanced turning applications, e.g. with multiple spindles. These functions are combined in the Turning Package 2:

- Polygon Machining with Two Spindles
- Chuck and Tail Stock Barrier
- Polygon Turning
- Thread Cutting Retract
- Actual Spindle Speed Output
- Spindle Synchronous Control
- Multi-Spindle Control
- G-Code System B/C
- Mirror Image for Double Turret
- Direct Input of Offset Value Measured B
- Y-Axis Offset
- Spindle Control with Servo Motor
- Manual Handle Retrace for Multi-Path

Benefits

- Select the options for turning applications easily

Ordering Information

Specification	Description
A02B-0372-R093	501iS-A Turning Package 2
A02B-0373-R093	501i-A Turning Package 2
A02B-0374-R093	502iS-A Turning Package 2
A02B-0375-R093	502i-A Turning Package 2
A02B-0377-R093	503i-A Turning Package 2

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

253

Option Packages and Kits

Milling Package

Features

The Milling Package combines functions that are frequently used in milling applications. These functions are combined in the Milling Package:

- Inverse Time Feed
- Dynamic Graphic Display Function *
- Speed Control with Acceleration in Circular Interpolation
- Single Direction Positioning
- Normal Direction Control
- Polar Coordinate Command
- One-Digit F Code Feed
- Thread Cutting, Synchronous Cutting
- Program Restart
- Programmable Mirror Image
- Automatic Corner Override
- Scaling
- Coordinate System Rotation
- Addition of Workpiece Coordinate System 48 Pairs
- Small Hole Peck Drilling Cycle
- Tool Offset Pairs 400
- Tool Life Management
- Tool Offset Memory C
- Manual Handle Retrace
- Auxiliary Function Output in Program Restart
- Quick Program Restart *
- Addition of Custom Macro Common Variables 1000
- Optional Chamfering / Corner Rounding
- One Touch Macro Call

- Optimum Torque Acceleration/Deceleration
- Jerk Control *
- AI Contour Control I+
- AI Contour Control II+ *
- NURBS Interpolation
- Smooth Tolerance+ Control *
- High Speed Processing *
- Look-Ahead Blocks Expansion *
- Look-Ahead Blocks Expansion of AI Contour Control II *

* This function is not available in some system software series.

Benefits

- Select the options for milling applications easily

Ordering Information

Specification	Description
A02B-0372-R094	501iS-A Milling Package
A02B-0373-R094	501i-A Milling Package
A02B-0374-R094	502iS-A Milling Package
A02B-0375-R094	502i-A Milling Package
A02B-0377-R094	503i-A Milling Package

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Gear Cutting Package

Features

The Gear Cutting Package combines the Electronic Gear Box function and the Flexible Synchronous Control function as well as their associated optional functions. Electronic Gear Box and Flexible Synchronous Control are often used together in gear hobbing machines. With the Gear Cutting Package, it is also possible to switch between Electronic Gear Box and Flexible Synchronous Control easily.

These functions are combined in the Gear Cutting Package:

- Electronic Gear Box
- Skip Function for Electronic Gear Box
- Electronic Gear Box - 2 Pairs
- Electronic Gear Box - Automatic Phase Synchronization
- Spindle Electronic Gear Box
- U-Axis Control 2 Pairs (only 30i/31i/32i-B Plus)
- Cs Contour Control (only 30i/31i/32i-B Plus)
- Flexible Synchronous Control
- Inter-Path Flexible Synchronous Control
- Automatic Phase Synchronization for Flexible Synchronous Control
- Skip Function for Flexible Synchronous Control
- Hob Command by Flexible Synchronous Control

Benefits

- Switch Between Electronic Gear Box and Flexible Synchronous Control easily.

