SONY®

INSTRUCTION MANUAL
FOR
MSD-9051C, 9052C

OCT. 1982

2-995-759-02

Sony Magnescale Inc.

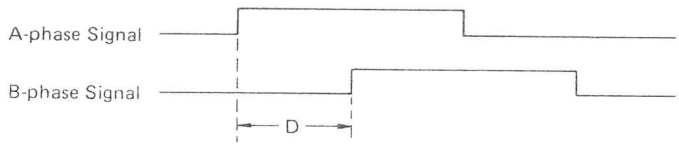
CONTENTS

1. GENERAL

In combination with a linear Magnescale, MSD-9051C / MSD-9052C detector gives out 2-phase signal output in response to the displacement of Magnescale. The phase difference between the A-phase and B-phase signals is 90°, the same as that of the rotary encoder.

2. SPECIFICATIONS

Resolution:	2.5 μm MSD-9051C
	1 μm/2 μm MSD-9052C
Max. response speed:	12 m/min.
Length of connecting cable:	Max. 20 m, with the specified cable
Number of axes:	2 axes in one console
Output signal:	1) Form of output signal



Phase difference: 90°

In the rotary encoder, the width (D) of the 2 phases (A, B) changes linearly in proportion to the rotary speed. In the Magnescale detection, the width (D) changes linearly in the same way up to 50 kHz ($50 \times 10^3 \times 1\,\mu m \times 60 = 3$ m/min. or $50 \times 10^3 \times 2\,\mu m \times 60 = 6$ m/min. for MSD9052C, $50 \times 10^3 \times 2.5\,\mu m \times 60 = 7.5$ m/min. for MSD9051C), however beyond 50 kHz, the width (D) becomes the value previously set inside the detector, since the Magnescale signal is detected with the sampling system every 50 kHz.

In the MSD9051C detector, the width (D) is factory-set to 10 μs, and in the MSD9052C detector, to 8 μs.

MSD-9051C

BR203/BR204	Width D	Max. Response Speed
No. 1 short	2.5 μs	38 m/min.
No. 2 short	5 μs	15 m/min.
No. 3 short	10 μs	8 m/min.
No. 4 short	20 μs	4 m/min.

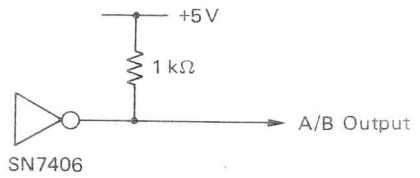
MSD-9052C

	Width D: Resolution		
BR203/BR204	1 μm	2 μm	Max. Response Speed
No. 1 short	1 μs	2 μs	45 m/min.
No. 2 short	2 μs	4 μs	20 m/min.
No. 3 short	4 μs	8 μs	10 m/min.
No. 4 short	8 μs	16 μs	5 m/min.

Set the BR203 (X-axis) and the BR204 (Y-axis) on the D PCB as shown in the table above.

2) Output circuit

Since the output is pulled up by TTL, 1 kΩ, use the output cable of less than 3 m.



Selection of direction: Select the direction of the output signal according to the scale movement with the slide switch of each axis.

Zero point:

- The detecting circuit of the magneswitch (PH-100) is built in this detector to generate the home pulse in combination with a magnet (PG-104).
- When the magneswitch passes over the magnet, the signal of approx. 8 mm width is output.

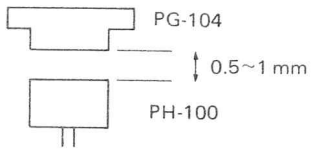
○ Speed of zero point passing should be less than 20 mm/s to obtain the repetition accuracy within 1 count (2.5 μm for MSD9051C, 1 μm/2 μm for MSD9052C).

○ Detect the zero point in one direction.

○ Repetition accuracy: ± 1 μm

○ Temperature characteristic: 0.8~1 μm/°C

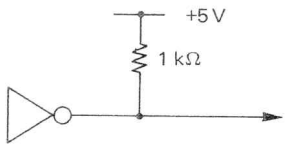
○ Clearance between the magnet and the head:



○ Mount the head wiper (PH-1) to sweep out dusts.

○ The same TTL (SN7406) output as that of the A-phase and B-phase signals.

