SNAIL HOUSING
LATHE CHUCK SETUP

Programs	O40 · O41
Work offset	G54

- Chuck on table — p. 1 · A
- Datum XY — p. 1 · B
- Clamping · Z — p. 2 · C, D
- O40 + O41 — p. 3 · E
- SOP G54 Z — p. 4 · step by step p. 5

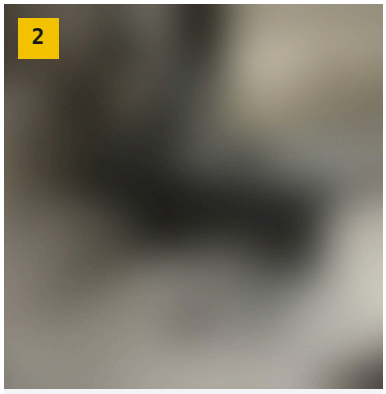
A CHUCK ON THE TABLE

CHUCK CLAMPING

3×	T-nut 16
3×	Clamp
3×	Bolt 24 mm
2×	Small block two under each clamp



Close-up: blocks under the clamp — type: small serrated step block. Clamp serrations on the block, nut with washer.

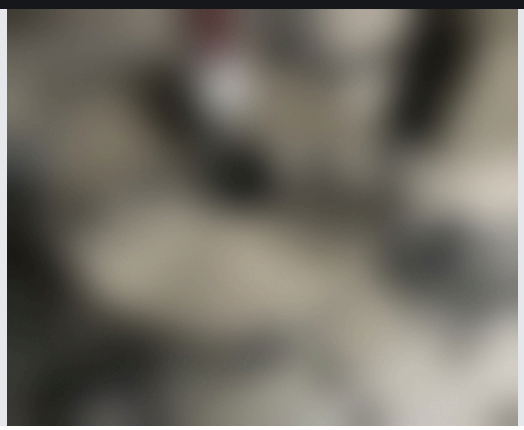


Clamp nose on the chuck flange, back end on the small blocks. Tighten 3× 24 mm bolts.

B DATUM XY — DTI · G54

FIRST PART ONLY

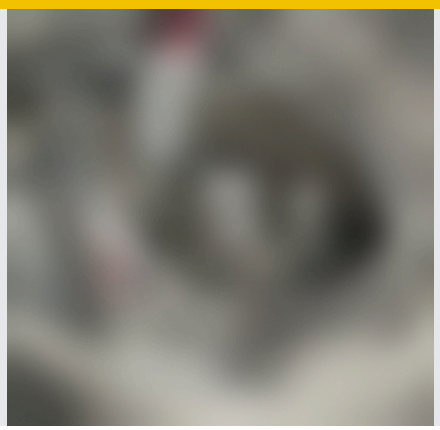
Big bore — chuck open



DTI in the lathe chuck bore, **jaws open**, before loading the part.

EVERY PART · AFTER O40

Small boss — outer wall



1. After O40 go to **X0 Y0** — **not** to Z0.
2. **Z down on the handwheel (HANDLE), by eye**, until the DTI tip is level with the outer wall of the small boss.
3. **Clock by hand on the outer wall** of the small boss and set the X Y offsets.
4. **Remove the DTI**, put it away → program O41.

1 **Turn the spindle by hand**, use the handwheel to move X and Y by half the difference until the needle stays still.

HANDLE → X / Y → ×10 / ×1

2 **Set X0 Y0 in G54**

OFFSET → WORK → X0 → MEASUR

Y0 → MEASUR

3 **Check:** G54 X, Y = MACHINE X, Y.

POS → ALL

CLAMPING AND Z

Programs	040 · 041
Work offset	G54

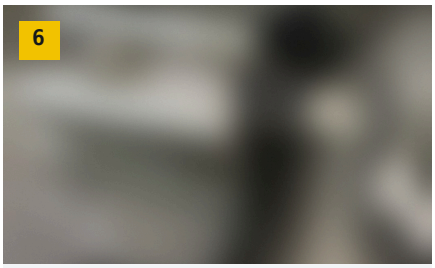
C PART CLAMPING AND TIGHTENING



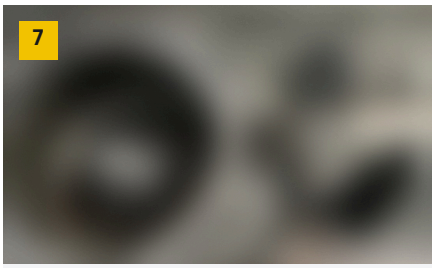
Casting clamped before machining — in the chuck, 2× top clamp, one each side.

