

3-20 High-speed Counter/Pulse Output Instructions

This section describes instructions used to control the high-speed counters and pulse outputs.

Instruction	Mnemonic	Function code	Page
MODE CONTROL	INI	880	705
HIGH-SPEED COUNTER PV READ	PRV	881	709
COUNTER FREQUENCY CONVERT	PRV2	881	715
REGISTER COMPARISON TABLE	CTBL	882	719
SPEED OUTPUT	SPED	885	723
SET PULSES	PULS	886	728
PULSE OUTPUT	PLS2	887	731
ACCELERATION CONTROL	ACC	888	739
ORIGIN SEARCH	ORG	889	745
PULSE WITH VARIABLE DUTY FACTOR	PWM	891	749

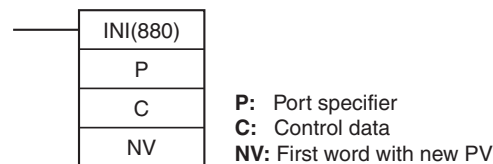
3-20-1 **MODE CONTROL: INI(880)**

Purpose

INI(880) can be used to execute the following operations for built-in I/O:

- To start comparison with the high-speed counter comparison table
- To stop comparison with the high-speed counter comparison table
- To change the PV of the high-speed counter.
- To change the PV of interrupt inputs in counter mode.
- To change the PV of the pulse output (origin fixed at 0).
- To stop pulse output.

Ladder Symbol



Variations

Variations	Executed Each Cycle for ON Condition	INI(880)
	Executed Once for Upward Differentiation	@INI(880)
	Executed Once for Downward Differentiation	Not supported
Immediate Refreshing Specification		Not supported

Applicable Program Areas

Block program areas	Step program areas	Subroutines	Interrupt tasks
OK	OK	OK	OK

Operands

P: Port Specifier

P specifies the port to which the operation applies.

P	Port
0000 hex	Pulse output 0
0001 hex	Pulse output 1
0002 hex	Pulse output 2 (CP1H only)
0003 hex	Pulse output 3 (CP1H only)
0010 hex	High-speed counter 0

P	Port
0011 hex	High-speed counter 1
0012 hex	High-speed counter 2
0013 hex	High-speed counter 3
0020 hex	Inverter positioning 0 (CP1L only)
0021 hex	Inverter positioning 1 (CP1L only)
0100 hex	Interrupt input 0 in counter mode
0101 hex	Interrupt input 1 in counter mode
0102 hex	Interrupt input 2 in counter mode
0103 hex	Interrupt input 3 in counter mode
0104 hex	Interrupt input 4 in counter mode (See note 1.)
0105 hex	Interrupt input 5 in counter mode (See note 1.)
0106 hex	Interrupt input 6 in counter mode (See note 2.)
0107 hex	Interrupt input 7 in counter mode (See note 2.)
1000 hex	PWM output 0
1001 hex	PWM output 1

- Note**
- (1) Interrupt inputs 4 and 5 cannot be used in the CP1L L CPU Units with 14 I/O points.
 - (2) Interrupt inputs 6 and 7 cannot be used in the CP1H Y CPU Units or the CP1L L CPU Units with 14 I/O points.

C: Control Data

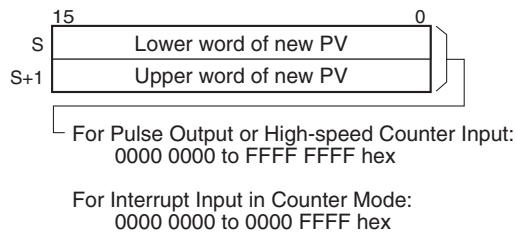
The function of INI(880) is determined by the control data, C.

C	INI(880) function
0000 hex	Starts comparison.
0001 hex	Stops comparison.
0002 hex	Changes the PV.
0003 hex	Stops pulse output.

NV: First Word with New PV

NV and NV+1 contain the new PV when changing the PV.

If C is 0002 hex (i.e., when changing a PV), NV and NV+1 contain the new PV. Any values in NV and NV+1 are ignored when C is not 0002 hex.



Operand Specifications

Area	P	C	NV
CIO Area	---	---	CIO 0 to CIO 6142
Work Area	---	---	W0 to W510
Holding Bit Area	---	---	H0 to H510
Auxiliary Bit Area	---	---	A448 to A958
Timer Area	---	---	T0000 to T4094
Counter Area	---	---	C0000 to C4094
DM Area	---	---	D0 to D32766

Area	P	C	NV
Indirect DM addresses in binary	---	---	@ D0 to @ D32767
Indirect DM addresses in BCD	---	---	*D0 to *D32767
Constants	See description of operand.	See description of operand.	---
Data Registers	---	---	---
Index Registers	---	---	---
Indirect addressing using Index Registers	---	---	,IR0 to ,IR15 -2048 to +2047 ,IR0 to -2048 to +2047 ,IR15 DR0 to DR15, IR0 to IR15 ,IR0+(++) to ,IR15+(++) ,-(--)IR0 to ,-(--)IR15

Description

INI(880) performs the operation specified in C for the port specified in P. The possible combinations of operations and ports are shown in the following table.

P: Port specifier	C: Control data			
	0000 hex: Start comparison	0001 hex: Stop comparison	0002 hex: Change PV	0003 hex: Stop pulse output
0000 to 0003 hex: Pulse output	Not allowed.	Not allowed.	OK	OK
0010 to 0013 hex: High-speed counter input	OK	OK	OK	Not allowed.
0100 to 0107 hex: Interrupt input in counter mode	Not allowed.	Not allowed.	OK	Not allowed.
1000 or 1001 hex: PWM output	Not allowed.	Not allowed.	Not allowed.	OK

■ **Starting Comparison (C = 0000 hex)**

If C is 0000 hex, INI(880) starts comparison of a high-speed counter's PV to the comparison table registered with CTBL(882).

