

## Re: New manufacture of the inductosyn panel (internal parts) made by MHI and the after-sale service correspondence

### 1. Outline

We have gratefully supplied a large number of inductosyn (consisting of a sensor body, a preamplifier, and a control panel (henceforth inductosyn panel)) made by Mitsubishi Heavy Industries, Ltd. as a position detection machine of hydraulic cylinders in a rolling mill etc. We appreciate deeply that you have been using them without a big problem to the present thanks to the equipment of your company and the daily maintenance by your engineers.

By the way, regarding the captioned subject, with remarkable development of electronics related technology, as for electric parts, such as IC chips, high performance and high integration (miniaturization) progress, and specification change and manufacture stop are made in a very short cycle, more than the half of the electric parts in the inductosyn panel also encounter a manufacture stop now. Although our company has been collecting information timely and examining an alternative, it is difficult under the present condition to newly manufacture several kinds of substrates applicable to the inductosyn panel. Since manufacture of inductosyn panel internal parts and an after-sale service correspondence plan are shown below, please review them carefully. In addition, although we had been manufacturing the inductosyn panels till 1992 after supplying the first machine in 1974, for the above-mentioned reason etc., the new manufacture was stopped in 1993 and afterwards (manufacture of internal parts is continued), and we are manufacturing MP-SCALE UNIT as a succeeding model of inductosyn panel. We would like you to plan immediate updating to MP-SCALE UNIT.

## 2. New manufacture and after-sale service correspondence plan

New manufacture of the inductosyn panel internal parts and an after-sale service correspondence plan as our company under the situation mentioned above should be as follows. Please examine them. The new manufacture correspondence table for every part is shown in Table 1.

Table 1 New manufacture correspondence table

	New manufacture	Repair
Inductosyn panel interval internal parts	Till year 2000 However, there is a limitation in the manufacture quantity.	Till year 2003
Preamplifier	Also responsible from now on.	Also responsible from now on.
Scale and slider	Also responsible from now on.	Also responsible from now on.

Note: About a preamplifier, a scale, and a slider, when situations, such as new, renewal and a manufacture stop, change, we contact you anew.

The specific contents of future after-sale service correspondence are indicated in the following.

### (1) Correspondence at the time of a trouble

Fundamentally, please replace with the spare parts that your company possesses.

### (2) Investigation and repair of a fault part

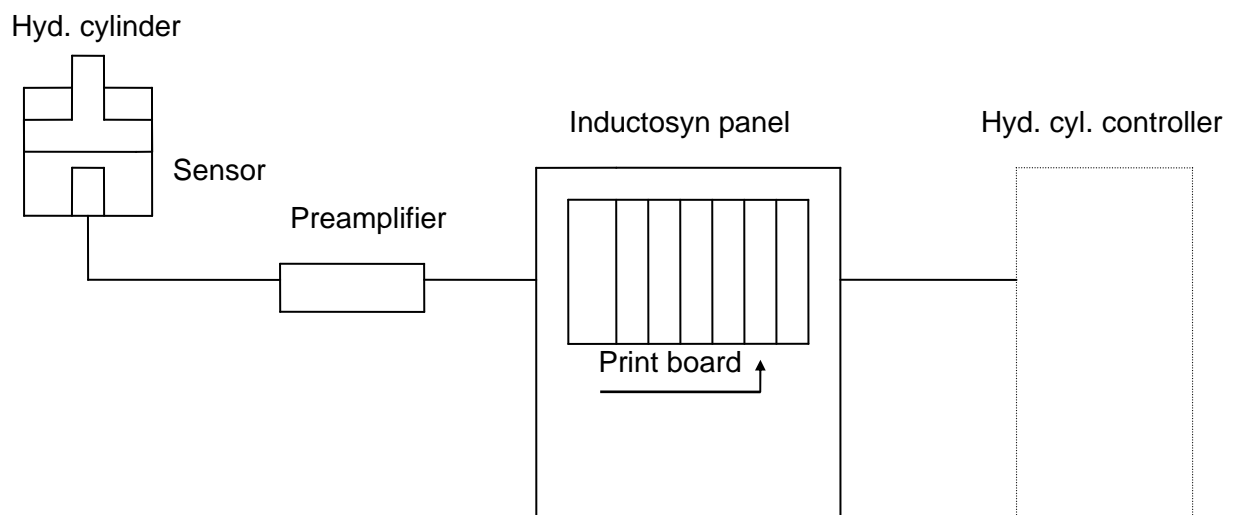
We would like to have the part that generate a fault sent to our company; pursue a fault part by our company inspection system, and repair the fault part. (However, repair may be difficult depending on the part where a fault occurs.)

