OPERATING MANUAL

FOR

Mazak

TOOL SETTER

QuickTurn 10N
QuickTurn 10N M/C
QuickTurn 20N

SERIAL NUMBER :

N/C EQUIPMENT : MAZATROL

CONTENTS

Outline of functions

The tool setter replaces the conventional TEACH fonction; it sets the coordinate values of the tip in the TOOL SET display when a tool is brought in contact with the tip of the measurement sensor.

..... (manual operation)

When replacing a tip moreover, the tool setter permits compensating for the tip wear as programmed in the automatic operation mode.

..... (semi-automatic operation)

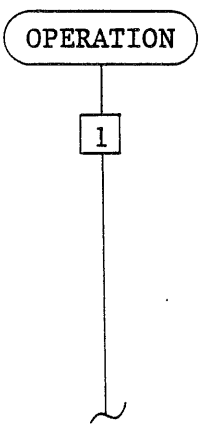
1. OPERATION

Operations are classified into:

1. Setting and measuring a tool,
2. Simple tool setting and
3. Run an operating program

To carry out each of the above operations, follow the step given below.

1-1 Setting and Measuring a Tool



Install the tool to be set in the turret in the machine body.

2 Select the "TOOL SET" screen.

3 Confirm that the SPINDLE STOP LED on the operating panel is ON. When the SPINDLE START LED is ON, stop the spindle using the RESET or SPINDLE STOP switch.

4 Verify that the tool setter arm does not interfere with the tool even if the arm is forward (the arm should extend to the measurement position.).

If the arm interferes with the tool, the turret should first be moved out of the way, otherwise, the tool setter can break.

5 Check that the tool setter arm when extended will not interfere with the chucking workpiece. If this should occur, unload the workpiece in advance.

6 For the UNIVERSAL ktype machine, check that the tail spindle is positioned at the retract end (TAIL SPINDLE RETRACT LED on the operating panel should be ON.). If not, retract the tail spindle.

Note: Attempting to extend the tool setter arm when the tail spindle is not positioned at the retract end will result in an alarm.

7 Press the menu [TOOLSET MEASURE].

When the menu becomes [TOOLSET MEASURE], the tool setter arm advances. In this case, moreover, the SLOW FEED mode 20 mm/min will be selected automatically. The data registration position for the selected tool will be inverted on the TOOL SET screen.

TNO.	TOOL SET-X	TOOL SET-Z
1	(0.)	(0.)
2	([0.])	([0.])
3	(0.)	(0.)

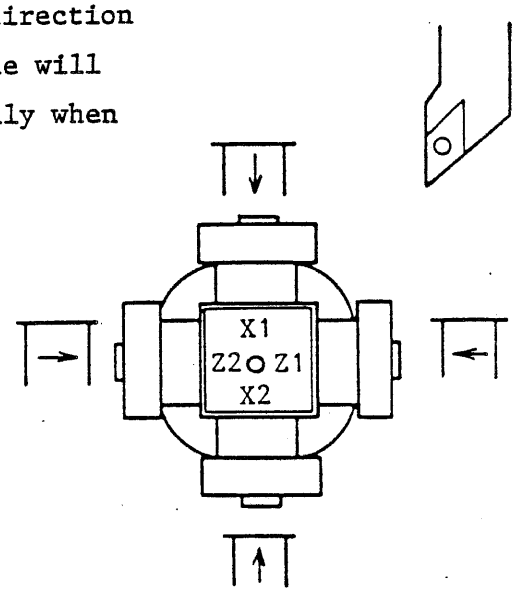
Note: When all TOOL SET data go to "0", the CHUCK BARRIER or TAIL BARRIER alarm may be triggered. In this case,

select [BARRIER CANCEL] and rest the alarm.

8 In the manual mode, bring the tip of the tool to be set up to the tool setter sensor.

9

Select the measurement direction from the menu. Feed mode will be specified automatically when the measurement direction has been selected. Measurement directions are related as shown at the light.
Select the menu [↓].



Note 1) Taking a measurement without selecting direction will trigger Alarm No. 182 "SENSOR ON NOT IN MEASURING".

2) Attempting to select the ZERO RETURN RAPID mode after measurement direction selection will result in an alarm.

10

Select the slow feed mode, 20 mm/min (100 indicated in segments) and use the mono lever to feed the tool tip in the direction selected in Step (9), and bring the tool in contact with the sensor.

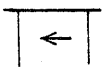
Note: A higher measurement speed causes a greater measurement data error.

11 The measurement sensor produces a "beep" and the measurement data are registered in the TOOL SET screen. The LED at the center of the sensor will go out and the axes will stop moving. Then, the axes will feed in the opposite direction.