Ordering Information

Specification	Description
A02B-0372-R024	501iS-A Gear Cutting Package
A02B-0373-R024	501i-A Gear Cutting Package
A02B-0374-R024	502iS-A Gear Cutting Package
A02B-0375-R024	502i-A Gear Cutting Package
A02B-0377-R024	503i-A Gear Cutting Package

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Multi-Path Kit

Features

The Multi-Path Kit combines functions that are frequently used in advanced multi-path applications. These functions are combined in the Multi-Path Kit:

- Synchronous and Composite Control
- Superimposed Control
- Synchronous, Composite and Superimposed Control by Program Command
- Flexible Path Axis Assignment

Benefits

- Select the options for advanced multi-path applications easily

Ordering Information

Specification	Description
A02B-0372-R096	501iS-A Multi-Path Kit
A02B-0373-R096	501i-A Multi-Path Kit
A02B-0374-R096	502iS-A Multi-Path Kit
A02B-0375-R096	502i-A Multi-Path Kit
A02B-0377-R096	503i-A Multi-Path Kit

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

257

Option Packages and Kits

TWP Kit

Features

The TWP (Tilted Working Plane) Kit combines functions that are frequently used in 3+2 axis machining applications. These functions are combined in the TWP Kit:

- Tilted Working Plane Indexing Command
- 3-Dimensional Coordinate System Conversion
- 3-Dimensional Manual Feed
- Retraction for 3-Dimensional Rigid Tapping
- Manual Interruption of 3-D Coordinate System Conversion

Benefits

- Select the options for 3+2 axis machining applications easily

Ordering Information

Specification	Description
A02B-0372-R097	501iS-A TWP Kit
A02B-0373-R097	501i-A TWP Kit
A02B-0374-R097	502iS-A TWP Kit
A02B-0375-R097	502i-A TWP Kit
A02B-0377-R097	503i-A TWP Kit

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

5-Axis Kit

Features

The 5-Axis Kit combines functions that are frequently used in simultaneous 5-axis machining applications. These functions are combined in the 5-Axis Kit:

- Tilted Working Plane Indexing Command
- 3-Dimensional Coordinate System Conversion
- 3-Dimensional Manual Feed
- Retraction for 3-Dimensional Rigid Tapping
- Manual Interruption of 3-D Coordinate System Conversion
- 3-Dimensional Rotary Error Compensation
- Tool Center Point Control
- Smooth Tool Center Point Control *
- High-Speed Smooth Tool Center Point Control *
- 3-Dimensional Cutter Compensation
- Workpiece Setting Error Compensation

* This function is not available in some system software series.

Benefits

- Select the options for simultaneous 5-axis machining applications easily

Ordering Information

Specification	Description
A02B-0372-R098	501iS-A 5-Axis Kit
A02B-0373-R098	501i-A 5-Axis Kit
A02B-0374-R098	502iS-A 5-Axis Kit
A02B-0375-R098	502i-A 5-Axis Kit
A02B-0377-R098	503i-A 5-Axis Kit

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Full Closed Kit

Features

The Full Closed Kit combines functions that are frequently used in applications that have linear encoders for position feedback. These functions are combined in the Full Closed Kit:

- Dual Position Feedback
- Linear Scale Interface with Absolute Address Reference Mark
- Linear Scale I/F Expansion with Absolute Address Reference Mark
- Temporary Absolute Coordinate Setting

Benefits

- Select the options for applications with linear encoders easily

Ordering Information

Specification	Description
A02B-0372-R101	501iS-A Full-Closed Kit
A02B-0373-R101	501i-A Full-Close Kit
A02B-0374-R101	502iS-A Full-Closed Kit
A02B-0375-R101	502i-A Full-Closed Kit
A02B-0377-R101	503i-A Full-Close Kit

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

260

Option Packages and Kits

Tandem Kit

Features

The Tandem Kit combines functions that are frequently used to perform synchronized motion, e.g. on gantry or spilt table axes. These functions are combined in the Tandem Kit:

- Axis Synchronous Control
- Tandem Disturbance Elimination

Benefits

- Select the options for applications with synchronized motion easily

Ordering Information

Specification	Description
A02B-0372-R102	501iS-A Tandem Kit
A02B-0373-R102	501i-A Tandem Kit
A02B-0374-R102	502iS-A Tandem Kit
A02B-0375-R102	502i-A Tandem Kit
A02B-0377-R102	503i-A Tandem Kit

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

261

Option Packages and Kits

Rotary Table Kit

Features

The Rotary Table Kit combines functions that are frequently used in machines with rotary tables, e.g. rotary transfer machines. These functions are combined in the Rotary Table Kit:

- Index Table Indexing
- Control Axis Detach
- 2nd Auxiliary Function
- Rotary Axis Control

