2.5 SPINDLE-SPEED FUNCTION (S-FUNCTION)

2.5.1 S 2-DIGIT PROGRAMMING

The spindle speed is specified by two digits following the address S (S00 to S99).

For each S code and its corresponding spindle speed (rpm), refer to the machine tool builder's manual.

When a move command and an S code are issued in a block, whether the S command is executed together with the move command or after the completion of tool move depends on the machine tool builder. Refer to the machine tool builder's manual.

EXAMPLE

```
G00 S11 M03 ;
          ... S command
              Spindle CW      } S11: Effective
    X... Y... Z... ;
G01 Z... F... ;
    .
    .
G00 X... Y... Z... M05 ; ... Spindle stop
                ... M03 ;   } S11: Effective
    X... Y... Z... ;
G01 Z... F... ;
    S22 ;
    X... Y... F... ;        } S22: Effective
    .
    .
```

NOTE: The two-digit BCD output is sent to the machine when S and two-digit command is issued.

2.5.2 S 5-DIGIT PROGRAMMING†

2.5.2.1 S 5-digit Programming

With five digits written after an address character S (S □□□□□), spindle speeds in rpm are directly commanded.

The programmed speeds become effective upon the inputting of an S-command-completion-input-signal (SFIN).

When an S command is programmed in the same block with M03 (spindle forward run) or M04 (spindle reverse run), the execution of the next block starts only after the spindle speed reaches to the level specified by the S command, in most cases. However, for exact behavior of the machine tool under consideration, refer to the machine tool builder's manual.

EXAMPLE

S 1000 M03 ;

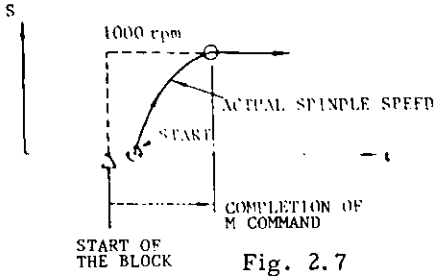


Fig. 2.7

The S commands are modal, and when it is programmed once, it remains effective until another command is programmed. Even when the spindle is stopped by a M05, the S command remains effective. Therefore, when the spindle starts again with an M03 (or M04), the spindle runs at the speed specified by the S command.

When the spindle speed is to be changed by a new S command after it is started with an M03 or M04, attention must be paid to the selected spindle speed range.

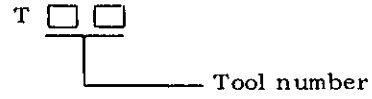
NOTES:

- The lower limit of programmable S commands (S0 and other S commands for near 0 values) is determined by the spindle motor of the machine tool. Refer to the machine tool builder's manual. Do not program minus values as S commands.
- When the control is equipped with the S 5-digit command function, spindle speed overriding is possible. That is, override speeds between 50 and 120% of the commanded spindle speed can be obtained at intervals of 10%.

2.6 TOOL FUNCTION (T-FUNCTION)

2.6.1 T 2-DIGIT PROGRAMMING

Two digits, following the address T, specify the tool number. Leading zeros may be omitted.



The figures used for the designation of tool number are determined by the machine. Refer to the machine tool builder's manual.

When a move command and a T code are issued simultaneously,

- the two commands are executed simultaneously, or
- the T command is executed upon completion of the execution of the move command,

depending on the design of the machine.

For this, refer to the machine builder's manual.

- T codes are modal, and therefore, once they are given, they remain effective until another T command is given.
- T code commands are generally for making automatic tool changers (ATC) to select the tool number to be used next. Therefore, they can be given without regard to the G, H or D codes which are for offsetting for the length or radius of the tool currently in use.