SONY

Interpolator MD20B

1st edition

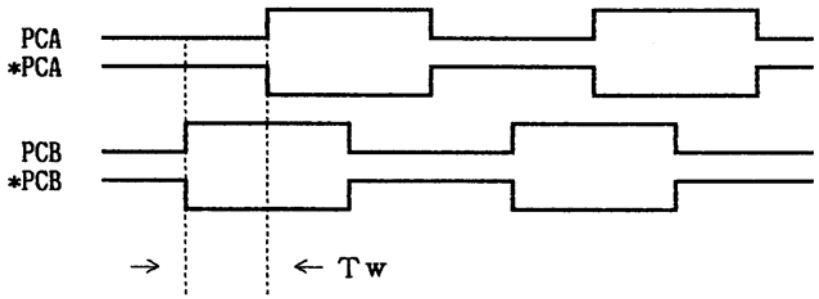
Sony Manufacturing Systems Corporation

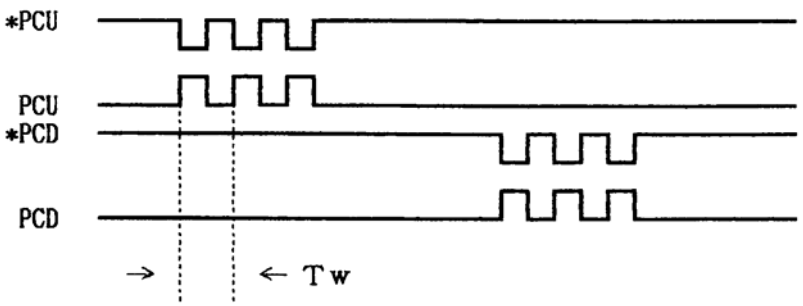
CONTENTS

1. Outline

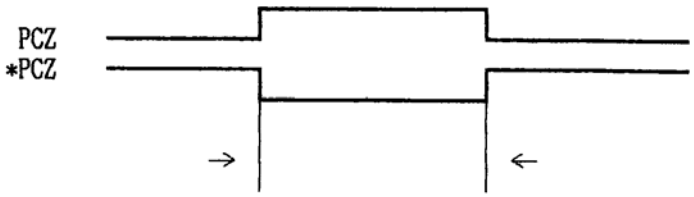
MD20B is successor model of MD20A that is unit type 1axis body interpolator, which is not designed only for upward compatible but also has additional function such as up to 0.1micron resolution, 0.1ms pulse width of output signal in order to improvement of the performance.

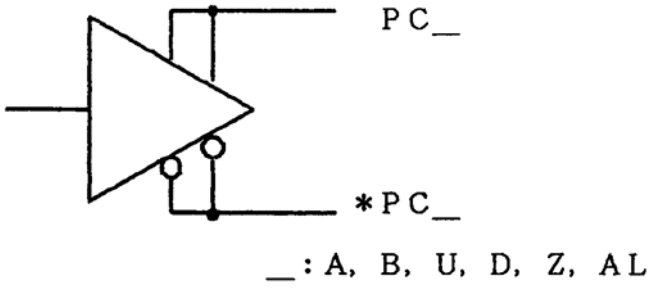
2. Specifications

<table>
<tr><td>Resolution</td><td>0.1μm 0.2μm 0.5μm 1 μm
2μm 4μm 2.5 μm 5 μm
10 μm (*1)</td></tr>
<tr><td>Output pulse width (Tw)</td><td>0.1 μs 0.2 μs 0.25 μs 0.5 μs
1μs 2μs 2.5 μs 5μs
10μs 20 μs (*2)</td></tr>
<tr><td>Connecting scale</td><td>SR721 SR721R SR721RD SR721RN
SR801 SR801R SR127 SR128
MSS101</td></tr>
<tr><td>Head connecting cable</td><td>Cable with D-sub 15pin connector</td></tr>
<tr><td>Head connecting cable length</td><td>Max. 50m</td></tr>
<tr><td rowspan="2">Output signal</td><td>AB quadrature output
 