TNO.	TOOL SET-X	TOOL SET-Z
1	(0)	(0)
2	([-236.412])	([0])
3	(0)	(0)

12 Carry out operations [9] thru [11] to enter TOOL SET-Z.

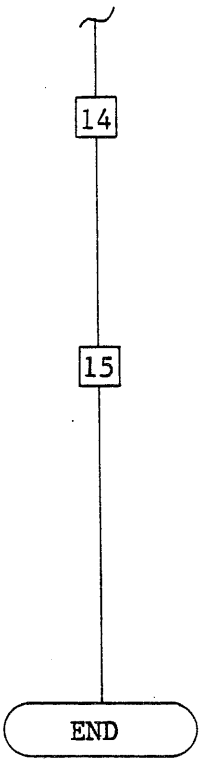
TNO.	TOOL SET-X	TOOL SET-Z
1	(0)	(0)
2	([-236.412])	([-347.456])
3	(0)	(0)



SLOW FEED mode: 20 mm/min

Use the mono lever to bring the tip in contact with the sensor. When the sensor produces a "beep", the measurement is completed. When the LED at the center of the sensor goes out, the axes will stop moving, feed the axes in the opposite direction.

13 To move the turret to the position where the tool can be swung, the HAND PULSE x 0.1 mode can be used. Then, select the tool to be set. Perform operations [9] thru [11] to measure both the TOOL SET-X and -Z.



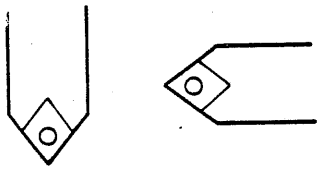
After setting the tool, move the turret to where it will not interfere even if the tool setter arm comes back (to the position where the tool setter is accommodated).

Press menu [TOOLSET / MEASURE] .

After the inverted menu display disappears, the tool setter arm will return. In this way, the TOOL SET measurement operations are accomplished.

1-2 Simplified Setting Operation

To set a tool measurable in either the X- or Z-axis direction as shown on the right, use the following simplified setting method.

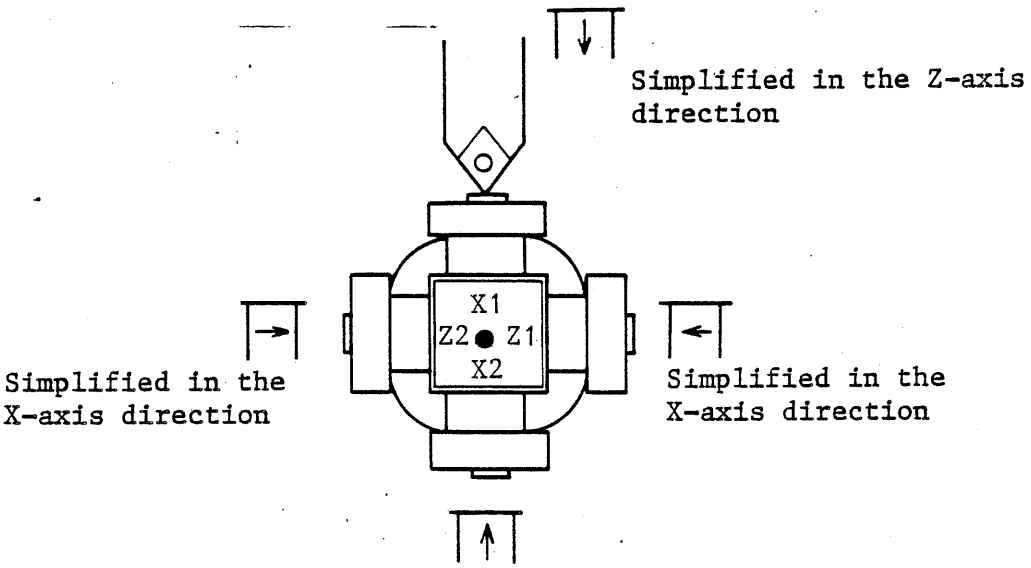


OPERATIONS

1 Follow Steps [1] thru [6] in the Section 6-1-1 "Setting and measuring a tool" above.

2 Press menu [AUTO SET].

3 Use the mono lever to move the tip up to the center of the sensor and make contact.



4

The measurement sensor will produce a "beep" and the TOOL SET values for the X and Z measurement data will be registered on the screen.

When the LED at the center of the sensor goes out, the axes will stop. Move them in the opposite direction.

TNO.	TOOL SET-X	TOOL SET-Z
1	(0)	(0)
2	(-236.412)	(-348.456)
3	(0)	(0)

Simplified set value

5

To continue setting in the simplified mode, move the turret to where the tool can be swung. Then, select a tool. Follow Steps 1 thru 4 above and set in the simplified manner.

