

# NPM

# Motion Checker

Enhanced Convenience with  
Memory and Programming Features



## MCH-5

**\* RoHS-Compliant Product**

### Features

- Equipped with memory feature to retain program settings
- Program operation (repetitive operation of 6 steps/pattern including zero return) enabled
- Inching operation (one-step operation) enabled
- Jog operation (continuous operation only while operating switch) enabled
- Easy-to-use compact and lightweight mobile type with built-in 2-phase stepper motor driving circuit.
- Various settings enabled such as rotation direction, speed control, position control, operation mode, stop time of stepper motor
- Connecting other external driving circuits enabled by pulse output signals
- Connecting and integrating external device enabled with external input/output signals
- All-in-one type for easy operation checking

### Specifications

No.	Item	MCH-5U	MCH-5B	
Electrical Specifications	1	Power input (*1)		
	2	Protective fuse		
	3	Output current		
		Rated: 250mA /phase (400mA max.) (NP-2671 Drive core chip)	Rated: 400mA / phase (700mA max.) (NP-3775 Drive core chip)	
	4	Driving system		
	5	Excitation mode		
6	Setting change			
Operating environment	7	Operating temperature		
	8	Operating humidity		
	9	Storage temperature		
Others	10	External dimensions		
	11	Weight		
	12	Environmental quality		
	13	Cooling method		
Accessories	14	Power supply	AC adapter	
		J Specification	Input: 100V to 240VAC / Output: 12VDC 2A	
		E Specification	2-conductor power cable for Japanese domestic specification	
	15	Sample motor	Part number	3-conductor power cable for overseas (US) specification
			Step angle	PFCU25-24C1G (1/20)-01
			Coil resistance	PFCU20-40S4GA2 (1/10)-10
			Rated voltage	0.75 deg/step (at 2-2 phase excitation)
16	Others	Coil resistance	120Ω ± 7%	
		Rated voltage	160Ω ± 7%	
		Terminal voltage: 12.5V (rated 12V)	Terminal voltage: 11.0V (rated 12V)	
		Motor leads (L = 250mm), Screwdriver, Instruction manual		

\*1: ● The motion checker supports up to 24V DC; however, the attached AC adapter and motor are 12V DC power input specification. **If you use this unit at a higher voltage, prepare an appropriate AC adapter and motor.**

## Model

Model name	2-conductor power cable	MCH-5U-J	U: Unipolar constant-voltage specification
		MCH-5B-J	B: Bipolar constant-voltage specification
	3-conductor power cable	MCH-5U-E	U: Unipolar constant-voltage specification
		MCH-5B-E	B: Bipolar constant-voltage specification

## Connection

Symbol	Name	Terminal	MCH-5U	MCH5-B	Symbol	Name	Number	MCH-5U/MCH-5B
PJ 1 (*2)	AC adapter connector	Center terminal	Power input (+)	Power input (+)	CN3	External input terminal	1	GND
		Spring terminal	Power input (-)	Power input (-)			2	START/STOP
CN1	Motor connector terminals	1	COM: (+ VM output) (Red)	NC			3	CW/CCW (PAUSE)
		2	COM: (+ VM output) (Red)	NC			4	ENABLE
		3	1Ø: Phase A (Black)	1Ø: Phase A (Brown)			5	ORG-REV
		4	3Ø: Phase A (Brown)	3Ø: Phase A (Orange)			6	+EL
		5	2Ø: Phase B (Orange)	2Ø: Phase B (Red)			7	-EL
		6	4Ø: Phase B (Yellow)	4Ø: Phase B (Yellow)			8	+SD
CN2 (*3)	External output terminal	1	GND	GND			9	-SD
		2	+PO: Pulse	+PO: Pulse			10	ORG (Origin signal)
		3	-PO: Direction	-PO: Direction				
		4	+5V	+5V				
		5	BSY: Busy	BSY: Busy				
		6	ORG: Origin	ORG: Origin				

AC adapter connector equivalent for MJ179P  
 \*2: (MARUSHIN) used. Use MP-121M or MP-136L when using other adapters.  
 \*3: External drive circuit can be connected