Benefits

- Select the options for applications with rotary tables easily

Ordering Information

Specification	Description
A02B-0372-R103	501iS-A Rotary Table Kit
A02B-0373-R103	501i-A Rotary Table Kit
A02B-0374-R103	502iS-A Rotary Table Kit
A02B-0375-R103	502i-A Rotary Table Kit
A02B-0377-R103	503i-A Rotary Table Kit

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

262
CNC

Communication

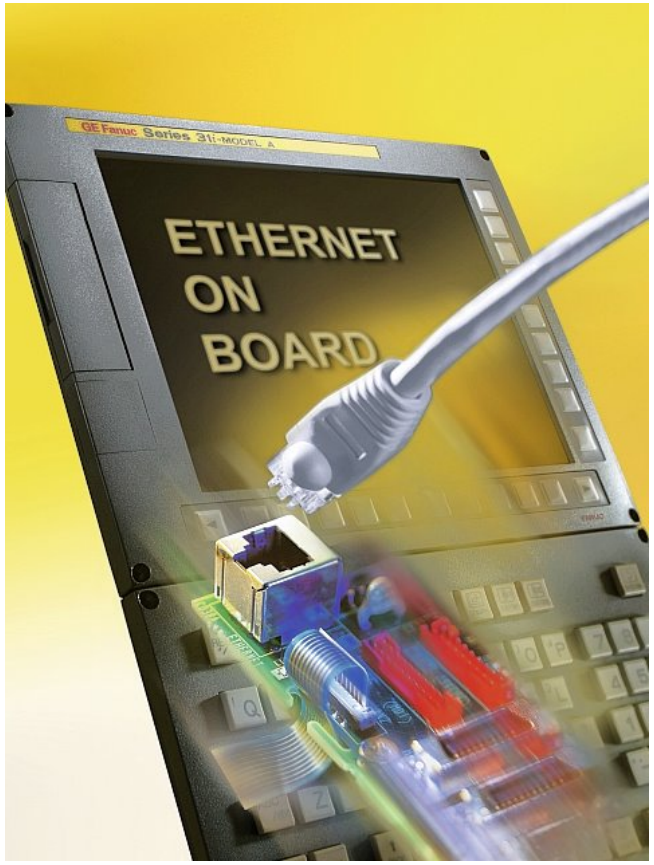
This section of the catalogue contains an overview of the most popular communication function available on the FANUC CNC.

The communication functions described include:

- FANUC Ethernet protocols
- EtherNet/IP
- PROFIBUS-DP
- PROFINET IO
- EtherCAT
- Etc.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.



Embedded Ethernet

Features

The Series 30i CNC family as well as the Power Motion i CNC are equipped with an embedded Ethernet port (Ethernet connection on the mother board). This port can support several connection types and protocols to simplify the connection of the CNC to the outside world and greatly improve its efficiency.

The following functions and protocols are supported by the embedded Ethernet port:

- DHCP
- DNS
- DNC1 over Ethernet
- FTP client
- FOCAS / FOCAS 2
- Basic Operation Package 2
- FANUC Ladder
- Modbus/TCP Server*

Note: *Modbus/TCP function required. See further in the communication section of the catalogue for more information about the Modbus/TCP function.

In addition to the embedded Ethernet port, it is possible to increase the number of Ethernet ports of the CNC by adding separate Ethernet boards in the option slots of the CNC (Standalone or LCD-Mounted types) or using a Multi-Function Ethernet module (LCD-Mounted type CNC only). The additional Ethernet boards and modules have their own processors and provide more processing power for complex protocols or multiple and concurrent Ethernet connections.

Benefits

- Addition of Ethernet connectivity to the CNC
- Increase of the maintenance and remote access efficiency
- Provides data collection capabilities to the CNC
- Improvement of machine flexibility and increase of the system efficiency / productivity

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

264

Communication

PROFIBUS-DP

PROFIBUS is an industrial network. It enables I/O communication between master devices and slave devices. The communication standard is managed by PI (PROFIBUS and PROFINET International).

265
PROFIBUS-DP

PROFIBUS-DP Slave

Features

The PROFIBUS-DP Slave function and the PROFIBUS-DP Slave board for the CNC provide an easy way to setup the CNC system to connect to popular PLCs and I/O devices equipment using PROFIBUS-DP.