6

After setting move the turret to where the tool setter arm does not interfere even if fully back.

7

Press menu TOOLSET / MEASURE .

Then, the inverted display of the menu will disappear and the tool setter arm will return. This completes the setting operations in the simplified mode.

END

1-3 Programmed Operation

In a programmed operation, the tool setter can be used to register offset data in measuring a tool.

However, MAZATROL programs only are valid in programming and the tool to be measured must be set beforehand.

(1) Programming procedure

The operations for preparing a MAZATROL program should be carried out first.

PNO.	MODE	TYPE	DIR	SPT-X	SPT-Z	FPT-X	FPT-Z	T LIM+	T LIM-	B OFST	SNS
*	MES	TOL	#3					0.2	0.1	0	3-1
	ⓐ	ⓑ	ⓒ					ⓓ	ⓔ	ⓕ	ⓖⓗ

SEQ	POINT	P-X	P-Z	Q-X	Q-Z	R-X	R-Z
1	1	40	-100				
	ⓘ	ⓙ	ⓚ	ⓛ	ⓜ	ⓝ	ⓞ

*** WORK PROGRAM NO. ***

In response to the messages while preparing a program, set data as follows:

(2) Process data

(a) "MODE (MENU)?"

Select the program mode from the menu. |→→→| |MESURE|

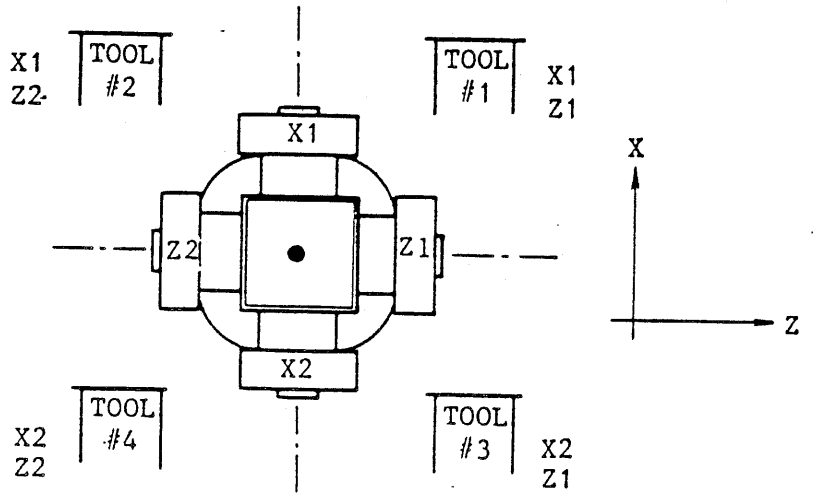
(b) "MEASURING TYPE (MENU)?"

Select a measurement method from the menu. |TOOL|

(c) "MEASURING DIRECTION (MENU)?"

Select a measurement direction from the menu. |TOOL #3|

Measurement directions are related to menu numbers as follows.



(d) "TOLERANCE IN THE DIR. OF X ?"

Set an offset limit value in the X-axis direction.
A positive value represents both positive and negative values in the setting.

[0] [.] [2] [⇨]
||
± 0.2

(e) "TOLERANCE IN THE DIR. OF Z?"

Set a Z-axis offset limit value.

[0] [.] [1] [⇨]
||
± 0.1

(f) "MEASURED UNIT IN YES (0), NO (1)?"

[0] [⇨]

The program permits one tool to be measured per process.
To measure two or more tools together using a sequence of processes, select whether or not the measurement table is to be returned or not.

(g) "TOOL NO. TO BE OFFSET?"

[3] [⇨]

Set the number of the tool to be offset, i.e. tool to be measured.

(h) "OFFSET NO.?"

[1] [⇨]

Set an offset number. With a MAZATROL program, however, data may be entered in OFFSET-1 only on the TOOL SET screen.

(3) Sequence data

When there is an obstacle present midway in the measurement path, set an intermediate relay point in the sequence data.

(i) "NUMBER OF MES RELAY POINT?"

Set the number of intermediate relay points. Up to three points can be set. [1] [→]

(j) "RELAY POINT #1-X?"

Set the coordinate of No. 1 intermediate relay point. The program zero point should be used as the reference point. [4] [0] [→]

(k) "RELAY POINT #1-Z?"

Set the Z coordinate of the No. 1 intermediate relay point. [−] [1] [0] [0] [→]

(l) "RELAY POINT #2-X?"

Set the X-coordinate of the No. 2 intermediate relay point.

(m) "RELAY POINT #2-Z?"

Set the Z-coordinate of the No. 2 intermediate relay point.

(n) "RELAY POINT #3-X?"