## Parameters: Settings on jog operation, ORG switch, and overall program operation

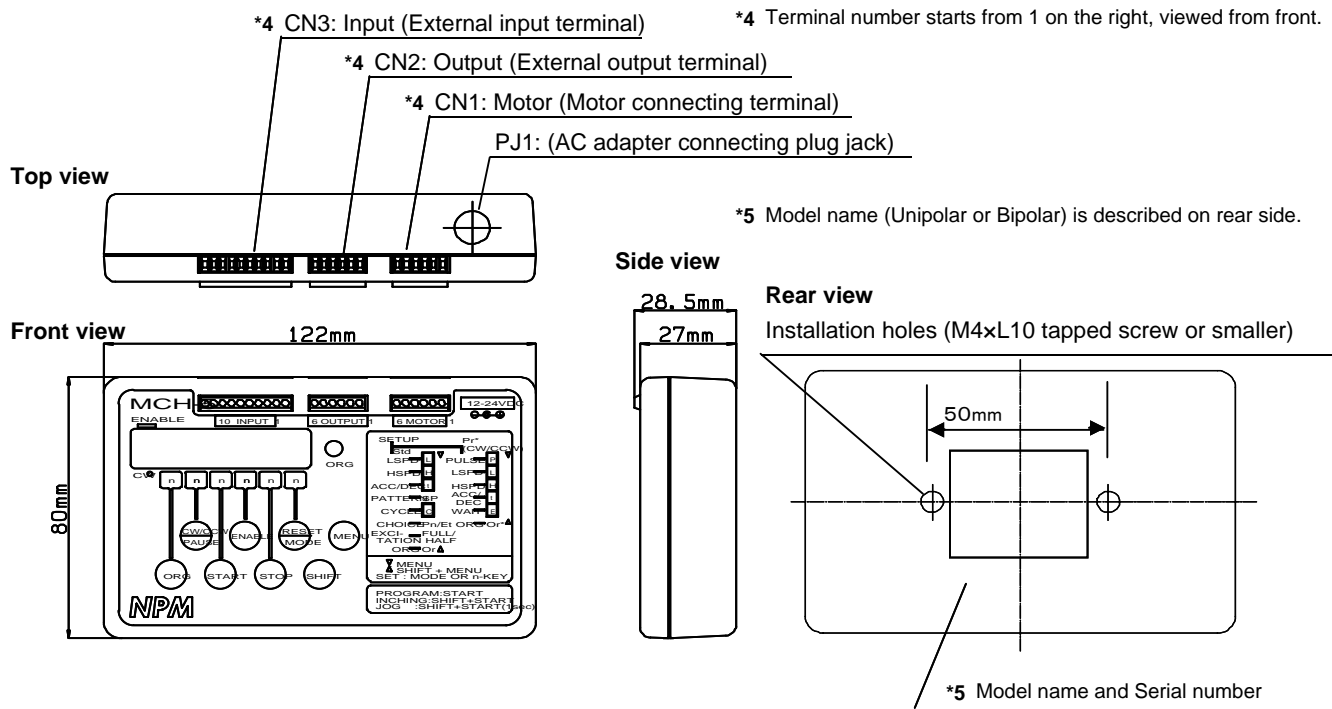
(1) Setting speed pattern			(4) Selecting operation input		
Setting item	Setting range	Panel indicators	Setting item	Setting detail	Panel indicators
Low speed (LSPD) [PPS]	1 to 999	L 0 0 0 n n n	Panel input	All switches on the panel and CN3 external signals (+EL, -EL, +SD, -SD, and ORG) are effective.	Pn
High speed (HSPD) [PPS]	1 to 7999	H 0 0 n n n n			
Acceleration/Deceleration time (ACC/DEC) [msec]	100 to 1600	t 0 0 n n 0 0			
(2) Selecting speed pattern (PATTERN)			External input	Switches on the panel (MENU, RESET, SHIFT, and SHIFT+START), and all CN3 external signals are effective.	Et1 Et2
Setting item	Setting detail	Panel indicators			
Constant speed (CONS.)	Constant motion at LSPD	SP1	(5) Selecting excitation mode (EXCITATION)		
Acceleration/Deceleration (PROFILE)	Accelerating/decelerating between at LSPD speed and HSPD speed	SP2	Setting item	Setting detail	Panel indicators
(3) Setting the number of repetition times of program operation (CYCLE)			Full step (FULL)	2-2 phase excitation sequence	2-2
Setting item	Setting detail	Panel indicators	Half step (HALF)	1-2 phase excitation sequence	1-2
Number of times: C [times] (CYCLE)	1 to 9999 (Infinite when C = 0)	C 0 0 n n n n	(6) Selecting zero return method by ORG switch (ORG)		
			Setting item		Panel indicators
			Default zero return		Or-1
			Origin sensor effective		Or-2

**Programming:** Setting items on each step (Pr1 - Pr6) required for program operation  
 A maximum of six steps (zero return selectable as one step) can be set for a program.