TW : Output pulse width</td></tr>
<tr><td>Up/Down output
 

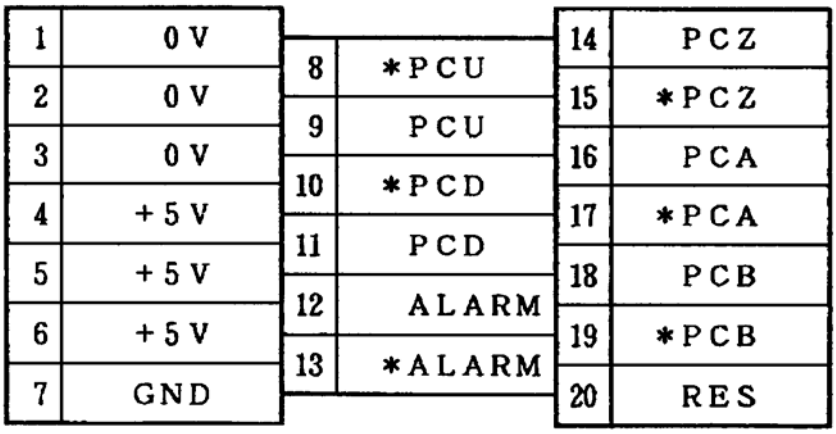
TW : Output pulse width</td></tr>
</table>

<table>
<tr><td>Scale direction</td><td>Switching DIP switch at the front panel enable to switch polarity of pulse output for scale movement.</td></tr>
<tr><td>Reference signal</td><td> 

The width of reference signal is approx. 8mm, reference signals are output in both direction, but refer only to starting up in one direction.</td></tr>
<tr><td>Output circuit</td><td>Voltage line driver DS34C87 (Equivalent)
 
</td></tr>
<tr><td>Max. response speed</td><td>Max. 60m/min
However, it changes by setting resolution and output pulse width. Refer to (*3).</td></tr>
<tr><td>External reference point circuit</td><td>Usable of Magneswitch PH100 (or PH500) and Magnet PG-104</td></tr>
<tr><td>Reference point response speed</td><td><table><tr><th>Resolution</th><th>Response speed</th></tr><tr><td>0.1μm to 10μm</td><td>5m/min</td></tr></table>
Note) However, they cannot exceed the scale response speed which is determined by resolution and output pulse width. (e.g. In case that resolution : 0.5μm, output pulse width : 10μs, response speed is 2.2m/min.)
It is possible to adapt up to 15m/min, therefore reference point position may be instability due to speed fluctuation if the reference point speed is increased.
The moving speed of reference point setting and using reference point that must be same at the time of 5m/min or more.
Note) However, they cannot exceed the scale response speed which is determined by resolution and output pulse width.</td></tr>
<tr><td>Alarm signal</td><td>When scale exceeds max. response speed, or breakage of head cable etc. occurs, it works. At the time of occurring alarm, ALARM</td></tr>
</table>

	output turns High, and *ALARM output turns low. At that time, excepting reference point output, output of PCA, *PCA, PCB, *PCB, PCU, *PCU, PCD, *PCD all turn to high impedance.
Alarm release	Alarm release is operated by resetting or powering on again after removing all causes of alarm above. Even though alarm works, if reset works, alarm signal does neither output nor high impedance. But output signal stops.
Reset	Detector is reset when RESET button at the front panel of main unit is pressed. And in case of resetting from external, shorten No.20 pin and No.7 pin of output connector.
Power source	DC+5V (±5%)
Power consumption	3W max
Operating temperature	0°C to 55°C
Storage temperature	-10°C to 75°C
Dimensions	171 x 144 x 32 (mm)
Accessories	Output connector …….1 set Link …….3 Screw M3 x 6 …….6 Mounting screw M4 x 8 …….2 Axial label …….1 set Instruction manuals …….1