The PROFIBUS-DP Slave function provides up to 244 bytes of data to the PROFIBUS-DP Master device.

Notes:

- The PROFIBUS-DP functions cannot be used simultaneously with the DeviceNet functions or CC-Link functions
- Refer to the connection manual for additional information on the PROFIBUS-DP functions supported, the size of the data tables, settings, diagnostics and GSD files

Benefits

- Connection to PLCs and equipment by PROFIBUS-DP network
- Acceleration of the system installation and commissionning
- Improvement of machine flexibility and increase of the system efficiency / productivity

Ordering Information

Specification	Description
A02B-0372-S732	501iS-A PROFIBUS Slave Function
A02B-0373-S732	501i-A PROFIBUS Slave Function
A02B-0374-S732	502iS-A PROFIBUS Slave Function
A02B-0375-S732	502i-A PROFIBUS Slave Function
A02B-0377-S732	503i-A PROFIBUS Slave Function

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

266
PROFIBUS-DP

PROFIBUS-DP Master

Features

The PROFIBUS-DP Master function and the PROFIBUS-DP Master board for the CNC provide an easy way to setup the CNC system to connect to popular PLCs and I/O devices equipment using PROFIBUS-DP.

Up to 48 PROFIBUS-DP Slave stations can be connected to the Master with a total of 244 bytes per Slave station.

Notes:

- The PROFIBUS-DP functions cannot be used simultaneously with the DeviceNet functions or CC-Link functions
- Refer to the connection manual for additional information on the PROFIBUS-DP functions supported, the size of the data tables, settings, diagnostics and GSD files

Benefits

- Connection to PLCs and equipment by PROFIBUS-DP network
- Acceleration of the system installation and commissionning
- Improvement of machine flexibility and increase of the system efficiency / productivity

Ordering Information

Specification	Description
A02B-0370-J210	500i-A Series - PROFIBUS Master/Slave Board
A02B-0370-J535#655P	500i-A Series PROFIBUS - Function Software
A02B-0372-S731	501iS-A PROFIBUS Master Function
A02B-0373-S731	501i-A PROFIBUS Master Function
A02B-0374-S731	502iS-A PROFIBUS Master Function
A02B-0375-S731	502i-A PROFIBUS Master Function
A02B-0377-S731	503i-A PROFIBUS Master Function

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Software FA

This section of the catalogue describes software tools.

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

268

Software FA

PC Software

This section groups all the different software products that are used when dealing with CNC systems such as

- Software for Operator Control (e.g. Manual Guide)
- Development Software (e.g. FANUC Ladder, C-Executor, ...)
- PC Opterating Software (e.g. Windows®)
- HMI Software (e.g. FANUC Picture)

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

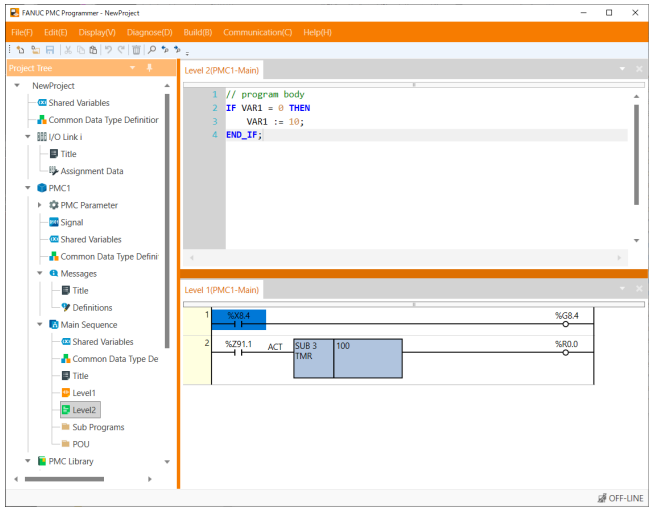
CNC GUIDE 2

Ordering Information

Specification	Description
A02B-0372-R874	501iS-A CNC GUIDE 2 Library
A02B-0373-R874	501i-A CNC GUIDE 2 Library
A02B-0374-R874	502iS-A CNC GUIDE 2 Library
A02B-0375-R874	502i-A CNC GUIDE 2 Library
A02B-0377-R874	503i-A CNC GUIDE 2 Library

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.



