

# Custom M-Code Specification for JS-D680S-2 CNC Controller

**Project:** Custom M-Code Implementation (Y5.0–Y5.4 Output Control)

**Revision:** 1.0

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**Document Status:** Technical Specification for PLC Programming

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## 1. Requirement for M Codes

1. **Scope:** Implement 6 user-defined M codes in the CNC system, used exclusively for PLC auxiliary output control. M-code numbers shall be selected from the free (unused) range. **Recommended example:** M200...M205.
  2. **Functional Principle:** Each M code shall set a unique combination of digital outputs Y5.0...Y5.4 according to the "one output ON, others OFF" principle, plus one additional code to switch all five outputs to OFF state.
  3. **Integration Method:** The M codes shall behave as normal auxiliary codes within a program block and must not affect axis motion interpolation. The function shall be realized via **PLC M-code/output mapping** (as per CNC documentation), not via G-code macro.
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## 2. Output Logic Specification

### Required Functions

**Note:** M-code numbers listed below are examples. Actual numbers may be changed to any available M codes from the free range, provided they do not conflict with system-reserved or machine-specific codes (see Section 3).

#### M200: Select State No. 1

- **Y5.0 = ON**
- **Y5.1, Y5.2, Y5.3, Y5.4 = OFF**

#### M201: Select State No. 2

- **Y5.1 = ON**
- **Y5.0, Y5.2, Y5.3, Y5.4 = OFF**

#### M202: Select State No. 3

- **Y5.2 = ON**
- **Y5.0, Y5.1, Y5.3, Y5.4 = OFF**

#### M203: Select State No. 4

- Y5.3 = ON
- Y5.0, Y5.1, Y5.2, Y5.4 = OFF

#### M204: Select State No. 5

- Y5.4 = ON
- Y5.0, Y5.1, Y5.2, Y5.3 = OFF

#### M205: Reset (All Outputs OFF)

- Y5.0, Y5.1, Y5.2, Y5.3, Y5.4 = OFF
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### 3. Additional Implementation Conditions

#### 3.1 M-Code Number Conflict Avoidance

The selected M-code numbers must **not conflict** with:

- CNC default M codes: M00, M01, M02, M03, M04, M05, M06, M07, M08, M09, M30, M92, M93, M98, M99
- Any M codes already assigned by the machine builder for standard machine functions
- Any M codes mapped to user-defined canned cycles G1007...G1020 via CNC parameters 010170–010183

**Verification Required:** Confirm with machine builder's documentation which M-code range is available before final assignment.

#### 3.2 Implementation Standard

Implementation shall be performed in accordance with the following documentation sections for controller **JS-D680S-2 V2.42**:

- **Section 4.1.2:** "Auxiliary Function Set by PLC"
- **Section 4.2:** "Table of M Command Function and Regular Status"
- **Programming Manual:** M-Code definition and PLC interface

#### 3.3 Response Time Requirement

If any of these M codes are configured as **synchronous M codes** (to be executed in the same program block as axis motion commands), their response time shall satisfy the parameter:

- **Parameter 010167:** "Max. time for synchronous M code response"
- **Default value:** Refer to machine configuration
- **Unit:** milliseconds

**Guidance:** When used in the same block with G01/G00 commands, ensure the PLC response does not exceed the configured synchronous M-code timing window.

### 3.4 Execution Timing

- **M Code Attribute:** Pre-function, Post-function, or Synchronous (to be determined during commissioning based on machine cycle requirements)
- **Default Recommendation:** Post-function (execute after any axis motion in the same block)
- **Block Structure:** Must execute as a single auxiliary code; multiple M codes in one block are permitted if they belong to different functional groups

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## 4. Implementation Reference

### 4.1 PLC M-Code Mapping Table

The following table summarizes the required mapping for reference during PLC ladder/STL programming:

| M Code | Function Description    | Function Group | PLC Outputs State                   |
|--------|-------------------------|----------------|-------------------------------------|
| M200   | Select state No. 1      | Custom Y5      | Y5.0=ON; Y5.1–Y5.4=OFF              |
| M201   | Select state No. 2      | Custom Y5      | Y5.1=ON; Y5.0, Y5.2–Y5.4=OFF        |
| M202   | Select state No. 3      | Custom Y5      | Y5.2=ON; Y5.0, Y5.1, Y5.3, Y5.4=OFF |
| M203   | Select state No. 4      | Custom Y5      | Y5.3=ON; Y5.0–Y5.2, Y5.4=OFF        |
| M204   | Select state No. 5      | Custom Y5      | Y5.4=ON; Y5.0–Y5.3=OFF              |
| M205   | Reset (all outputs OFF) | Custom Y5      | Y5.0–Y5.4=OFF                       |

Table 1: M-Code to PLC Output Mapping

### 4.2 Logic Verification Checklist

During PLC implementation, verify:

- Each M code sets exactly one output to ON state while all others are OFF
- M205 clears all five outputs simultaneously
- Output state transitions occur within the response time window (Parm 010167)
- No unintended side effects on spindle, feed, coolant, or axis control
- PLC program is tested in dry-run mode before commissioning
- Machine builder's safety interlocks are preserved

## 5. Usage Example in CNC Program

### 5.1 Basic Program Structure

### 5.2 Combined Block Example (if synchronous mode is selected)

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## 6. References

- JS-D680S-2 CNC Controller – Programming Manual V2.42, Section 4 (Auxiliary Function), 久久精工
  - JS-D680S-2 CNC Controller – Parameter Manual V2.42, Section 3.48 and 010167, 久久精工
  - Machine Tool Specification – Provided by machine builder
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## 7. Sign-Off and Approval

| Role                      | Name | Date       | Signature |
|---------------------------|------|------------|-----------|
| Specification Author      | —    | 2026-01-26 | —         |
| Customer Representative   | —    | —          | —         |
| PLC Programmer/Technician | —    | —          | —         |
| Commission Technician     | —    | —          | —         |

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### Document Control

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