Output connector specifications

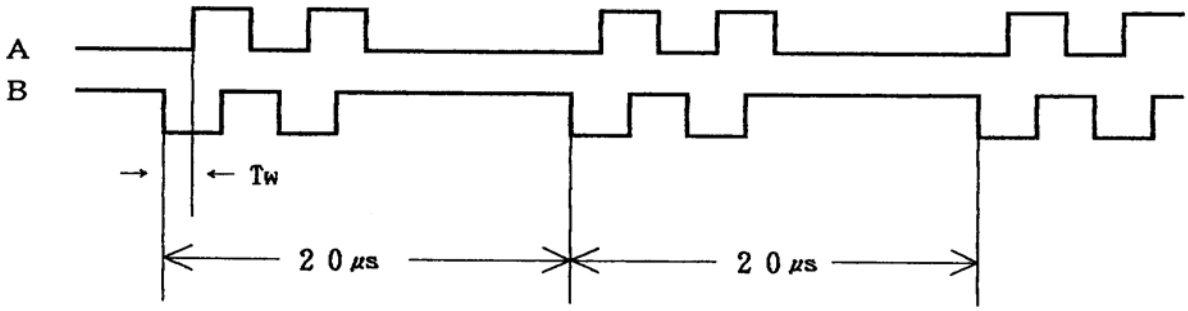


MR-20RMAG (HONDA TSUSHIN)

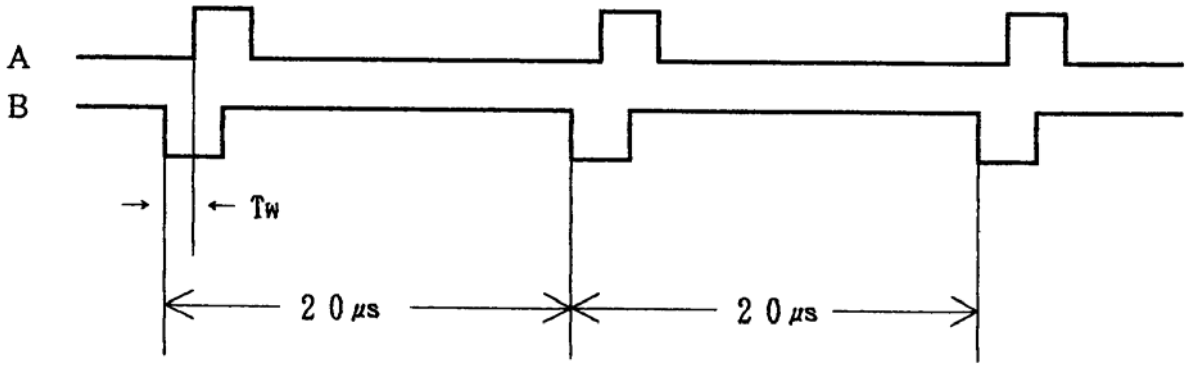
(NOTE1) Resolution can be switched with Rotary switch at front panel of main unit.
Factory setting : 1μm.
A/B quadratuire output of this interpolator is resolution set by phase difference of A signal and B signal.

(NOTE2) Output pulse width can be switched with Rotary switch at front panel of main unit.
Factory setting : 1μsec.
A/B quadrature output of this detector is output in the pulse width (Tw) set in advance even if moving speed of scale is slow, because it operates moving value per 20μs, unlike general rotary encoder. (Refer to the following figure.)
It is necessary for receiving circuit to be able to receive signals of pulse width which is set.