FANUC PMC Programmer

Features

FANUC PMC Programmer is the standard programming system for developing, diagnosing and maintaining sequence programs for FANUC PMC, FANUC's integrated PLC, of the Series 500i-A. PMC Programmer supports the ST language in addition to the conventional ladder language. PMC programs with complicated calculations and structured programming can be created easily.

Key features

- Creating ladder programs
- Creating ST (Structured Text) programs
- Creating PMC message data and I/O Link i assignment data
- Communication function with PMC
- Monitoring PMC variables, PMC parameters on a PC
- Transfer sequence program to PMC
- Transfer PMC message data, I/O Link i assignment data

FANUC PMC Programmer is available only to machine tool builders.

Ordering Information (Electronic Licenses)

The software can be downloaded from MyFANUC. The license is available in the FANUC E-Store.

Specification	Description
A08B-9210-J560#ZZ99	FANUC PMC Programmer (1 User)
A08B-9210-J563#ZZ99	FANUC PMC Programmer (10 Users)
A08B-9210-J564#ZZ99	FANUC PMC Programmer (20 Users)
A08B-9210-J565#ZZ99	FANUC PMC Programmer (Site License)

Benefits

- Creation of the machine PMC program, startup and debug
- Modification of the PMC program to follow machine and production evolution
- Rich maintenance and diagnostics capabilities of the PMC and machine control

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

FANUC SERVO GUIDE 2

Features

FANUC SERVO GUIDE 2 is a Windows® application that allows a quick and easy optimization of servo and spindle axes for the Series 500i-A CNC.

This software provides the integrated environment to test programs, set parameters and data measurement, needed for servo and spindle tuning.

Direct connection is possible between the Personal Computer and the Series 500i-A CNC through Ethernet.

Key functions

- Easy connection to Series 500i-A CNC
- Integrated working environment for tuning machine servo and spindles
- Integrated and optimized environment for creating, tuning and optimizing programs, measuring data and changing parameters
- Measurement of servo and spindle data as well as external triggering events from the PMC at once
- Many automatic adjustment functions

SERVO GUIDE 2 is available only to machine tool builders.

Ordering Information (Electronic Licenses)

The software can be downloaded from MyFANUC. The license is available in the FANUC E-Store.

Specification	Description
A08B-9010-J971#ZZ99	FANUC SERVO GUIDE 2 (1 User)

Benefits

Effective and easy-to-use PC tool for:

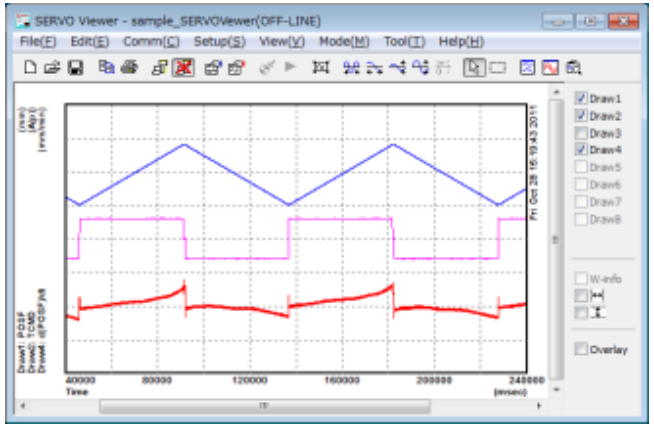
- Setup support for servo and spindle functions
- Optimization of servo and spindle control
- Display of path error for troubleshooting machining quality issues
- Finding potential to reduce machining cycle time
- Troubleshooting of servo and spindle related alarms

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

272

PC Software



FANUC SERVO VIEWER

Features

SERVO Viewer is a Windows® application software that enables to measure and display various kinds of data from a machine tool with a FANUC CNC. It is possible to acqiure and view servo/spindle data such as position, speed and torque, PMC signals, or CNC status information such as program number, sequence number or M/S/T codes.