Set the X-coordinate of the No. 3 intermediate relay point.

(o) "RELAY POINT #3-Z?"

Set the Z-coordinate of the No. 3 intermediate relay point.

(4) EIA programme procedure

(5) Setting of measuring intervals

2. TOOL SETTER PARAMETERS

The tool setter parameters are illustrated below.

M33 : Measurement sensor width (X-axis radius)

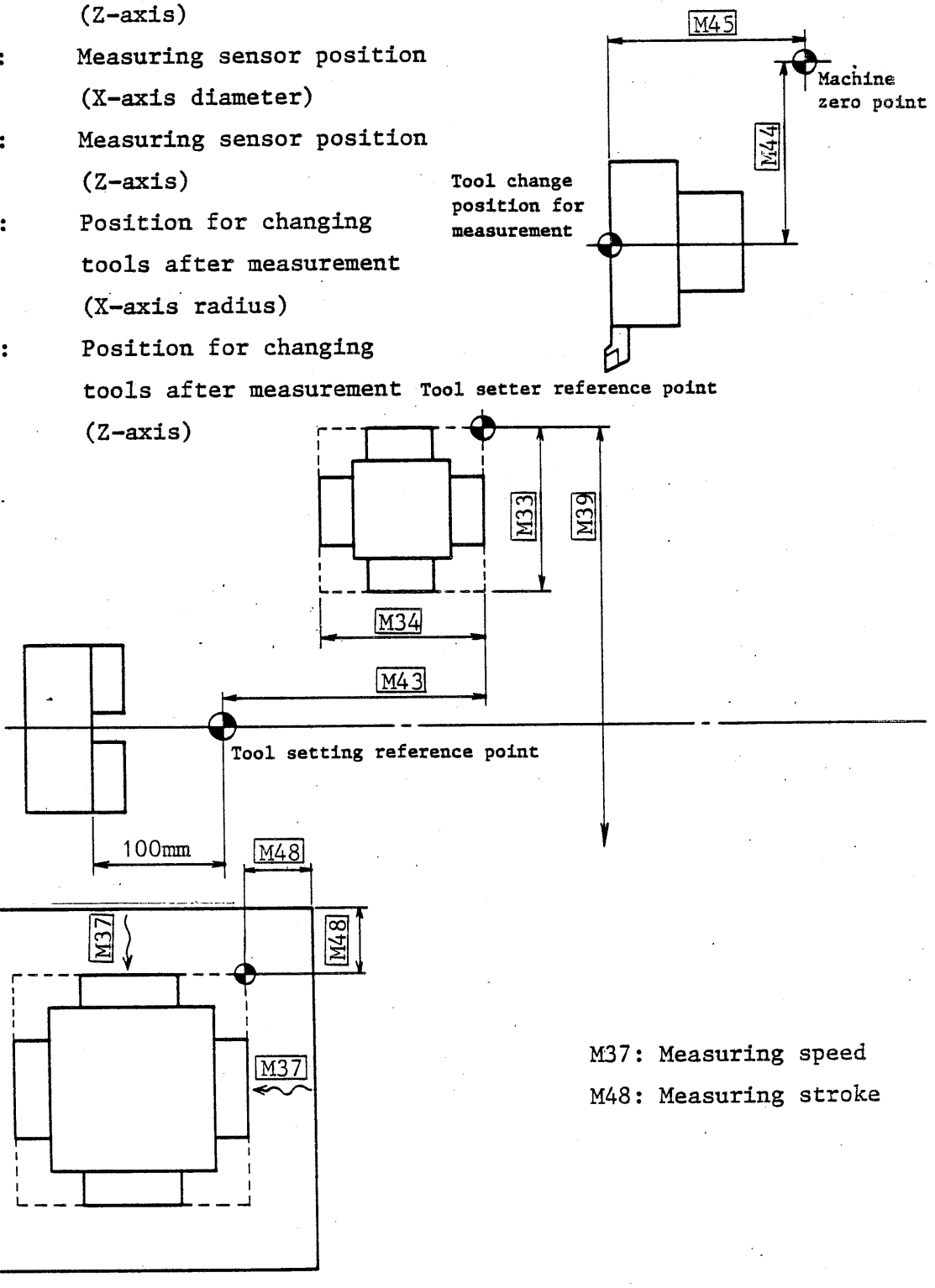
M34 : Measurement sensor width (Z-axis)

M39 : Measuring sensor position (X-axis diameter)

M43 : Measuring sensor position (Z-axis)

M44 : Position for changing tools after measurement (X-axis radius)

M45 : Position for changing tools after measurement (Z-axis)



