

Overview of functions

Positioning modules

2

- Basic version
- Option
- Not possible

FM 353

FM 354

FM 357-2L
FM 357-2LX
FM 357-2HSIMODRIVE 611
universal HRS

Structure/application

Structure				
• SIMATIC S7-300	●	●	●	–
• SIMODRIVE 611	–	–	–	●
Axes per module	1	1	4	1/2
Channels per module	1	1	4 ³⁾	–
Interpolating axes, max.	–	–	4	2
Max. modules per SIMATIC programmable controller	1 ¹⁾	1 ¹⁾	3 ³⁾	–
Drives				
• Power control for stepper motors ⁶⁾	●	–	●	–
• SIMODRIVE 611 universal HRS (with analog setpoint interface)	● 5)	●	●	●
• SIMODRIVE 611 universal HRS via PROFIBUS DP	● 5)	–	●	●
• SIMOVERT MASTERDRIVES MC via PROFIBUS DP	–	–	●	–

Measuring systems that can be connected

Indirect measuring systems				
• Incremental rotary measuring systems via RS 422	–	●	● 2)	● 4)
• Incremental encoder with sin/cos 1 V _{pp}	–	–	–	●
• Resolver	–	–	–	●
• Absolute rotary measuring systems with SSI	–	●	● 2)	–
• Absolute rotary measuring systems with EnDat	–	–	–	●
Direct measuring systems				
• Incremental rotary measuring systems via RS 422	–	●	● 2)	–
• Incremental encoder with sin/cos 1 V _{pp}	–	–	–	●
• Resolver	–	–	–	●
• Absolute rotary measuring systems with SSI	–	●	● 2)	–
• Absolute linear scale with SSI	–	●	● 2)	–
• Absolute linear scale with EnDat	–	–	–	●

Functionality

Traversing range in m	±1 000	±1 000	±1 000	± 200
Velocity in mm/min	–	0.01 ... 500 000	0.001 ... > 10 000 000	1 ... 2 000 000.000
Max. stepping rate in kHz	200	–	750	–
Acceleration in m/s ²	–	0.001 ... 100	0.001 ... 100	0.001 ... 999
Acceleration in kHz/s for stepper drives	0.01 ... 10 000	–	0.001 ... 100	–
Jerk time in s	–	0 ... 10	0 ... 10	0 ... 0.2

1) Depending on requirements and module complement of the subrack.

2) Also in combination with stepper drive.

3) With FM 357-2H only 1.

4) With sin/cos module only.

5) Via shaft angle encoder interface only.

6) On request.

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Functionality (continued)

Basic resolution in				
• mm	10^{-3}	10^{-3}	10^{-3}	10^{-3}
• inch	10^{-4}	10^{-4}	10^{-4}	10^{-4}
• degrees	$10^{-2}, 10^{-4}$	$10^{-2}, 10^{-4}$	$10^{-2}, 10^{-4}$	10^{-3}
Position-controlled mode	–	●	●	●
Controlled operation with stepper drives	●	–	●	–
Position control cycle in ms	–	2	2 ... 3	1 ... 4
Interpolation time in ms	2	2	6 ... 9	2 ... 20
Rotary axis	●	●	●	○
Automatic block search	●	●	●	○
Programmable acceleration	●	●	●	○
High-speed process signals				
• Inputs	4	4	12	1
• Outputs	4	4	8 ¹⁾	–
Options for assigning the high-speed inputs:				
• External start	●	●	●	●
• Enable input (Stop)	●	●	●	●
• External block change	●	●	2)	●
• Set actual value on-the-fly	●	●	2)	●
• On-the-fly measurement	●	●	●	●
• Home position switch	●	●	●	●
• Reversing cam	●	●	●	–
Options for assigning the high-speed outputs:				
• Position reached Stop	●	●	●	●
• Forward, back	●	●	●	–
• M function output M97/M98	●	●	2)	–
• Start enable	●	●	2)	–
• Direct output (for user)	●	●	●	–
• Cam output	–	–	●	–

CNC programming

Programming language (DIN 66025)	●	●	●	–
No. of traversing programs	199 ³⁾	199 ³⁾	4)	1
Program length in blocks, max.	100	100	4)	256
Block capacity per module, max.	3)	3)	4)	256 ⁵⁾
Subroutine levels, max.	1	1	11	–
No. of subroutine passes, max.	250	250	≤ 9 999	–
Max. number of different subroutines from one program	20	20	4)	–

1) Expandable using local bus segment.

2) Via synchronized actions.

3) Limited by program memory (16 KB).

4) Limited by program memory (770 KB).

5) With software version 10 or higher.