Benefits

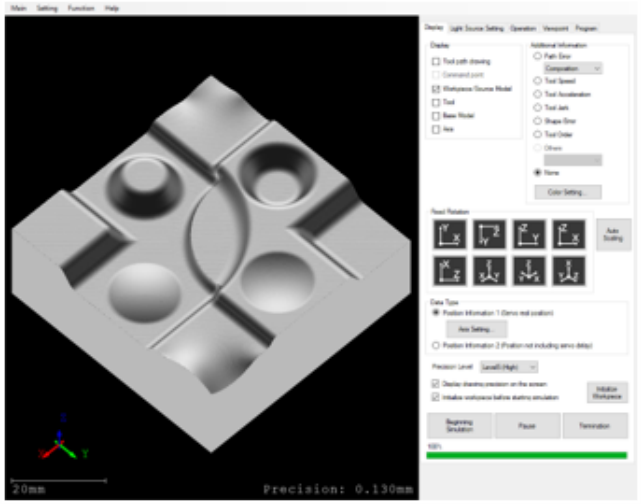
- Analyze the axis movement and CNC operation timing
- Optimize the CNC program to reduce cycle times
- Monitor the machine's condition by periodical measurements

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

273

FANUC SERVO VIEWER



Surface Estimation

Features

Surface Estimation is software that can simulate the machined surface on PC. The machining results can be simulated before actual machining to reduce trial machining. Surface estimation is based on servo data, including machine characteristics.

The application can use data for simulation from an NC program, SERVO VIEWER data, or SERVO GUIDE data for 3-axis linear and 5-axis machining center. Measurement of servo position data during air cutting with SERVO VIEWER.

Servo Position Data can also be measured from CNC GUIDE 2 simulation with SERVO VIEWER. This allows visualization of the estimated surface before actual machining by CNC GUIDE 2 with its embedded Servo Model.

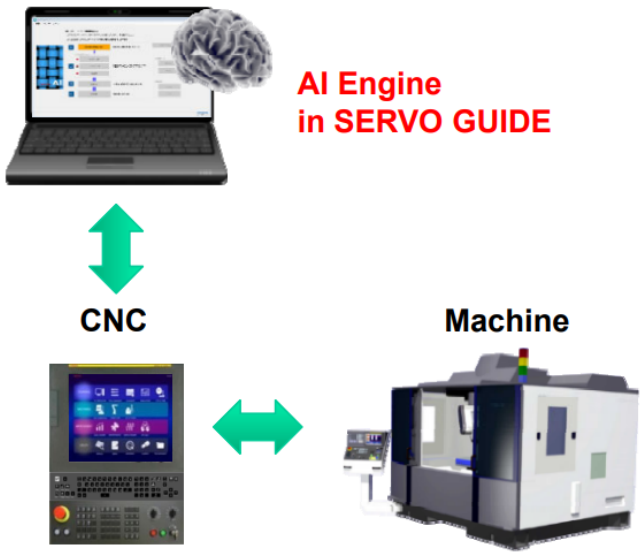
Ordering Information (Electronic Licenses)

The software can be downloaded from MyFANUC. The license is available in the FANUC E-Store.

Specification	Description
A08B-9010-J941#ZZ99	Surface Estimation (Software License, 1 User)
A08B-9010-J943#ZZ99	Surface Estimation Update (Software License, 1 User)

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.



AI Servo Tuning

Features

AI Servo Tuning is an optional function for SERVO GUIDE. It optimizes the parameters related to axis control using machine learning (AI). You can achieve optimal tuning results in a short time. AI Servo Tuning suppots initial machine tuning as well as on-site adjustments.

AI Servo Tuning consits of 3 tuning items: Gain/Filter tuning improves the responsiveness of the servo system. Feedforward enhances contouring accuracy. And AICC Acc/Dec tuning reduces cycle time.

Ordering Information (Electronic Licenses)

The software can be downloaded from MyFANUC. The license is available in the FANUC E-Store.

Specification	Description
A08B-9010-J905#ZZ99	AI Servo Tuning

CNC Application Development Kit 2022

Features

The CNC Application Development Kit 2022 is a package of tools intended to support the customization for the Series 500i-A CNC. The kit includes following tools:

- FANUC PICTURE2
- FANUC Macro Compiler 2022
- FANUC CNC Design Studio
- FANUC Industrial Network Setting Tool
- FANUC CNC User Setting Tool

The CNC Application Development Kit 2022 is available only to machine tool builders.