Setting items for each step			Setting	Panel indicators
Item				
Rotation direction	(CW/CCW)		"," comes on for CW.	. Pr x
Feed amount	(PULSE)	[PULSE]	0 - 999999	P n n n n n n
Low speed	(LSPD)	[PPS]	1 - 999	L x n n n
High speed	(HSPD)	[PPS]	1 - 7999	H x n n n
Acceleration/Deceleration time	(ACC/DEC)	[msec]	100 - 1600 (every 100ms)	t x n n 0 0
Wait time	(WAIT)	[msec]	100 - 4900 (every 100ms)	E x n n 0 0
Zero return selection	(ORG)		0 - 4	Or x n

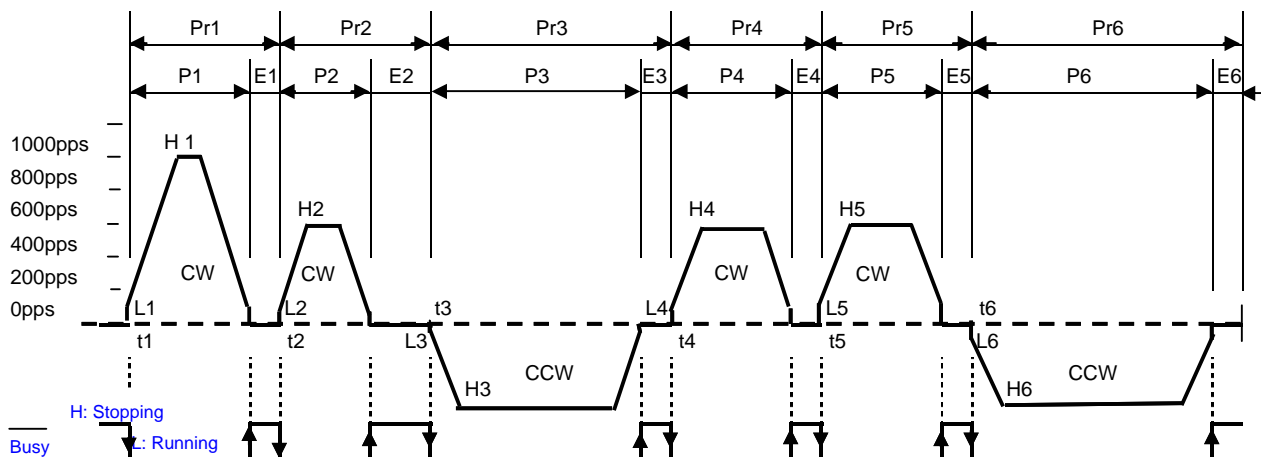
x : program step number

## Outline drawings



## Functions

- 1 PAUSE function** : CW/CCW and PAUSE are alternative.  
 : When "Stop time" is set in settings and PAUSE is pressed during program operation, the program temporarily stops its operation after terminating the current step.
- 2 SHIFT function** : Switching display "Counter", "Step No.", "Program repetition times"  
 : Inching and jog operations "SHIFT + START"  
 : Returning to previous step "SHIFT + MODE"  
 : Decreasing set value "SHIFT + n key" } Setting mode
- 3 START switch** : Inching operation (1 pulse sending) "SHIFT + START (Pressing shorter time for 1 second or less"  
 : Jog operation (Continuous sending) "SHIFT + START (Pressing longer time for second or more)"
- 4 Program operation exampl**