M37: Measuring speed

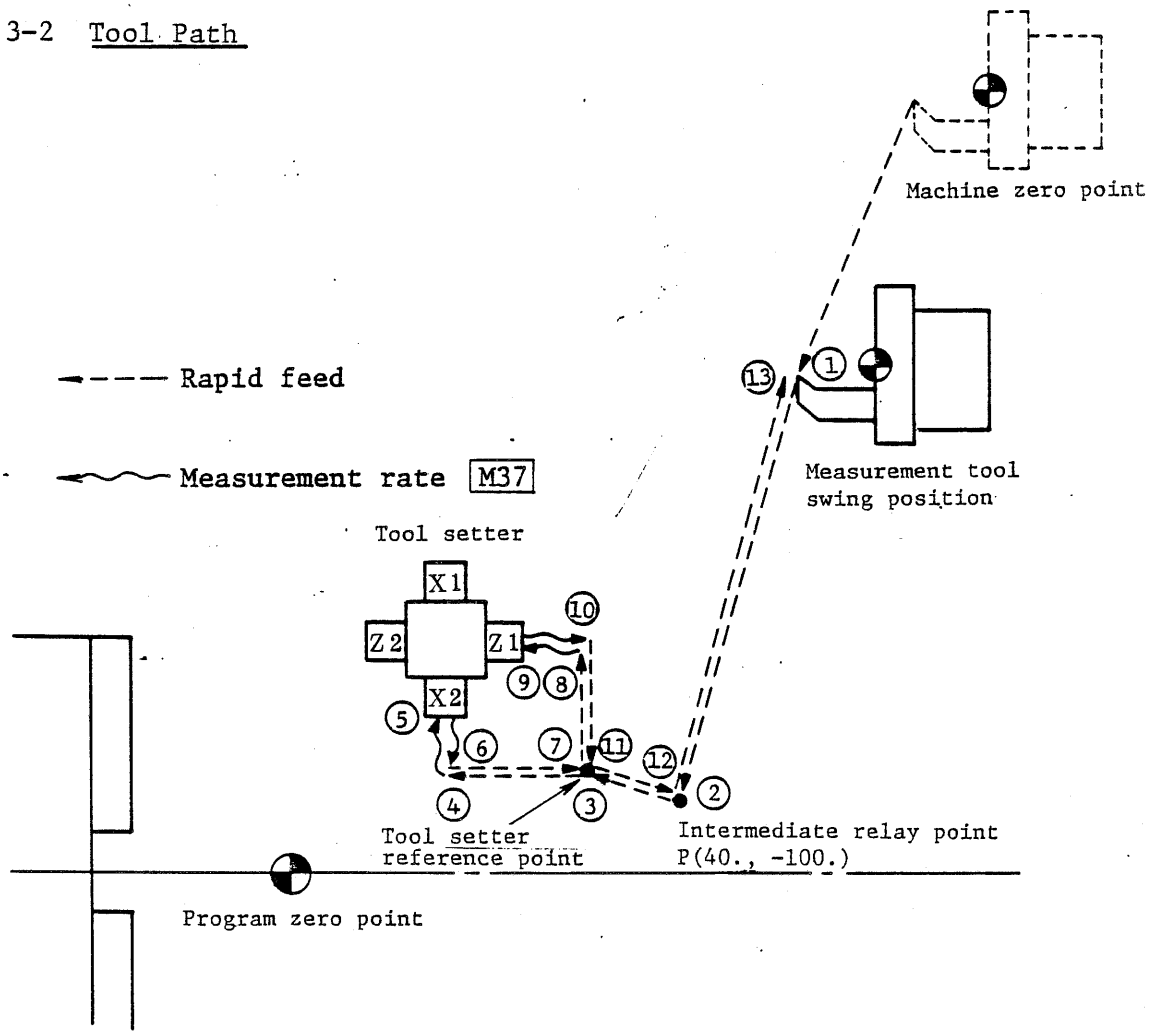
M48: Measuring stroke

3. PROGRAM EXAMPLES AND TOOL PATHS

3-1 Program Example

PNO.	MODE	TYPE	DIR	SPT-X	SPT-Z	FPT-X	FPT-Z	T LIM+	T LIM-	B	OFST	SNS
*	MES	TOL	#3					0.2	0.1	0	3-1	
SEQ.	POINT	P-X	P-Z	Q-X	Q-Z	R-X	R-Z					
1	1	40.	-100									

3-2 Tool Path



3-3 EIA Program Example

Note: For an inside diameter tool, the Alarm "STORED STROKE LIMIT-X" can result if an intermediate relay point has a small X value.