Ordering Information (Electronic Licenses)

The software can be downloaded from MyFANUC. The license is available in the FANUC E-Store.

Specification	Description
A08B-9010-J560#ZZ99	CNC Application Development Kit 2022 (1 User)
A08B-9010-J561#ZZ99	CNC Application Development Kit 2022 (10 Users)
A08B-9010-J562#ZZ99	CNC Application Development Kit 2022 (20 Users)
A08B-9010-J563#ZZ99	CNC Application Development Kit 2022 (Site License)

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

276

CNC Application Development Kit 2022

FANUC CNC Design Studio

Features

FANUC CNC Design Studio is a software to manage CNC data, from design to maintenance and debugging, in an integrated manner for more efficient development. The following is an overview of the functions.

Project Management

Unified management of CNC development configuration files such as applications, parameters, connection settings, etc.

Application Collaboration

Manage shared resources between applications to be developed and provide a mechanism to access shared resources from each application.

Debugging and Maintenance

Developed projects can be easily synchronized by connecting to the actual machine (CNC) or CNC GUIDE 2. Synchronization facilitates data linkage and analysis of failure information from FANUC CNC Design Studio.

Benefits

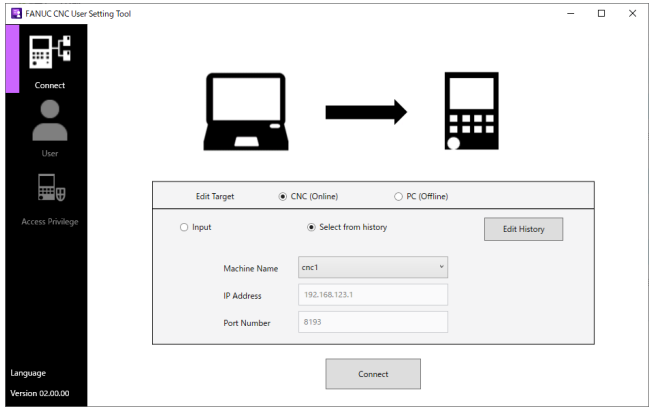
- Simplify data handling for a more efficient development
- Develop your machine using a Digital Twin with CNC GUIDE 2

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

277

CNC Application Development Kit 2022



FANUC CNC User Setting Tool

Features

The Series 500i-A CNC is equipped with a User Authentication function and a Data Access function. The User Authentication function prevents unauthorized operation of the CNC, and the Data Access function manages operating privileges of authorized users.

The CNC User Setting Tool is a PC tool that can connect to a CNC in a network, and can edit account and access privileges remotely.

Benefits

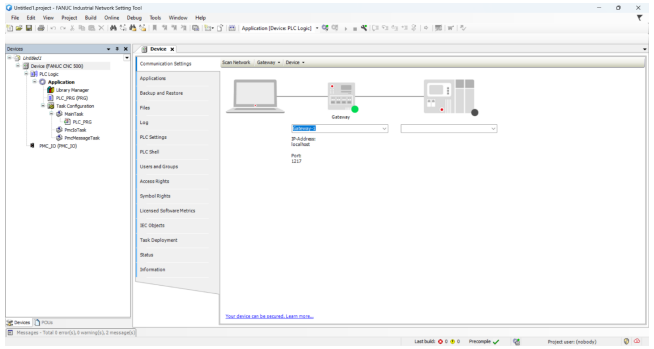
- Set up and configure CNC user accounts easily

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

278

CNC Application Development Kit 2022



FANUC Industrial Network Setting Tool

Features

The FANUC Industrial Network Setting Tool is used to configure the allocation of industrial network equipment to the PMC on Series 500i-A CNCs. The tool supports the comminication functions EtherNet/IP Scanner and EtherNet/IP Adapter, PROFINET IO Controller and PROFINET IO Device, and FL-net.

Benefits

- Simplified management of industrial network settings
- Increase of the efficiency in managing multiple machine seetings and large networking projects

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

279

CNC Application Development Kit 2022

FANUC Macro Compiler 2022

Features

Some NC programs such as technology functions or programs created using custom macros do not need to be modified once created. Other NC programs, such as machining programs, evolve during machining.

The Series 500i-A Macro Compiler and Macro Executor function can convert a Custom Macro program created by the machine tool builder to an executable macro program, load the executable macro program (P-CODE macro) into the CNC Flash Memory, and execute it.

