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 mot
- 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)		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 chip)	(NP-3775 Drive core chip)
	4	Driving system		Unipolar constant voltage	Bipolar constant voltage
	5	Excitation mode		Full step (2-2 phase excitation) / Half step (1-2 phase excitation)	
	6	Setting change		100,000 times (EEPROM used)	
Operating environmen	7	Operating temperature		0℃ to + 40℃	
	8	Operating humidity		0% to 80% RH (No condensation)	
	9	Storage temperature		-10℃ to +70℃	
Others	10	External dimensions		122mm (L) x 80mm (W) x 27mm (H)	
	11	Weight		140g or less (main unit)	
	12	Environmental quality		RoHS-compliant parts used	
	13	Cooling method		Air cooling without blower	
Accessories	14	Power supply	AC adapter	Input: 100V to 240VAC / Output: 12VDC 2A	
			J Specification	2-conductor power cable for Japanese domestic specification	
			E Specification	3-conductor power cable for overseas (US) specification	
	15	Sample motor	Part number	PFCU25-24C1G (1/20)-01	PFCU20-40S4GA2 (1/10)-10
			Step angle	0.75 deg/step (at 2-2 phase excitation)	0.9 deg/step (at 2-2 phase excitation)
			Coil resistance	120Ω ± 7%	160Ω ± 7%
			Rated voltage	Terminal voltage: 12.5V (rated 12V)	Terminal voltage: 11.0V (rated 12V)
	16	Others		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
PJ 1 (*2)	AC adapter connector	Center terminal	Power input (+)	Power input (+)
		Spring terminal	Power input (-)	Power input (-)
CN1	Motor connector terminals	1	COM: (+VM output) (Red)	NC
		2	COM: (+VM output) (Red)	NC
		3	1Ø: Phase A (Black)	1Ø: Phase A (Brown)
		4	3Ø: $\overline{\text{Phase A}}$ (Brown)	3Ø: $\overline{\text{Phase A}}$ (Orange)
		5	2Ø: Phase B (Orange)	2Ø: Phase B (Red)
		6	4Ø: $\overline{\text{Phase B}}$ (Yellow)	4Ø: $\overline{\text{Phase B}}$ (Yellow)
CN2 (*3)	External output terminal	1	GND	GND
		2	$\overline{\text{+PO}}$: Pulse	$\overline{\text{+PO}}$: Pulse
		3	$\overline{\text{-PO}}$: Direction	$\overline{\text{-PO}}$: Direction
		4	+5V	+5V
		5	$\overline{\text{BSY}}$: Busy	$\overline{\text{BSY}}$: Busy
		6	$\overline{\text{ORG}}$: Origin	$\overline{\text{ORG}}$: Origin

Symbol	Name	Number	MCH−5U／MCH−5B
CN3	External input terminal	1	GND
		2	START/STOP
		3	$\overline{\text{CW}}$/$\overline{\text{CCW}}$ ($\overline{\text{PAUSE}}$)
		4	$\overline{\text{ENABLE}}$
		5	ORG-REV
		6	$\overline{\text{+EL}}$
		7	$\overline{\text{-EL}}$
		8	$\overline{\text{+SD}}$
		9	$\overline{\text{-SD}}$
		10	$\overline{\text{ORG}}$ (Origin signal)

*2: AC adapter connector equivalent for MJ179P (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

Setting item	Setting range	Panel indicators
Low speed (LSPD) [PPS]	1 to 999	L 000nnn
High speed (HSPD) [PPS]	1 to 7999	H 00nnnn
Acceleration/Deceleration time (ACC/DEC) [msec	100 to 1600	t 00nn00

(2) Selecting speed pattern (PATTERN)

Setting item	Setting detail	Panel indicators
Constant speed (CONS..)	Constant motion at LSPD	SP1
Acceleration/Deceleration (PROFILE)	Accelerating/decelerating between at LSPD speed and HSPD speed	SP2

(3) Setting the number of repetition times of program operation (CYCLE)