4. TOOL SETTER INTERFERENCE

4-1 Standard Universal 8D (12D)

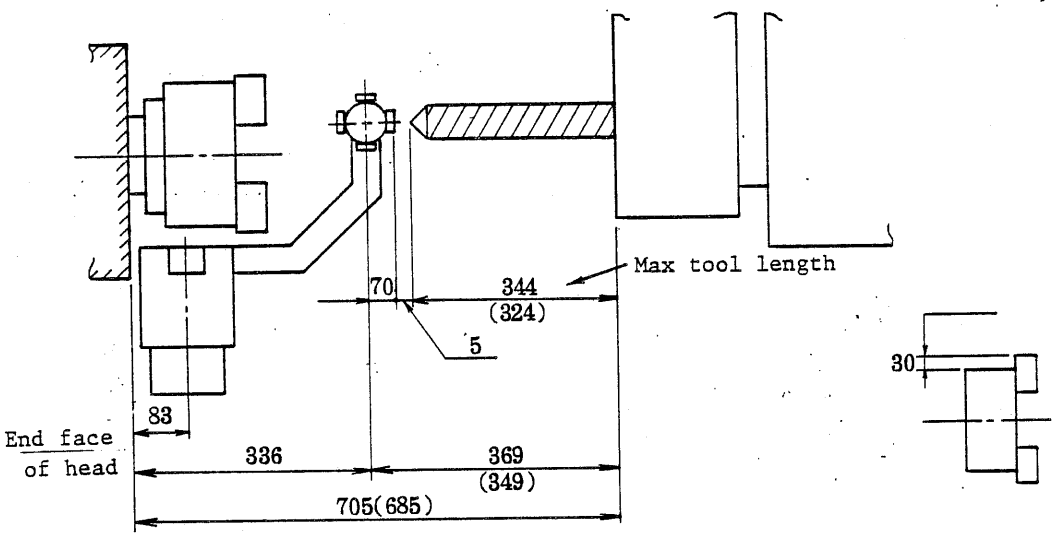
8D = 8" chuck

12D = 6" chuck

Max tool length

8D = 344

12D = 324



Note: Distance between chuck jaws is:

8D = 30 m/m

12D = 30 m/m

4-2 Standard Chucker 8D (12D)

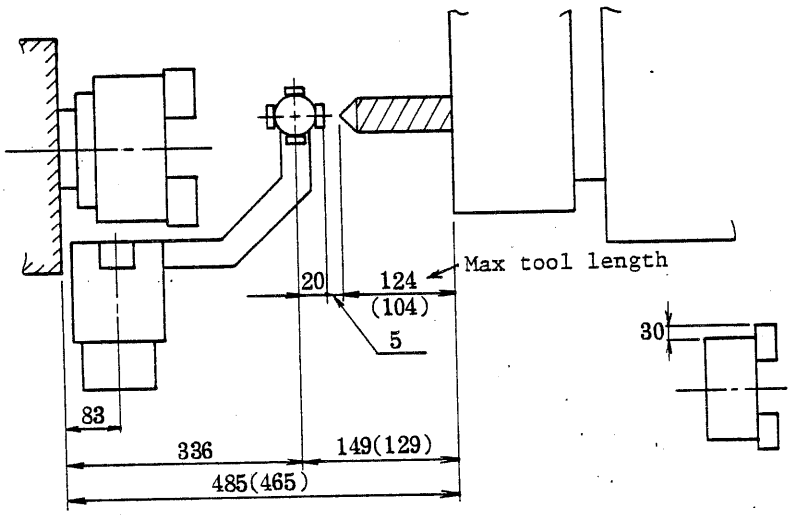
8D = 8" chuck

12D = 6" chuck

Max tool length

8D = 124

12D = 104



Note: Distance between chuck jaws up to 30 m/m for one-side is OK.

8D =

12D =

4-3 Special Order 8D (12D)

8D = 8" chuck

12D = 6" chuck

Max tool length

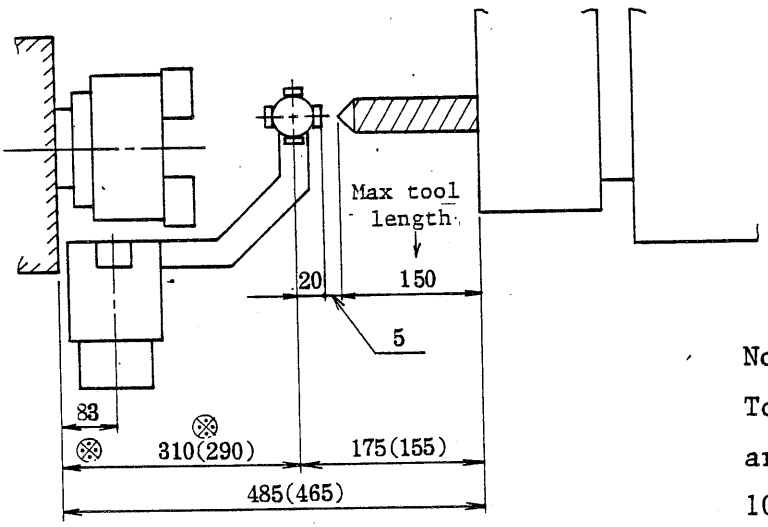
(1) 8D = 150

12D = 150

(2) Max. length of tool with 10 m/m extended stroke andk also usable as arm.