TIGHTENING · ORDER

1	**Chuck — a little**
2	**Clamps in turn** one, then the other
3	**Chuck fully tight**
4	**Clamps fully tight again**
✔	**Check the part sits on all 3** by eye, or with a feeler gauge to be sure



Top clamp on blocks, arrows towards the part.

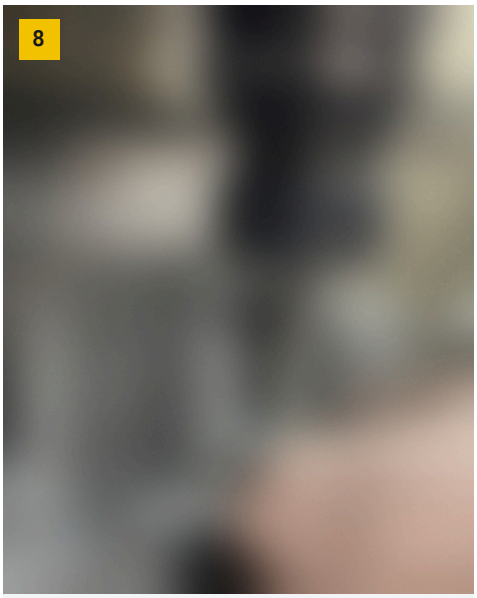


Second clamp — ground tip.

TOP CLAMPS

2× block for the top clamps — must be **ground**.

D SETTING Z — PAPER · ENTER TOOL LENGTH



Endmill Ø12, 4 flute (T12) above the paper — set Z at this spot.

1 **Endmill Ø12, 4 flute** (T12) into the spindle.

MDI → PROG → T12 M6 ; → INSERT → CYCLE START

2 **Read the tool length** from the offset table (GEOM H, tool number).

OFFSET → OFFSET → No. 012 · GEOM(H)

Length: _____

3 **Paper** as in photo 8. Lower Z on the handwheel, small steps when close, until the tool touches the paper → **pull the paper out**.

HANDLE → Z → ×10 / ×1

4 **G54 Z = enter the TOOL LENGTH, not 0**

OFFSET → WORK → G54 · Z → Z + length → MEASUR

e.g. length 120.000 → type Z120. and MEASUR · SOP — p. 4

5 **Check:** G54 Z = MACHINE Z − length.

POS → ALL → MACHINE Z

Set Z once, at setup — not for every part.

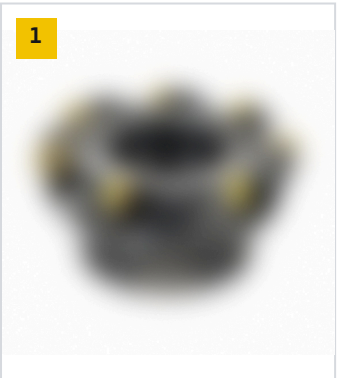
040 + 041

Programs	040 · 041
Work offset	G54

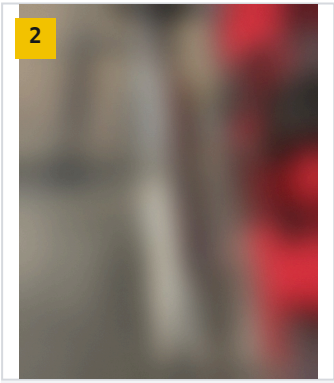
E OPERATION SEQUENCE

OP	TOOL (number — for info only, may change)	WHAT IT DOES	TO
040	**first 5 operations**		
1	**Face mill Ø100** (T20)	Light skim of the top	–
2	**Drill Ø60** (T7) load it	Drills to **Z+3.5**, retracts slightly out of the hole, then comes back and drills to **Z-42**. **Careful — hand on STOP.**	Z-42
3	**Endmill Ø50** (T19)	Centre	Z0
4	**Endmill Ø50** (T19)	Outer ring — leaves	Z0
5	**Endmill Ø50** (T19)	Into the centre and deburr	Z-15
◎	**DTI — small boss, outer wall** → X Y offsets (every part) → **remove DTI, put away** → switch to O41		
041	**last operation**		
6	**Endmill Ø12, 4 flute** (T12)	Light machining in the centre — smoothing the edges	–
■	**Check inserts → part change**		