Setting item	Setting detail	Panel indicators
Number of times: C [times] (CYCLE)	1 to 9999 (Infinite when C = 0)	C00nnnn

(4) Selecting operation input

Setting item	Setting detail	Panel indicators
Panel input	All switches on the panel and CN3 external signals (+EL, -EL, +SD, -SD, and ORG) are effective.	Pn
External input	Switches on the panel (MENU, RESET, SHIFT, and SHIFT+START), and all CN3 external signals are effective.	Et1 Et2

(5) 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

(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

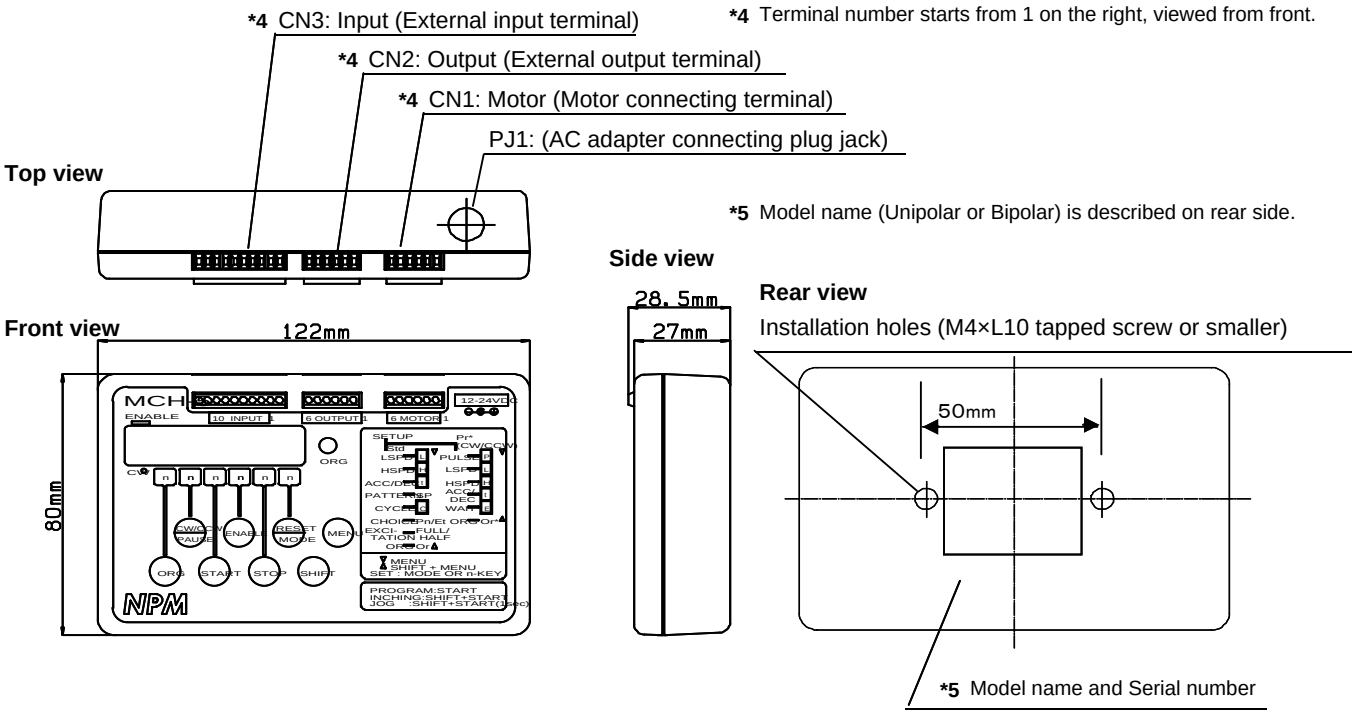
A maximum of six steps (zero return selectable as one step) can be set for a program.