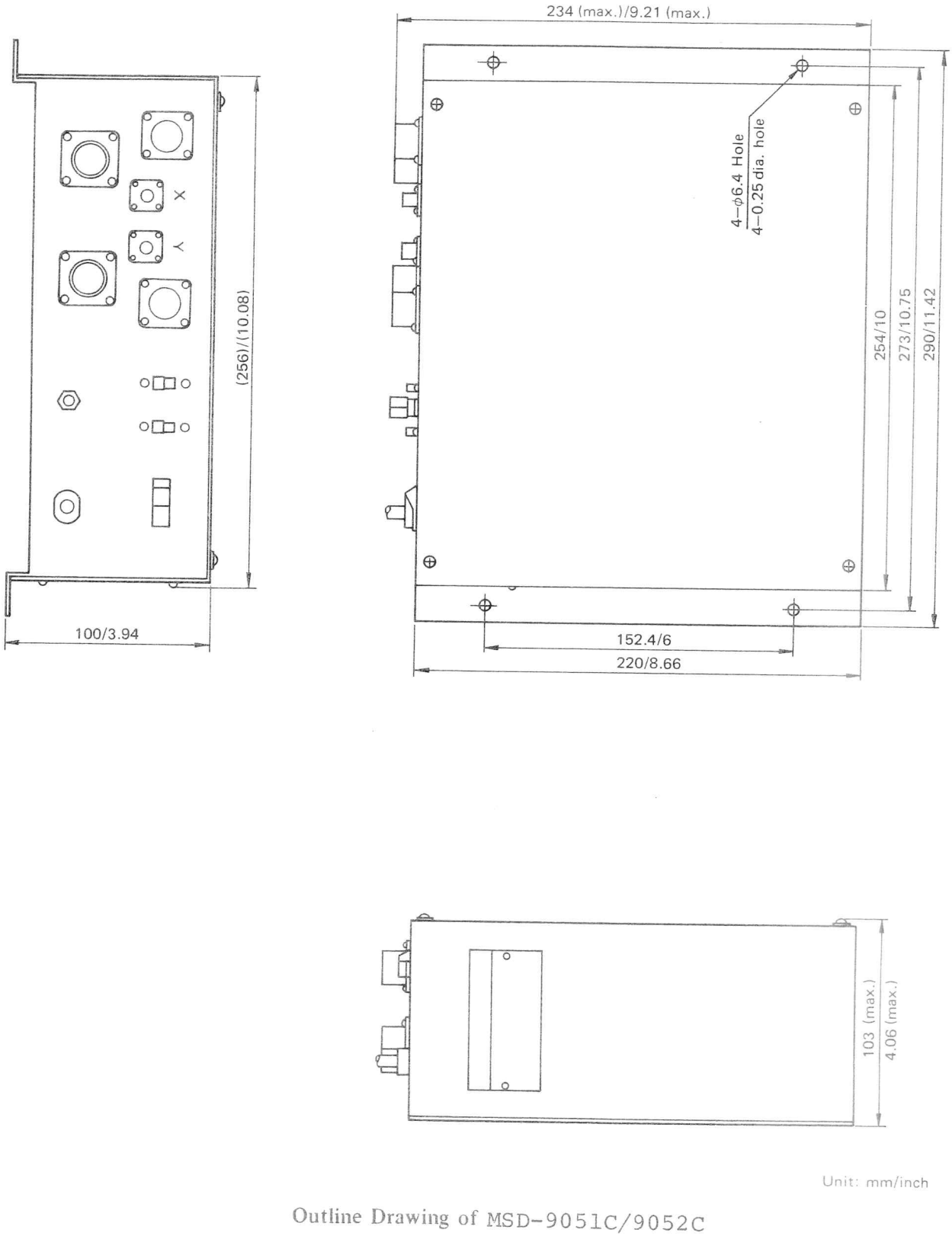
○ Length of connecting cable: within 3 m



Power supply:	AC 115 V ± 10%, 50/60 Hz
Power consumption:	15 W
Operating temperature:	0~+40°C/32~104°F
Storage temperature:	-10~+50°C/14~122°F
Outside dimensions:	103 (H) x 234 (W) x 290 (D) mm/4.06 (H) x 9.21 (W) x 11.42 (D) inch
Weight:	3.8 kg/8.4 lb
Accessories:	Grounding wire 1
	Fuse 2