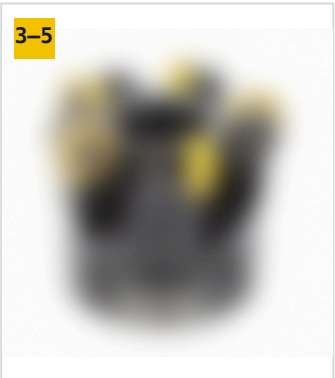
E2 TOOLS — TYPE



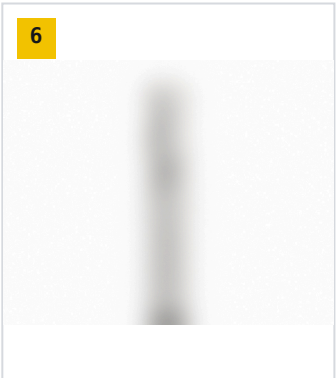
Face mill Ø100
round inserts (T20)



Drill Ø60
indexable inserts (T7)



Endmill Ø50
round inserts (T19)



Endmill Ø12 HSS
4 flute (T12)

OP. 2 · DRILL Ø60

To Z+3.5 → retracts slightly out of the hole → comes back → to Z-42. This is normal — but **keep your hand on STOP**.

FEED HOLD / RESET

DRILL Ø60 · INSERTS

Load before the program, **remove** when finished.
Check the inserts — if worn, replace.

NOTES · MEASUREMENTS · CORRECTIONS

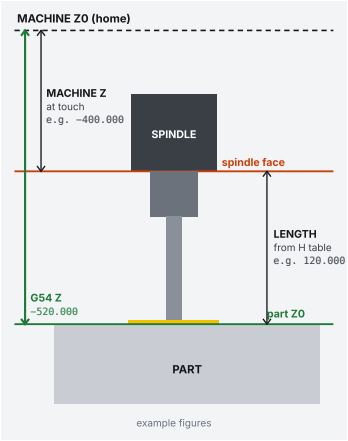
SOP WORK INSTRUCTION · VMC FANUC 0I-MC

SETTING G54 Z

Tool	**Endmill Ø12 (T12)**
Method	**paper · MEASUR**
When	**once · at setup**

1 · PURPOSE	2 · SCOPE	3 · REQUIRED
Set the Z zero point (G54 Z) on the top face of the part, consistent with the tool lengths in the OFFSET table.	Snail housing — lathe chuck setup, programs O40 and O41. Carry out at every new setup.	Endmill Ø12 `(T12)` with its length in the table (GEOM H) · paper · HANDLE handwheel.

4 PRINCIPLE



example figures

The OFFSET table (**GEOM H** column) holds the **tool lengths** — from the spindle face to the tool tip. The program calls them with **G43 H**. That is why G54 Z is set with the **tool length**, not 0:

G54 Z = MACHINE Z at touch − tool length

MACHINE Z when touching the paper	**−400.000**
− tool length (GEOM H)	**120.000**
= G54 Z `(example figures)`	**−520.000**

The **MEASUR** key does this calculation: type **Z + length** (e.g. **Z120.**).