(Ex.)
Scale speed : Fast



Scale speed : Slow



(NOTE3) Scale maximum response speed

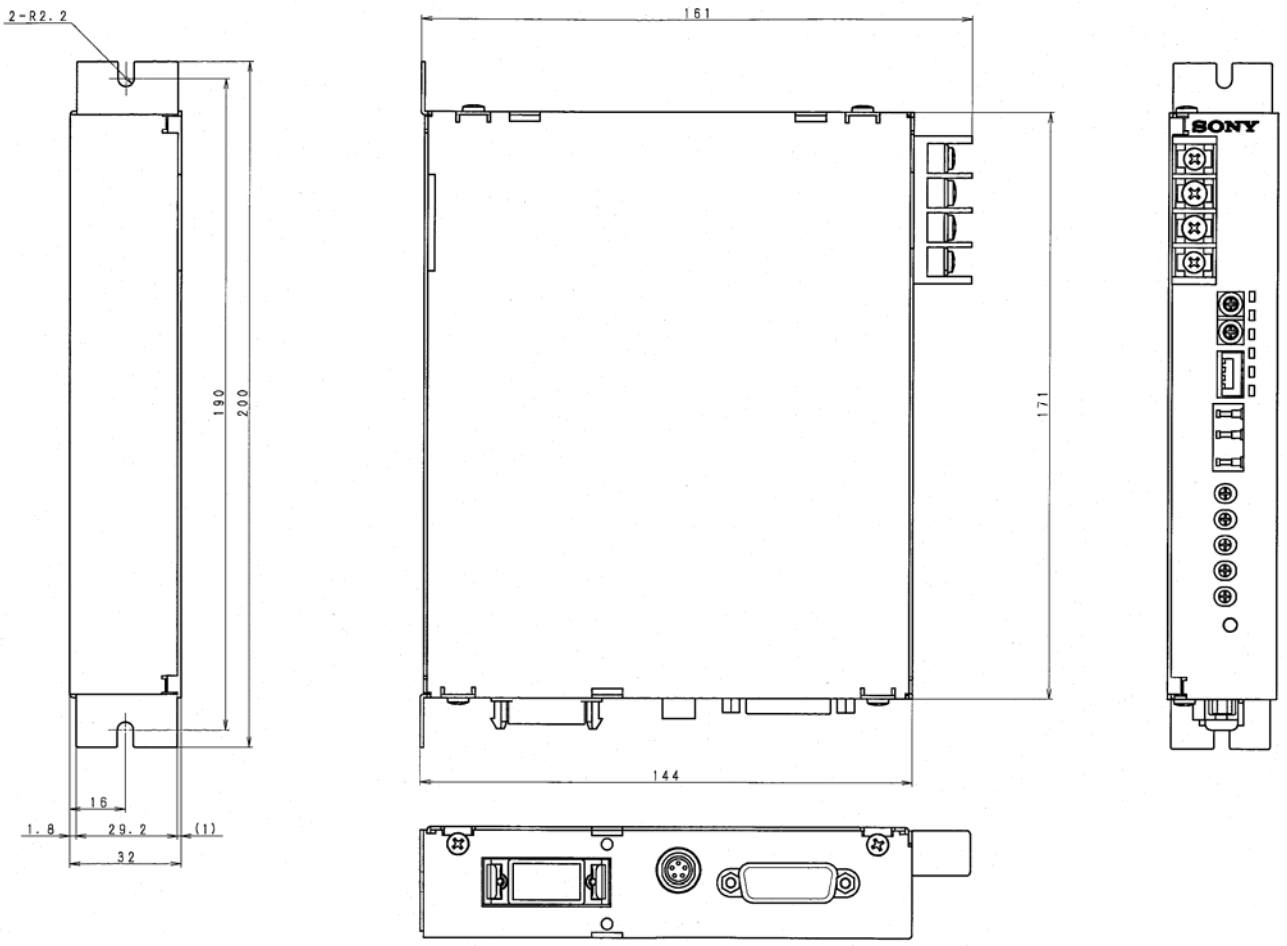
(Unit : m/min)

Resolution (μm)	Output pulse width (μs)									
	0.1	0.2	0.25	0.5	1	2	2.5	5	10	20
0.1	42	20	18	9	4.5	2.2	1.8	0.8	—	—
0.2	60	42	30	18	9	4.5	3.6	1.8	0.8	—
0.5	60	60	60	45	22	11	9	4.5	2.2	1.1
1	60	60	60	60	45	22	18	9	4.5	2.2
2	60	60	60	60	60	45	36	18	9	4.5
4	60	60	60	60	60	60	60	36	18	9
2.5	60	60	60	60	60	55	45	22	11	5.5
5	60	60	60	60	60	60	60	45	22	11
10	60	60	60	60	60	60	60	60	45	22

Note) A pulse width of 20μs and 10μs cannot be used at a resolution of 0.1μm.