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CNC programming (continued)

Dimensions in mm, degrees, inch	●	●	●	●
Skip block	●	●	●	●
Subroutines	●	●	●	–
Endless loop with M18	●	●	●	With GOTO
M function, actual-value-specific	–	–	●	–
M function, time/acknowledgement-driven	●	●	●	–
Syntax check	●	●	●	●

Communication

Backup of user data on PG from				
• Hard disk, floppy disk	FM Param	FM Param	FM Param	○
• Memory card	–	–	●	–
I/O bus, S7-CPU ↔ FM	●	●	●	–
Software technology module for communication between CPU and positioning module	●	●	●	●
Multipoint interface (MPI)				
• Via SIMATIC S7-CPU	●	●	●	–
Networking with PROFIBUS DP via SIMATIC S7 CP 342-5 DP	○	○	○	●
PROFIBUS DP with PROFIdrive profile	–	–	1) ●	○
SIMODRIVE drive interface	–	±10 V	±10 V	±10 V
Power control for stepper motors ⁴⁾ drive interface (stepping rate, direction signal)	●	–	●	–
Data transfer via memory card	–	–	●	–

Operation

Standard screens for OP7	2) ●	2) ●	–	–
Standard screens for OP17	2) ●	2) ●	2) ●	–
Standard screens for OP27	–	–	2) ●	–
Standard screens for TP 170B/MP 270B	–	–	2) ●	–

Operating modes and machine functions

Incremental dimension, relative	●	●	●	●
Jog mode	●	●	●	●
Control	●	●	●	○
MDI	●	●	3) ●	–
Automatic	●	●	●	●
Reference point approach	●	●	●	●
Follow-up mode	–	●	●	○
Parking axis	●	●	●	○
Simulation	●	●	●	–

1) Cannot be used when HT 6 is used in combination with FM 357-2H.

2) Included in the configuration package.

3) Only via startup screen.

4) On request.

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- Basic version
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- Not possible

FM 353**FM 354****FM 357-2L
FM 357-2LX
FM 357-2H****SIMODRIVE 611
universal HRS****Operating modes and machine functions (continued)**

Length measurement	●	●	●	–
Retrigger reference point	●	●	●	–
Switch off enable input	●	●	●	–
Switch off software limit switch	●	●	●	–
On-the-fly measurement	●	●	● 1)	●
Switch off automatic drift compensation	–	●	●	–
Preset (set actual value)	●	●	●	–
Block search	●	●	–	●
Teach In	●	●	● 2)	○
Delete distance-to-go	●	●	●	–
Restart	●	●	●	–
Handling transformation	–	–	● 2)	–

Compensations and reference points

20 tool compensations	●	●	●	–
Tool compensations 1 length + 1 wear (add./abs.)	●	●	●	–
Tool compensation, 3 lengths	–	–	●	–
Zero offset	●	●	●	●
Reference point offset	●	●	●	●
Automatic drift compensation for analog speed setpoints	–	●	●	–
Backlash compensation	●	●	●	●

Axis monitoring functions

Software limit switch monitoring	●	●	●	●
Position monitoring	–	●	●	●
Standstill (zero-speed) monitoring	–	●	●	●
Rotation monitoring	●	–	●	–
Plausibility in data communication	●	●	●	–
Limit value	●	●	●	●
Following error	–	●	●	●
Cable break	–	●	●	●
Setpoint	●	●	●	–
Watchdog	●	●	●	–

1) Not with FM 357-2L.

2) With FM 357-2H.

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Positioning modules

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- Basic version
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FM 353**FM 354****FM 357-2L
FM 357-2LX
FM 357-2H****SIMODRIVE 611
universal HRS****PLC area**

FM can be used in SIMATIC S7-300

PLC programming with HiGraph
Add-on package for STEP 7

SIMATIC S7 technology modules

Digital inputs/outputs, max.

No. of I/O modules, max.

Bit memories

Counter

Timers

Main memory in KB

Machining time

• Bit commands, typ. in µs

• Word commands, typ. in µs

FB

FC

DB

Cyclic function block

Time-controlled function blocks

STEP 7 programming language

Programming: STL, SCL, LAD/FBD

Equipment for PLC programming and program
testing

Memory card (flash EPROM)

CPU 314 and
higherCPU 314 and
higherCPU 314C and
higher

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●

●

●

–

1 024

1 024

992

8¹⁾

32

32

31

–

2 048

2 048

2 048

–

256

256

256

–

256

256

256

–

48

48

48

–

0.1

0.1

0.1

–

1.0

1.0

1.0

–

512

512

512

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511

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PG 7../PC

PG 7../PC

PG 7../PC

–

CPU 314
CPU 315CPU 314
CPU 315CPU 314C
CPU 315
CPU 316
CPU 318-2

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Diagnostic functions

PLC status

Diagnostic buffer specifying error ID codes

Servo alarms

Diagnostic alarms and messages

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Startup/parameterization

PG 720/PG 740/PG 760 programming devices

PC with RS 232 C (V.24)

PC with MPI card

Windows-based startup tool

Configured using SIMATIC STEP 7

Startup functions

• Measurement functions

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1) Expansion is possible via options.

2) The last 5 events.