5 PROCEDURE

STEP	ACTION	KEYS	CHECK
5.1	**Endmill Ø12** `(T12)` into the spindle.	MDI → T12 M6 ; → INSERT → CYCLE START	T12 shown on screen.
5.2	**Read the length** of this tool from the table and write it down.	OFFSET → OFFSET → No. 012 · GEOM(H)	Length: _____
5.3	**Paper** on the top face of the part, under the tool (p. 2, photo 8).		Always the same paper.
5.4	**Lower Z on the handwheel.** Small steps when close. Tool touches the paper → **pull the paper out**.	HANDLE → Z → ×10 → ×1	Paper drags slightly.
5.5	**Enter the tool length** in G54 Z and confirm with MEASUR.	OFFSET → WORK → G54 · Z → Z + length → MEASUR	**Do not enter 0.**
5.6	**Check the result.**	POS → ALL	G54 Z = MACHINE Z − length.
5.7	**Move Z up** on the handwheel.	HANDLE → Z → +	—

6 ERRORS AND EFFECTS

ERROR	EFFECT	HOW TO AVOID
0 entered instead of the length	Z0 a full tool length **too high** — tools cut air.	Step 5.5: Z + length.
Length of another tool (wrong H number)	Z0 shifted by the length difference — **too low (crash)** or too high.	Step 5.2: H of the tool that is in the spindle.
Paper thickness not allowed for	Z0 higher by the paper thickness — cuts that much shallower.	When accuracy matters: enter length + paper thickness.

Reference: FANUC Series 0i-MF Plus Operator's Handbook (Adv Mill), §1.2 Work offset — method with tool length offset.

CYCLE SETUP AND EVERY PART

STEP BY STEP

Programs	**040 · 041**
Work offset	**G54**

SETUP · ONCE · FIRST PART

1 Chuck on the table

3× T-nut 16, 3× clamp on 2 small blocks, 3× 24 mm bolt — tighten.

2 XY — DTI, big bore, chuck open

OFFSET → WORK → X0 → MEASUR → Y0 → MEASUR

3 Z — paper, endmill Ø12 (T12)

WORK → G54 · Z → Z + length → MEASUR

Tool length, not 0. Check: G54 Z = MACHINE Z − length.

4 Load drill Ø60 (T7)

EVERY PART

5 Casting into the chuck + 2× top clamp

Blocks for the top clamps ground, arrows towards the part.

6 Tightening — order

1 chuck a little → 2 clamps in turn → 3 chuck max → 4 clamps max

✓ Sits on all 3 — by eye or with a feeler gauge.

7 O40 — 5 operations

EDIT → PROG → O40 → ↓ → RESET → AUTO → CYCLE START

Drilling Ø60: hand on STOP.

8 DTI — small boss (outer wall) → X Y offsets

X0 Y0 (no Z0) → Z down on the handwheel, by eye → clock by hand on the outer wall of the small boss.

X0 → MEASUR → Y0 → MEASUR

9 Remove DTI, put away → O41

EDIT → PROG → O41 → ↓ → RESET → AUTO → CYCLE START

10 Check inserts → part change

worn → replace → unclamp → new part → step 5

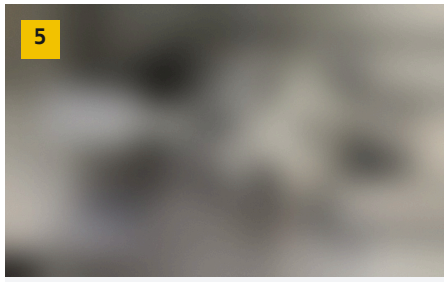
FANUC 0I-MC · CHEAT SHEET

WORK	work offset screen · **01 = G54**
MEASUR	X0 / Y0 → position = 0 **Z + length** → tool tip = Z0
+INPUT	**adds** to the value
INPUT	**overwrites** the value

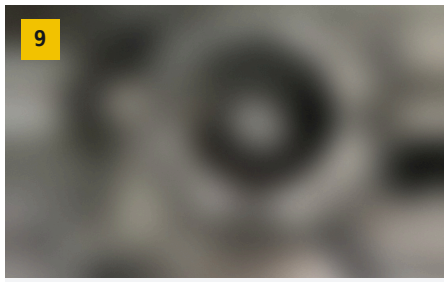
TOOLS

Face mill Ø100 (T20)
Drill Ø60 (T7)
Endmill Ø50 (T19)
Endmill Ø12, 4 flute (T12)
DTI (lever dial indicator)

numbers for info only — may change



Clamped casting.



Finished part.

WHEN FINISHED

Remove the **drill Ø60** (T7).