Operation Guidance function

FANUC MANUAL GUIDE i
1. What is MANUAL GUIDE?

- Operation Guidance, which supports whole operations on an all-in-one screen for daily machining including creating a program on a lathe, machining center and compound machine.

**Easy programming**

Based on ISO-code program format, complex machining motions can be created easily by menu form.

**All-in-one Screen**

Only one screen concentrated all operations.

**Machine status window**

Machine status such as actual position, feedrate and load meter are displayed always.

**Realistic machining simulation**

3-D solid model machining simulation is available.

**Intuitive menu selecting**

Menu can be selected easily and intuitively by soft-key with icon.

**Good affinity with CAD/CAM**

Most popular ISO-code program format on CAD/CAM can be dealt as it is.
2. Market trend of Conversational programming

- Thanks to reducing a price, CAD/CAM on a PC are getting more popular.
- Desire for more easy operations of a machine and CNC is getting strong.
- The demand of MANUAL GUIDE, which has necessary and sufficient features and thoroughly simplified operations, is getting stronger rather than orthodox conversational programming functions such as Super CAPiT/M and Symbol CAPiT.
- FANUC’s conversational programming functions will be concentrated to MANUAL GUIDE.
Simple operation on all-in-one screen
(10.4" Color / 9.5" Monochrome LCD)

All-in-one screen for Programming, Graphic simulation and Machining

Status Indicator Window

Graphic Display Window

Program Window

Pop-up Window

Key in Buffer

Soft-keys with Icon

Program List
O0001: DRILLING BOLT HOL : 5M12S: 1998 / 06 / 10 10:32
O0010: SIDE CUTTING REC : 4M32S: 1998 / 06 / 10 12:10
O0012: CONTOUR MACHIN : 9M22S: 1998 / 06 / 10 13:30
Various features to support screen operation

1. Icon menu
All menu is displayed with Icon soft-keys
Operator can select machining type easily by intuition

2. Application of Pop-up window
All data is displayed on one screen without screen switching
Supplemental data which cannot be displayed on one screen is displayed in a pop-up window

(Cycle machining menu soft-keys)

(Tool file window)
FANUC MANUAL GUIDE i for Milling
Overview

1. Simple operation on all-in-one screen (10.4”color/9.5”monochrome LCD)
   All operation can be done on one screen, and no screen switching is needed.

2. Guided ISO programming by conversational method
   (ISO program has higher flexibility than machining process program.)
   a) Easy operations using Icon menu soft-keys
   b) Guidance window to illustrate required parameter

3. Advanced canned cycles for complicated milling machining
   Drilling, Facing, Side cutting, Pocketing, Contour machining

4. Easy program checking by sophisticated graphic simulation
   Realistic animated drawing simulation with solid model

5. Machining used handwheel for manual operation
   Guidance cutting and teach-in for playback

6. Optional function on Series 16i/18i/21i - MA/MB
Various features to support milling machine operations

1. All operations can be done on one screen

2. Advance canned cycles for milling machining
   a) Drilling  
   b) Hole pattern  
   c) Facing  
   d) Side cutting  
   e) Pocketing  
   f) Contour machining

3. Quick and realistic machining simulation
   Tool path drawing, animated drawing on a solid model, rotation of a product and so on are available

4. Abundant customizing tools for building up the best suited milling machine system
   Installing MTB’s own tool set-up guidance, machining process and so on are available

5. Abundant displaying language
   In addition to standard 6 languages display, Japanese / English / German / French / Italian / Spanish, 4 extra languages can be installed easily
**Advanced canned cycles**

- Contour machining (Side / Pocket / Groove)
  
  By entering contour figure, tool path of contour machining will be created automatically.

- Drilling
  (Center drill / Drill / Tap / Reamer / Bore / Back bore)
- Hole pattern
  (Line / Arc / Circle / Square / Grid)
- Facing
  (Square / Circle / Ring)
- Side cutting
  (Square / Circle / Track / One side)
- Pocketing
  (Square / Circle / Track / Groove)

**Easy program checking**

- Animated drawing on a solid model
- Cross-sectional viewing
- Tool path drawing

**Contour programming**

- Automatic calculation of intersections enables simple programming of complicated machining profile.
- Contour editing function
  - Symmetry
  - Translation
  - Rotation

**Contour programming screen**

- Tool path of contour pocketing
Guidance cutting to support manual operation

Guidance cutting, with teaching of auxiliary functions and others, support manual operations strongly

1. Manual operations such as positioning and cutting
2. Auxiliary functions, such as coolant on/off and spindle rotation
3. Approach cutting toward Line and Circle by a Guidance Handwheel
4. Along cutting of Line and Circle by a Guidance Handwheel
5. These motions can be teach-in for playback

(Sample of guidance cutting screen)
1. What is Tool Management function?

- Tool Management Data Table is available, into which all tool data (Tool Offset value, Tool Life data and so on) are integrated.

- Tool Management Data Table can be managed collectively by CNC and can be accessed by PMC, MANUAL GUIDE and a personal computer.

2. Adaptation of MANUAL GUIDE to Tool Management function

- Cutting condition (Feedrate, Spindle Speed) can be set automatically by inputting Tool Type Number.

- MTB can add their original data to Tool Management Data Table and use it in cycle machining (Available by MTB’s customizing).
1. Addition of Background Drawing Function
   - Checking of machining motion can be done easily by machining simulation during other actual machining.