3. OPERATING INSTRUCTIONS

3-1 Outline Drawing

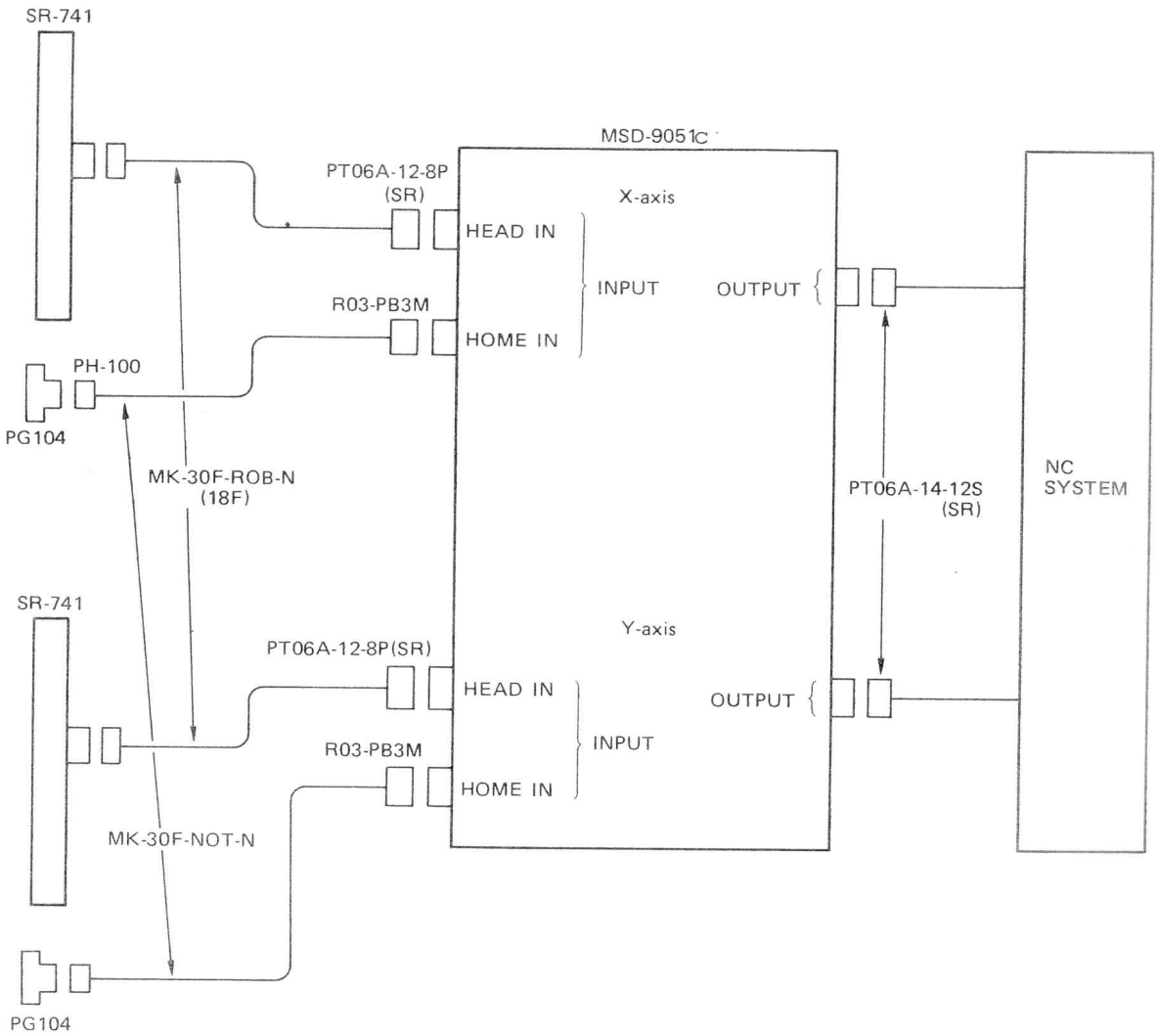


Unit: mm/inch

Outline Drawing of MSD-9051C/9052C

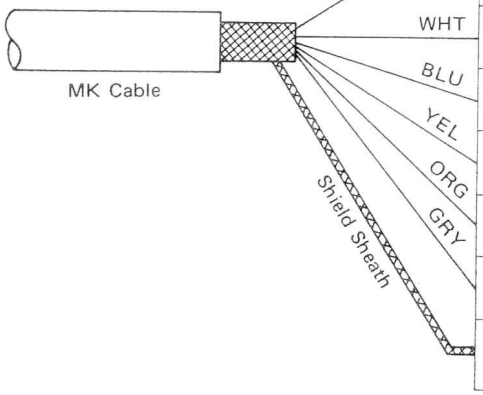
3-2 Connection

(1) Composition



(2) Pin Arrangement

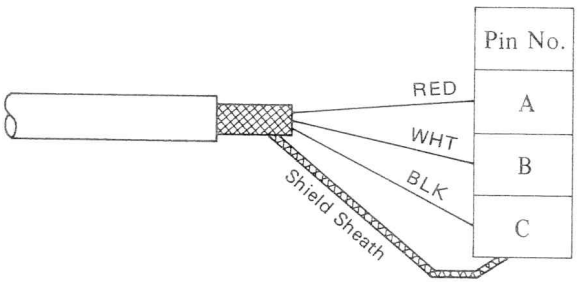
HEAD IN



PT02A12-8S (BENDIX)

Pin No.	Symbol	Name
A	EXA	Excitor Signal
B		
C	EXB	Excitor Signal
D	H1A	CH-1 Signal
E	H1B	CH-1 Signal
F	H2A	CH-2 Signal
G	H2B	CH-2 Signal
H	C-GND	Casing GND

HOME IN