Note A target value comparison table must be registered in advance with CTBL(882). If INI(880) is executed without registering a table, the Error Flag will turn ON.

■ **Stopping Comparison (C = 0001 hex)**

If C is 0001 hex, INI(880) stops comparison of a high-speed counter's PV to the comparison table registered with CTBL(882).

■ **Changing a PV (C = 0002 hex)**

If C is 0002 hex, INI(880) changes a PV as shown in the following table.

Port and mode			Operation	Setting range
Pulse output (P = 0000 to 0003 hex)			The present value of the pulse output is changed. The new value is specified in NV and NV+1. Note This instruction can be executed only when pulse output is stopped. An error will occur if it is executed during pulse output.	8000 0000 to 7FFF FFFF hex (-2,147,483,648 to 2,147,483,647)
High-speed counter input (P = 0010 to 0013 hex)	Linear Mode	Differential inputs, increment/decrement pulses, or pulse + direction inputs	The present value of the high-speed counter is changed. The new value is specified in NV and NV+1. Note An error will occur for the instruction if the specified port is not set for a high-speed counter.	8000 0000 to 7FFF FFFF hex (-2,147,483,648 to 2,147,483,647)
		Increment pulse input		
	Ring Mode	0000 0000 to FFFF FFFF hex (0 to 4,294,967,295)		
Interrupt inputs in counter mode (P = 0100 to 0107 hex)			The present value of the interrupt input is changed. The new value is specified in NV and NV+1.	0000 0000 to 0000 FFFF hex (0 to 65,535) Note An error will occur if a value outside this range is specified.

■ **Stopping Pulse Output (P = 0000 to 0003, 1000, or 1001 hex and C = 0003 hex)**

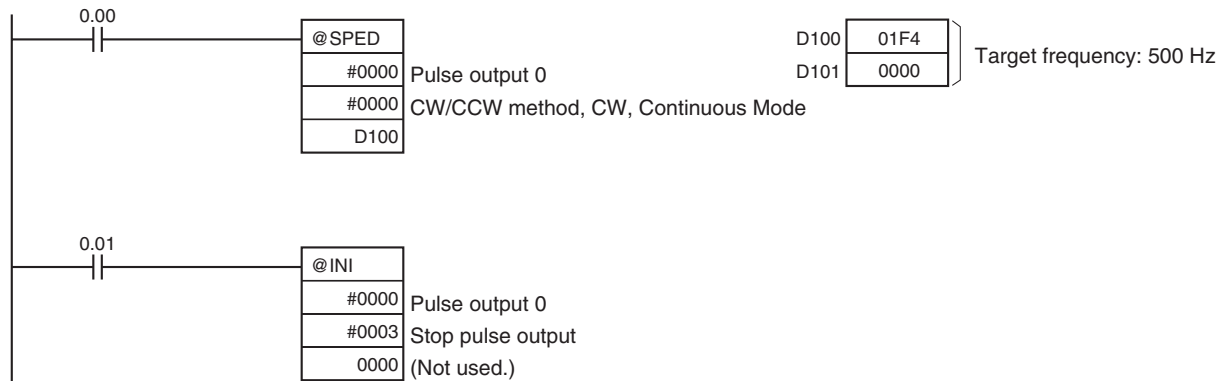
If C is 0003 hex, INI(880) immediately stops pulse output for the specified port. If this instruction is executed when pulse output is already stopped, then the pulse amount setting will be cleared.

Flags

Name	Label	Operation
Error Flag	ER	ON if the specified range for P, C, or NV is exceeded. ON if the combination of P and C is not allowed. ON if a comparison table has not been registered but starting comparison is specified. ON if a new PV is specified for a port that is currently outputting pulses. ON if changing the PV of a high-speed counter is specified for a port that is not specified for a high-speed counter. ON if a value that is out of range is specified as the PV for an interrupt input in counter mode. ON if INI(880) is executed in an interrupt task for a high-speed counter and an interrupt occurs when CTBL(882) is executed. ON if executed for a port not set for an interrupt input in counter mode.

Example

When CIO 0.00 turns ON in the following example, SPED(885) starts outputting pulses from pulse output 0 in Continuous Mode at 500 Hz. When CIO 0.01 turns ON, pulse output is stopped by INI(880).



3-20-2 HIGH-SPEED COUNTER PV READ: PRV(881)

Purpose

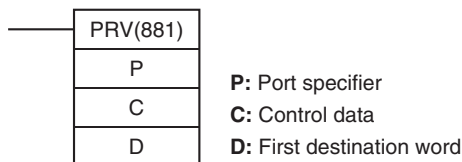
PRV(881) reads the following data on the built-in I/O.

- PVs: High-speed counter PV, pulse output PV, interrupt input PV in counter mode.
- The following status information.

Status type	Contents
Pulse output status	Pulse Output Status Flag PV Underflow/Overflow Flag Pulse Output Amount Set Flag Pulse Output Completed Flag Pulse Output Flag No-origin Flag At Origin Flag Pulse Output Stopped Error Flag
High-speed counter input status	Comparison In-progress Flag PV Underflow/Overflow Flag
PWM(891) output status	Pulse Output In-progress Flag

- Range comparison results
- Pulse output frequency of pulse output 0 to pulse output 3
- High-speed counter frequency for high-speed counter input 0.

Ladder Symbol



Variations

Variations	Executed Each Cycle for ON Condition	PRV(881)
	Executed Once for Upward Differentiation	@PRV(881)
	Executed Once for Downward Differentiation	Not supported
Immediate Refreshing Specification		Not supported