Setting items for each step

Item			Setting	Panel indicators
Rotation direction	(CW/CCW)		"." comes on for CW.	.Prx
Feed amount	(PULSE)	[PULSE]	0 - 999999	P nnnnnn
Low speed	(LSPD)	[PPS]	1 - 999	L x nnn
High speed	(HSPD)	[PPS]	1 - 7999	H x nnn
Acceleration/Deceleration time	(ACC/DEC)	[msec]	100 -1600 (every 100ms)	t x nn00
Wait time	(WAIT)	[msec]	100 - 4900 (every 100ms)	E x nn00
Zero return selection	(ORG)		0 - 4	Orx n

x : program step number

Outline drawings



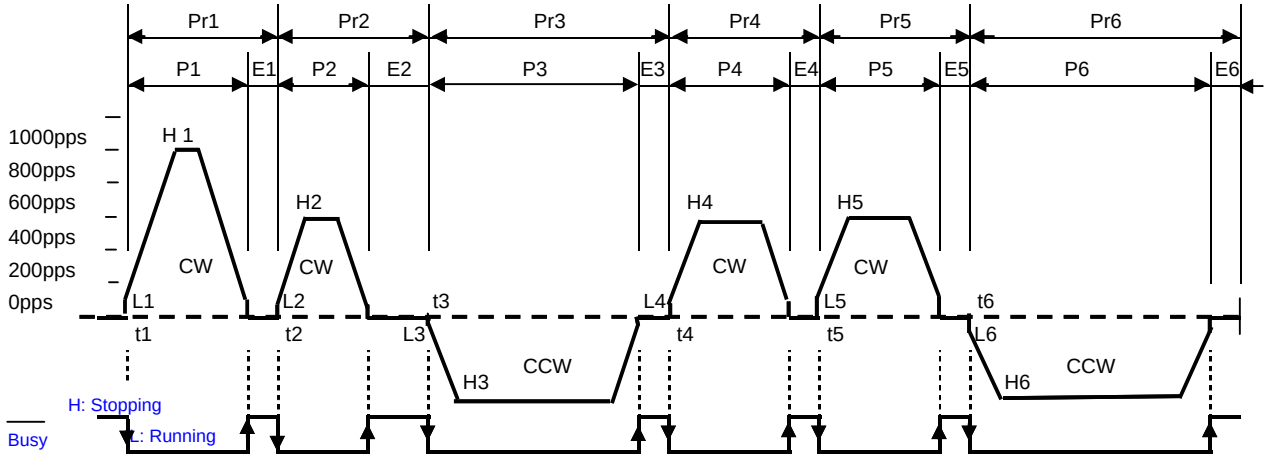
Functions

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)	(CCW)
Feed amount	PULSE	P	1000	1000	2000	1000	1000	2000
Low speed	PPS	L	25	50	50	5	100	50
High speed	PPS	H	1000	600	550	490	600	500
Acceleration/deceleration time	msec	t	200	100	100	100	100	100
Wait time	msec	E	1000	2000	1000	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℃ to +40℃	
	7	Operating humidity	0% to 80% RH ((No condensation)	
	8	Storage temperature	−10℃ to +70℃	
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

Setting item		Setting range	Panel indicators
Low speed (LSPD)		1 to 999 [PPS]	L
High speed (HSPD)		1 to 999 [PPS]	H
Acceleration/Deceleration time (ACC/DEC)		100 to 1600 [msec]	t
Feed amount (PULSE)	MCH-2	1 to 999 [PULSE]	P
	MCH-3	1 to 999999 [PULSE]	

Selecting operation mode (OPERATION)

Setting item	Setting detail	Panel indicators
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
±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 speed pattern (PATTERN)

Setting item	Setting detail	Panel indicators
Constant speed (CONS.)	Constant motion at LSPD speed	SP1
Acceleration/Deceleration (PROFILE)	Accelerating/Decelerating between LSPD speed and HSPD speed	SP2

Setting the number of repetition times of program operation (CYCLE)

Setting item	Setting detail	Panel indicators
Number of repetitions: C (CYCLE)	1 to 9999 (Infinite when C = 0)	C

Setting wait time of program operation (WAIT)

Setting item	Setting detail	Panel indicators
Wait time E [msec] (WAIT)	100 to 4900	E

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.

ISO 9001

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