R03-RB3F (TAJIMI)

Pin No.	Symbol	Name
A	RED	+5V
B	WHT	Zero Point Signal
C	BLK	-5V

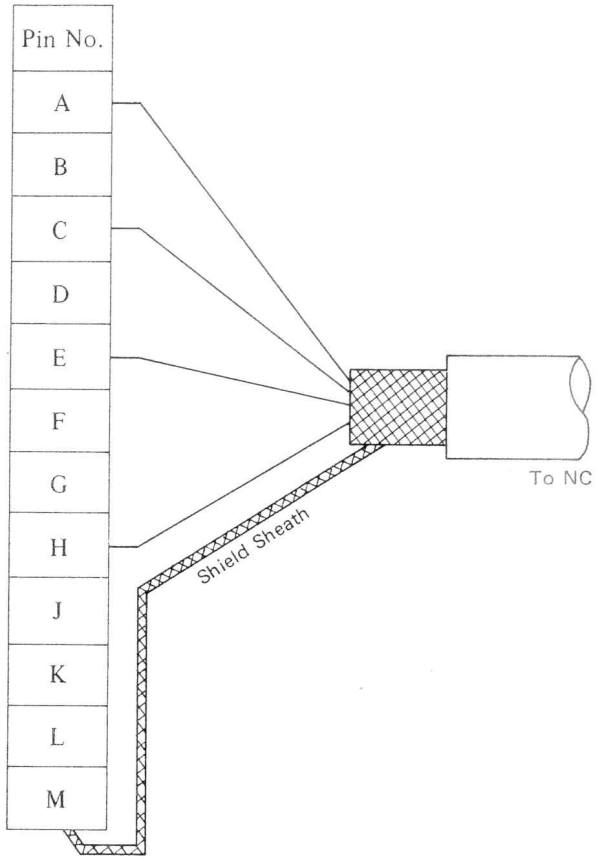
Connect the shield sheath to the shell.

SIGNAL OUT

PT02A-14-12P

Pin No.	Symbol	Name
A	A-OUT	A-phase Signal
B		
C	COM	Circuit GND
D		
E	ZP-OUT	Zero Point Signal
F		
G		
H	B-OUT	B-phase Signal
J	C-GND	Casing GND
K		
L		
M		

PT06A-14-12S (SR)



4. ADJUSTMENT

4-1 Before Adjustment

(1) Connect the power cable, the head cable, the zero point cable and the output cable.