2. Addition of Automatic measuring cycles
   - X/Y/Z single surface          - Stub/Groove
   - Outside/Inside circle         - Outside/Inside rectangular
   - Outside/Inside corner         - Hole position
   - Work-piece angle              -
   - Automatic calibration for a prove

3. Others
   - Full screen display of machining simulation
   - NC Program Expansion for milling canned cycle
   - Hand held calculator type data calculation
FANUC MANUAL GUIDE i for Lathe
Overview

1. Simple operation on all-in-one screen (10.4”color/9.5”monochrome LCD)
   All operation can be done on one screen, and no screen switching is needed.

2. Exclusive built operating methods for manual lathe
   a) Easy operations using Icon menu soft-keys
   b) Guidance window to illustrate required parameter
   c) Consistent operations from trial cutting until mass producing

3. Various machining menus
   Bar machining, Grooving, Threading, Lathe drilling, C-axis drilling/grooving and so on

4. Easy program checking by sophisticated graphic simulation
   Realistic animated drawing simulation with solid model

5. Machining used handwheel for manual operation
   Guidance cutting and teach-in for playback

6. Optional function on Series 16i/18i/21i - TA/TB
Operation Guidance which possess both of Manual Lathe’s Easiness and CNC Lathe’s Functionality, and shop-floor programming is also available.

1. Advance canned cycles for lathe machining
   - Bar machining
   - Threading
   - C-axis drilling
   - Thread repair cycle
   - Grooving
   - Lathe drilling
   - C-axis grooving

2. All operations can be done on one screen

3. Quick and realistic machining simulation
   Tool path drawing, animated drawing on a solid model, rotation of a product are available

4. Teaching playback
   By teaching operation of skilled worker, its playback machining can be done easily.
1. Guidance Cutting

- Cutting of Line or Circle form can be done by Guidance Handwheel.
- Teaching, Editing of taught-in blocks and Playback machining are available.

2. Single Cutting

- Tool path such as Positioning, line and Circle can be inputted directly.
- Teaching, Editing of taught-in blocks and Playback machining are available.
Cycle cutting

By inputting a machining figure, all of the machining motions can be done automatically.

- Bar machining
  - (Outer / Inner / End face)
- Grooving (Standard / Trapezoidal)
- Threading (General / Metric / Unified / PT / PF)
- Necking (DIN509E / DIN76)
- Drilling (Center drilling / Drilling / Reaming / Boring / Tapping)

Easy program checking

- Tool path such as positioning, line and circle can be inputted directly
- Teaching and editing of taught-in blocks and playback machining are available

Single cutting

- Tool path drawing
- Input tool path
1. Air Cut Canceling function
- The optimized machining motions can be carried out automatically in accordance to the entered preformed work-piece figure data.
- Processing time can be reduced.

2. Thread Repair Cycle
- The starting point of threading can be measured by making a threading tool touch onto the actual thread.
- A broken thread can be repaired easily.

3. Necking cycles
- DIN509-F necking pattern can be input easily in addition to DIN509-E and DIN76.

4. Adaptation to work coordinate (G55-G59)
- G55-G59 work coordinate can be selected in addition to G54.
5. Addition of contour enlarging function
   - Detail of contour can be checked easily by enlarging.

6. Addition of a Process List for selecting a executing process
   - Only finishing as the need arises after measuring can be executed.

7. Implementation of explanatory diagram
   - Diagram explaining a position of imaginary tool nose was added.

8. Other improvement for operation
   - A function to prevent selecting a wrong machining program was added.
   - Zooming operation in animation screen was optimized.
   - Positions for spindle orientation and the second reference can be set in initial screen.
Operation Guidance for Compound Machine

Compound Machine

Turning Capacity equal to Lathe + Milling Capacity equal to Machining Center

High efficient machining, but complicated operation

Simple operation with MANUAL GUIDE for Compound Machine
Accomplish simple operation on a Compound Machine

Applicable CNC: FANUC Series 16i/18i - TB
for compound machining function

- Relief of the complicated operation
  - Display and operations were integrated to one screen.
  - Offset data, Work coordinate system
  - Current position, G/M/S/T-code display

- Easy making of machining program
  - Operator can make program easily in dialogue form
    without knowledge for turning and milling.

- Easy checking of machining program
  - Realistic drawing both of turning and milling with 3-D solid model is available.
  - Milling on a slanted surface can be simulated.
  - Cutter mark according to a tool tip shape can be expressed.
Support whole machining and turning facilities

**Milling Cycles**
- Contour machining (Side wall, Pocket, Groove)
- Hole Machining (Center drilling, Drilling, Reaming, Boring, Tapping)
- Hole pattern (Points, Line, Arc, Circle, Square, Grid)
- Facing (Square, Circle)
- Side cutting (Square, Circle, Track, One side)
- Pocketing (Square, Circle, Track, Groove)
  Note) All of the above can be done also on a slanted surface
- Measuring (Centering/Product measuring for turning/milling)

**Turning Cycles**
- Bar machining (Roughing)
- Bar machining (Finishing)
- Threading
- Grooving (Normal, Trapezoidal)
- Hole machining for lathe (Center drilling, Drilling, Reaming, Boring, Tapping)
- C-axis hole machining
- C-axis grooving
- C-axis cylindrical machining