8D = 160

12D = 150



Note 1:

In the conditions shown on the left.

Distance between jaws:

8D = 8 m/m

12D = Approx. 5 m/m chamfering is required due to interference with jaws.

Note 2:

To use 8D or 12D as the arm, extend the stroke by 10 m/m and make *310 or *290 to 300.

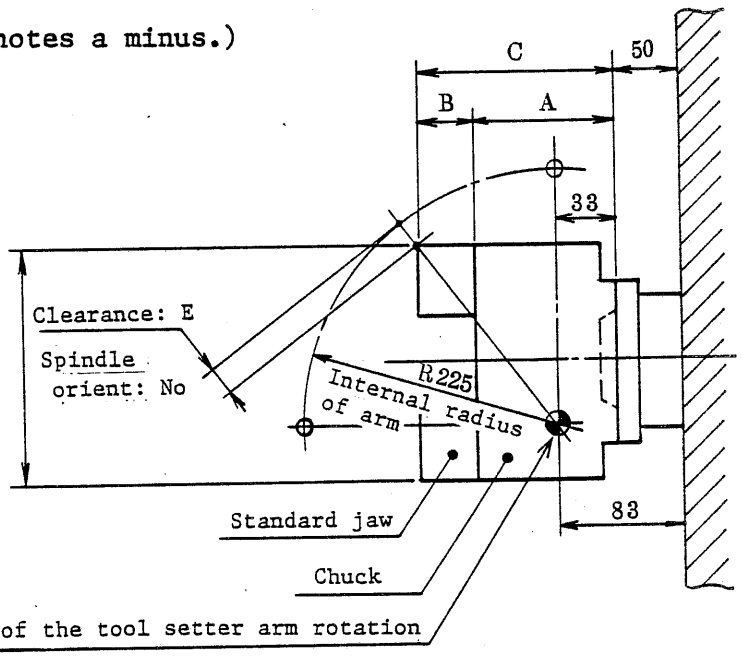
Jaw distance:

8D = 5 m/m chamfering is required.

12D = 10 m/m chamfering is required.

5. CHUCK-TOOL SETTER INTERFERENCE (QT 10N, QT 10N M/C)

Note: The chuck identified by the ▲ in column E of the following table cannot be measured since it interferes with the tool setter arm. ("▲" denotes a minus.)

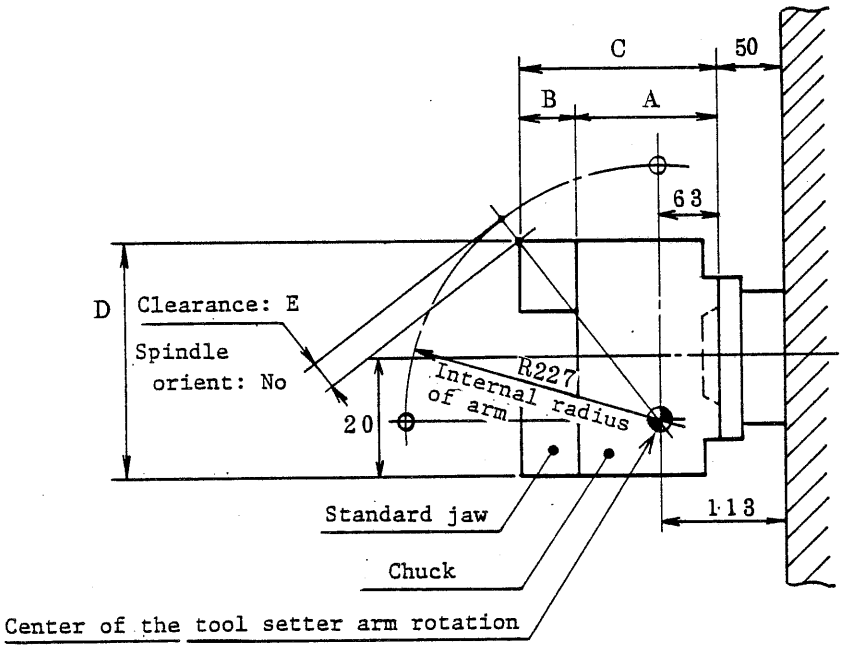


Note: To check for possible tool setter arm, chuck jaw, interferance first turn off the power, then after placing one of the chuck jaws on top swing the arm manually.