(2) Remove the casing of the detector and connect the probe of the oscilloscope to PM (TP101) and G (TP102) on the A-PCB. (Adjust the X-axis first.)

(3) Move the scale at a speed of 0.5~5 m/min. and adjust the horizontal axis of the oscilloscope so that the waveform may be clearly observed.

Set the knobs of the oscilloscope as follows.

Vertical axis mode:	AC
Vertical axis sensitivity:	0.5 V/div.
Horizontal sweep:	0.5~50 msec./div.
Trigger source:	INT
Trigger mode:	AUTO

4-2 Adjustment

Perform all the following adjustments moving the scale.

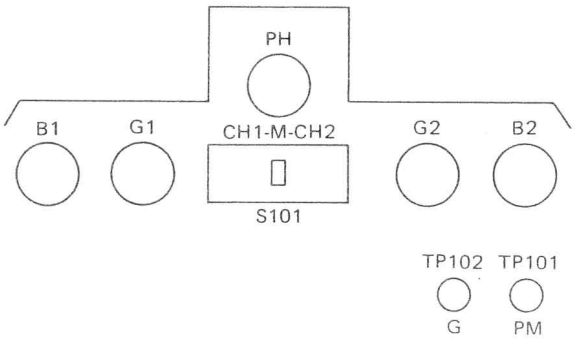


Fig. 4-1

(1) Set the slide switch S101 on the PCB to CH-1. Adjust the volume (B1) to make (a) and (b) of the waveform in Fig. 4-2 equal.

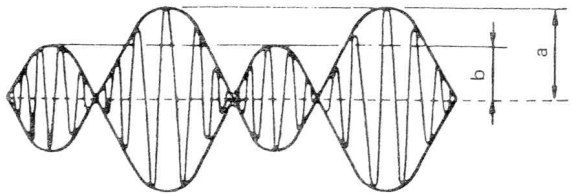


Fig. 4-2. Waveform before adjustment of the DC balance

(2) Adjust the volume (G1) to make the amplitude 2V ±0.2Vp-p as shown in Fig. 4-3.

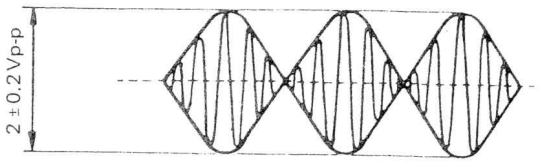


Fig. 4-3. Waveform after adjustment of the DC balance

(3) Set the slide switch to CH-2 and perform the same adjustments as (1), (2).

(4) Set the slide switch to M (Middle position). The waveform illustrated in Fig. 4-4 will be observed. Adjust the phase volume (PH) to make c/d less than 0.05.

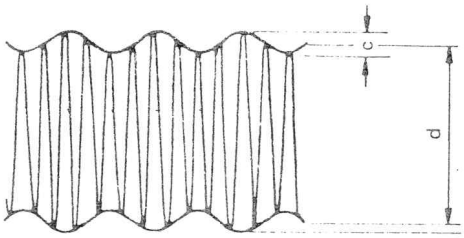


Fig. 4-4. PM signal (Phase modulated signal)

(5) As occasion demands, repeat the above adjustments (1)~(4) to obtain the optimum PM signal.

Perform the same adjustment for the Y-axis.

5. SETTING

[A-PCB]

Model	C122	C143
MSD-9051C	Capacitor, styrole: 300PF	Capacitor, styrole: 300PF
MSD-9052C	Capacitor, VFM: 62PF	Capacitor, VFM: 62PF

[D-PCB]

Model	Resolution	Interpolation clock	Interpolation
MSD-9052C	1μm	10 MHz	1/200
	2μm	5 MHz	1/100
MSD-9051C	2.5μm	4 MHz	1/80

Model	Resolution	Setting of S201, S202					B201		BR202		Crystal Oscillator	IC208
		1	2	3	4	5	1	2	1	2		
MSD-9052C	1μm	1	0	0	1	1	O			O	10 MHz	74LS90
	2μm	0	0	1	1	0		O		O		
MSD-9051C	2.5μm	1	1	0	1	0		O	O		8 MHz	74LS93

1: ON
0: OFF

O: Short-circuit