Setting items	Panel	Pr 1	Pr 2	Pr 3	Pr 4	Pr 5	Pr 6
Rotation direction	CW/CCW	·	· (CW)	· (CW)	(CCW)	· (CW)	· (CW)
Feed amount	PULSE	P	1000	1000	2000	1000	1000
Low speed	PPS	L	25	50	50	5	100
High speed	PPS	H	1000	600	550	490	600
Acceleration/deceleration time	msec	t	200	100	100	100	100
Wait time	msec	E	1000	2000	1000	1000	1000
Zero return selection	Or	0	0	0	0	0	0

## MCH-2 and MCH-3 Specifications

No.	Item	MCH-2U/MCH-3U	MCH-2B/MCH-3B	
Electrical Specifications	1	Power input (*6)	12VDC (2A) to 24VDC (1A), 24Watt maximum power supply by AC adapter	
	2	Protective fuse	2A fuse mounted on motor power line	
	3	Output current	Rated: 250mA / phase (400mA max.)	Rated: 400mA / phase (700mA max.)
			(NP-2671 Drive core IC)	(NP-3775 Drive core IC)
	4	Drive mode	Unipolar constant voltage	Bipolar constant voltage
5	Excitation mode	Full step (2-2 phase excitation) / Half step(1-2 phase excitation)		
Operating environment	6	Operating temperature	0°C to +40°C	
	7	Operating humidity	0% to 80% RH ((No condensation)	
	8	Storage temperature	-10°C to +70°C	
Others	9	Cooling method	Air cooling without blower	
	10	Weight	130g	
Accessories	11	Power supply (AC adapter)	100V - 240VAC / Output 12VDC 2A	100V-240VAC/ Output 12VDC 2A
			2-conductor power cable	3-conductor power cable
	12	Sample motor	PFCU25-24C1G (1/20)	PFCU20-40S4GA2 (1/10) -03
			0.75 deg/step	0.9 deg/step
			Coil resistance: 120Ω ± 7%	Coil resistance: 160Ω ± 7%
		Terminal voltage: 12.5V (rated 12V)	Terminal voltage: 11.0V (rated 12V)	
13	Others	Motor leads (L=200mm), Screwdriver, Instruction manual		

\*6 ● The motion checker supports up to 24V DC, however, the attached AC adapter and motor are 12V DC power input specification. **If you use this unit at a higher voltage, prepare an appropriate AC adapter and motor .**

## Menu settings for MCH-2 and MCH-3

Setting speed pattern				Selecting speed pattern (PATTERN)		
Setting item	Setting range	Panel indicators	Setting item	Setting detail	Panel indicators	
Low speed (LSPD)	1 to 999 [PPS]	L	Constant speed (CONS.)	Constant motion at LSPD speed	SP1	
High speed (HSPD)	1 to 999 [PPS]	H				
Acceleration/Deceleration time (ACC/DEC)	100 to 1600 [msec]	t	Acceleration/Deceleration (PROFILE)	Accelerating/Decelerating between LSPD speed and HSPD speed	SP2	
Feed amount (PULSE)	MCH-2	1 to 999 [PULSE]	Setting the number of repetition times of program operation (CYCLE)			
	MCH-3	1 to 999999 [PULSE]				
Selecting operation mode (OPERATION)			Setting item	Setting detail	Panel indicators	
Setting item	Setting detail	Panel indicators	Number of repetitions: C (CYCLE)	1 to 9999 (Infinite when C = 0)	C	
Continuous operation (CONT. )	Continuous motion in a specified direction. Stop by the STOP signal	d1				
Repeat operation (REPEAT)	After a single motion, repeat the same motion in the same direction after waiting a specified time. Repeat the pattern above for a specified number of times.	d2	Setting wait time of program operation (WAIT)			
			Setting item	Setting detail	Panel indicators	
			Wait time E [msec] (WAIT)	100 to 4900	E	
±Repeat motion (±REPEAT)	After a single motion, repeat the same motion in the opposite direction after waiting a specified time. Repeat the pattern above for a specified number of times.	d3	Selecting excitation mode (EXCITATION)			
			Setting item	Setting detail	Panel indicators	
			Full step (FULL)	2-2 phase excitation sequence	2-2	
			Half step (HALF)	1-2 phase excitation sequence	1-2	

MCH-2 does not have ORG or BSY on CN-2 and CN-3.

MCH-3 has the same connection as MCH-5.



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