The software which converts a Custom Macro program to an Executable Macro program is called the Macro Compiler. The function which reads and executes a P-CODE macro on the Series 500i-A CNC is called the Macro Executor.

The Series 500i-A Macro Compiler and Macro Executor function supports Motion Script. Motion Script enables to command operations that will be performed depending on conditions, such as controlling peripheral axes, in a macro program. Motion Script commands are executed simultaneously with NC axis control commands. Therefore, even in the middle of an NC axis command, operations such as movement commands for peripheral axes can be performed depending on the machine status.

Benefits

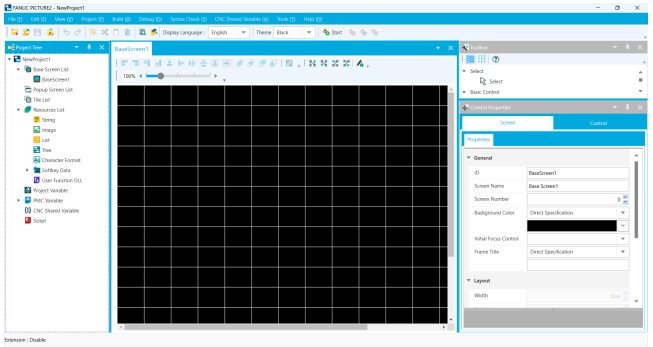
- Creation of customized functions and programs
- Modification of Macro Programs to follow machine and production evolution
- Powerful programming language for machining or machine management purpose

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

280

CNC Application Development Kit 2022



FANUC PICTURE2

Features

The FANUC PICTURE2 software provides a rich set of functions and tools to design and implement customized Human Machine Interfaces (HMI) for the Series 500i-A CNC. FANUC PICTURE2 includes the following features:

- Display operation screens can be designed on a PC for display units with touch panels and soft keys
- Layouts can be checked and modified easily
- A wide variety of screen components can be used to realize a variety of screens
- Simple logic can be set up without programming
- Complex logic can be created with mruby scripts

Benefits

- Creation of customized HMI on the FANUC CNC
- Powerful HMI without the requirement of PC hardware
- Simple modification of the HMI to follow machine and production evolution

Ordering Information

Specification	Description
A02B-0372-R925	501iS-A Fanuc Picture 2 Extension
A02B-0373-R925	501i-A Fanuc Picture 2 Extension
A02B-0374-R925	502iS-A Fanuc Picture 2 Extension
A02B-0375-R925	502i-A Fanuc Picture 2 Extension
A02B-0377-R925	503i-A Fanuc Picture 2 Extension

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

FOCAS3 Library

Features

FOCAS (FANUC Open CNC API Specification) is the protocol used to connect and interact with the FANUC CNC from an external Personal Computer (PC).

The FOCAS3 library provides all required functions to be able to develop Windows applications which can communicate with a Series 500i-A CNC via Ethernet.

Benefits

- Creation of customized functions and applications under Windows
- Modification of Macro Programs to follow machine and production evolution
- Easy access to many ressources of the FANUC CNC to create advanced applications

Ordering Information (Electronic Licenses)

The software can be downloaded from MyFANUC. The license is available in the FANUC E-Store.

Specification	Description
A08B-9510-J850#ZZ99	FOCAS3 Library (1 User)
A08B-9510-J856#ZZ99	FOCAS3 Library Windows OS C# (1 User)

Notice

Certain functions may require additional hardware, different CPU type or additional memory capacity or may cause compatibility issue with other functions. In case of doubt, contact your FANUC sales representative for additional information and support.

Index

D

E

F

G

H

I

L

M

N

O

P

R

S

T

V

W

Y

i

FANUC

Automation has a name.

FA
CNCs, Drives, Accessories and Software

ROBOTS
Industrial and Collaborative Robots, Accessories and Software

ROBODRILL
Compact CNC Machining Centres

ROBOSHOT
Electric CNC Injection Moulding Machines

ROBOCUT
CNC Wire-Cut Electric Discharge Machines

IoT
Industry 4.0 solutions

Discover the world's widest range of products for industrial automation:

FANUC.EU

MBR-05506-EN -04/2026