A pulse width of 20μs cannot be used at a resolution of 0.2μm.

3. Outside dimensions



Unit : mm

MS-07001

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MD20B

The description of the change from original MD21 and MD20A

Note) This is described about specifications compatibility with MD20A and MD21.
See each specification sheet for more detail.

1st Edition

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Resolution , Pulse width setting

Added following items.
And rotary switches for each setting are located on the front panel.

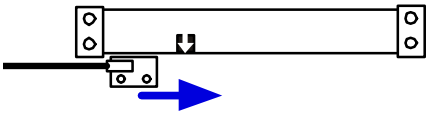
Additional setting items	Resolution	Output pulse width
For MD20A	0.1μm、0.2μm	0.1μs、0.2μs
For MD21	Resolutions of MD20A	0.1μs、0.2μs

Reference point setting

To improve the operational performance, change setting method of reference point setting.

Setting method

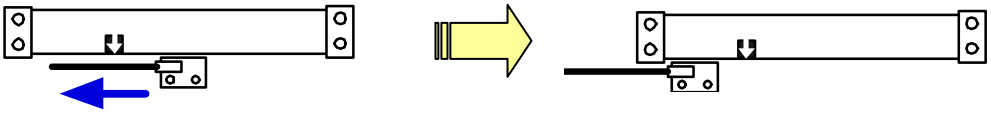
In order for the interpolator to output the reference point signals which are in synchronization with the A/B quadrature signal output, it is necessary to set the correlation between the reference point sensor. If the reference point is used, first install the scale and reference point sensor, and then be absolutely sure to perform the following settings.



As a reference point detection direction.

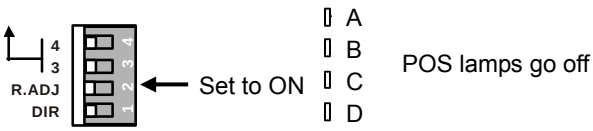
1. Make sure the R.ADJ switch is OFF.

2. Move the scale in the direction opposite to that in which the reference point is read.
   Check that the REF lamp is off at this time.

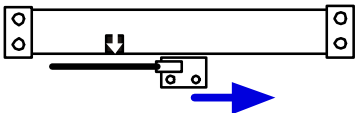


Reverse direction of reference point detection direction.

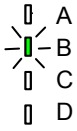
3. Set R.ADJ switch to ON. It becomes reference point setting mode.
   All the POS. lamps go off.



4.. Move the scale beyond the reference point.



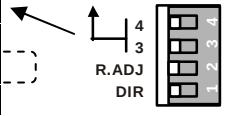
5. One POS. lamp on the front of the mainframe now lights.



6. Set MODE switches “3” and “4” as indicated next to the lighted POS. lamp.

Set it in case of above.→

	3	4
A	OFF	OFF
B	ON	OFF
C	OFF	ON
D	ON	ON



7. Set R.ADJ switch is OFF

8. Reboot the MD20B.

* After finish the reference point setting, it is necessary to reboot the MD20B. Otherwise, reference point position may be shifted.
*Moving speed at the time of reference point setting and using reference point that is must be same. (Deviation is 10% or less.)

Reference point Response speed

Improve reference point response speed at the high resolution.

Resolution	Response speed
0,1μm～10μm	5m/min

Note) However, they cannot exceed the scale response speed which is determined by resolution and output pulse width. (e.g. In case that resolution : 0.5μm, output pulse width : 10μs, response speed is 2.2m/min.)
It is possible to adapt up to 15m/min, therefore reference point position may be instability due to speed fluctuation if the reference point speed is increased.
The moving speed of reference point setting and using reference point that must be same at the time of 5m/min or more.
Note) However, they cannot exceed the scale response speed which is determined by resolution and output pulse width.

Analog adder function

Eliminate analog adder function.

Check terminal

Eliminate check terminal of UP/DOWN signals.