### (3) Urgent correspondence parts

Since we do not hold the urgent correspondence parts, even if there is a request of a part lease more urgent than your company etc., the correspondence is difficult. In addition, when a manufacture request is made newly (there are limitations in the manufacture term and quantity), please place an order after checking the time for delivery shown in Table 2.

Table 2 Inductosyn panel internal panel new manufacture correspondence table

Panel	Time of delivery for new manufacture	Substitution to MP-SCALE UNIT
CD-A-1	2-4 months	Replaced with the left-listed panels for two loops by one MP-SCALE UNIT.
CD-C-1	2-4 months	
CD-E	2-4 months	
CD-O	2-4 months	
CD-T	2-4 months	
CD-W-1	2-4 months	
CD-Z	4 months	
CD-D	4 months	
CD-H	4 months	
CD-J	4 months	



### 3. Updating to MP-SCALE UNIT

In our company, from several years before, the new manufacture system has shifted to MP-SCALE UNIT that is the succeeding model of the inductosyn panel extensively, and we have supplied 160 sets by present. We ask you to plan immediate updating also in your company. The comparison table of an inductosyn panel and MP-SCALE UNIT is shown in Table 2. (See the catalog of an attached sheet for the details of MP-SCALE UNIT.)

Table 2 Comparison of the inductosyn panel and the MP-SCALE UNIT

	Item		Inductosyn panel	MP-SCALE UNIT
Sensor area	Sensor		Scale/slider	Same as left
	Amplifier		Preamplifier	Same as left
	Sensor electric specs Signal processing		Applying the short waveform of 2 kHz excitation (SIN and COS), perform phase comparison with the standard waveform after fixing the waveform of induced voltage by filtering.	Same as left
A/D converter area	Structure		Exclusive control panel (max. 6 ch/panel)	UNIT structure (max. 2ch/UNIT) (In case of assembling to the panel of the same size as the left one, max. 8 ch / panel)
	External I/F	Pos. actual result +INH	O/C max. DC150V, 50 mA DATA max.19b / ch DATA 1 $\mu$ m increment DATA updating cycle: 0.5 ms	O/C max. DC150V, 50 mA DATA max.19b / ch DATA 1 $\mu$ m increment DATA updating cycle: 0.5 ms
		Normal signal	Mercury relay point of contact max. 500V, 2A	O/C max. DC60V, 20mA
		Pos. reset signal	Relay input, DC48V	Photo-coupler input DC24V, DC48V selected
	Position actual result display		Indicator installed to the control panel front door	Indicator mounted to the UNIT front
	Power supply unit		Common to the inside of control panel	Built in the unit

Since the sensor and the amplifier are completely the same ones used as shown

in above table, and the I/F specification with the host computer side is also manufactured in consideration of compatibility with the inductosyn panel, when replacing the inductosyn panel with MP-SCALE UNIT, it can be carried out without the reconstruction of the sensor and the host computer sides. The concrete method (proposal) of replacing is shown below.

- (1) When the case of the existing inductosyn panel is used
  - ① Withdrawal of the apparatus in the panel
  - ② Inclusion of MP-SCALE UNIT (the partial processing necessary for an attachment bar)
  - ③ Wiring in the panel (new: the cable between MP-SCALE UNIT and external TB)
- (2) When a MP-SCALE panel is installed newly
  - ① External wiring removal
  - ② Inductosyn panel withdrawal
  - ③ MP-SCALE panel installation
  - ④ External wiring restoration