No.	Chuck		Dimensions (in mm)				
	Maker	Type	A	B	C	D	E
1	HOWA	H01MA - 8	100	43	143	ϕ210	43.0
		H07MA - 8	105	39	144	ϕ210	42.4
		H027M - 8	112	44	156	ϕ210	34.9
		H05M - 8	135	30	165	ϕ210	28.9
		H011MB - 8	115	55	170	ϕ210	25.5
		H018M - 8	123	38	161	ϕ210	31.6
		H021MB - 8	110	53	163	ϕ210	30.3
		H022M - 8	97	44	141	ϕ210	44.2
		H024M - 8	97	44	141	ϕ210	44.2
		H012MA - 8	165	44	209	ϕ270	23.2
		H01MA - 10	110	43	153	ϕ254	19.4
		H07MA - 10	120	44	164	ϕ254	12.8
		H027M - 10	133	49	182	ϕ254	1.2
		H022M - 10	105	54	159	ϕ254	15.8
		H024M - 10	105	54	159	ϕ254	15.8
2	KITAGAWA	UVE - 200				ϕ302	▲
		KTNC - 200	103	45	148	ϕ206	41.5
3	SMW	KNSP - 200				ϕ290	▲

6. INTERFERENCE OF CHUCK AND TOOL SETTER (QT 20N)

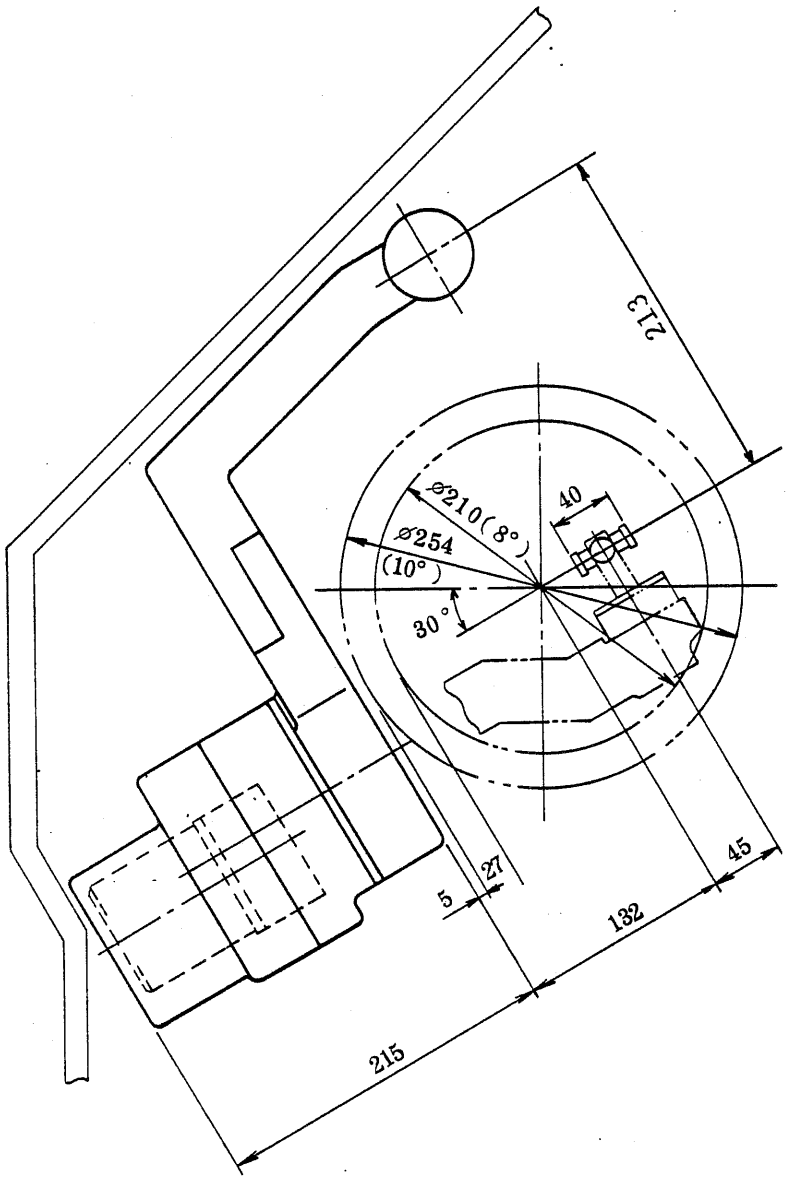
Note: The chuck identified by the ▲ in column E of the following table cannot be measured since it interferes with the tool setter arm. (" ▲ " denotes a minus.)

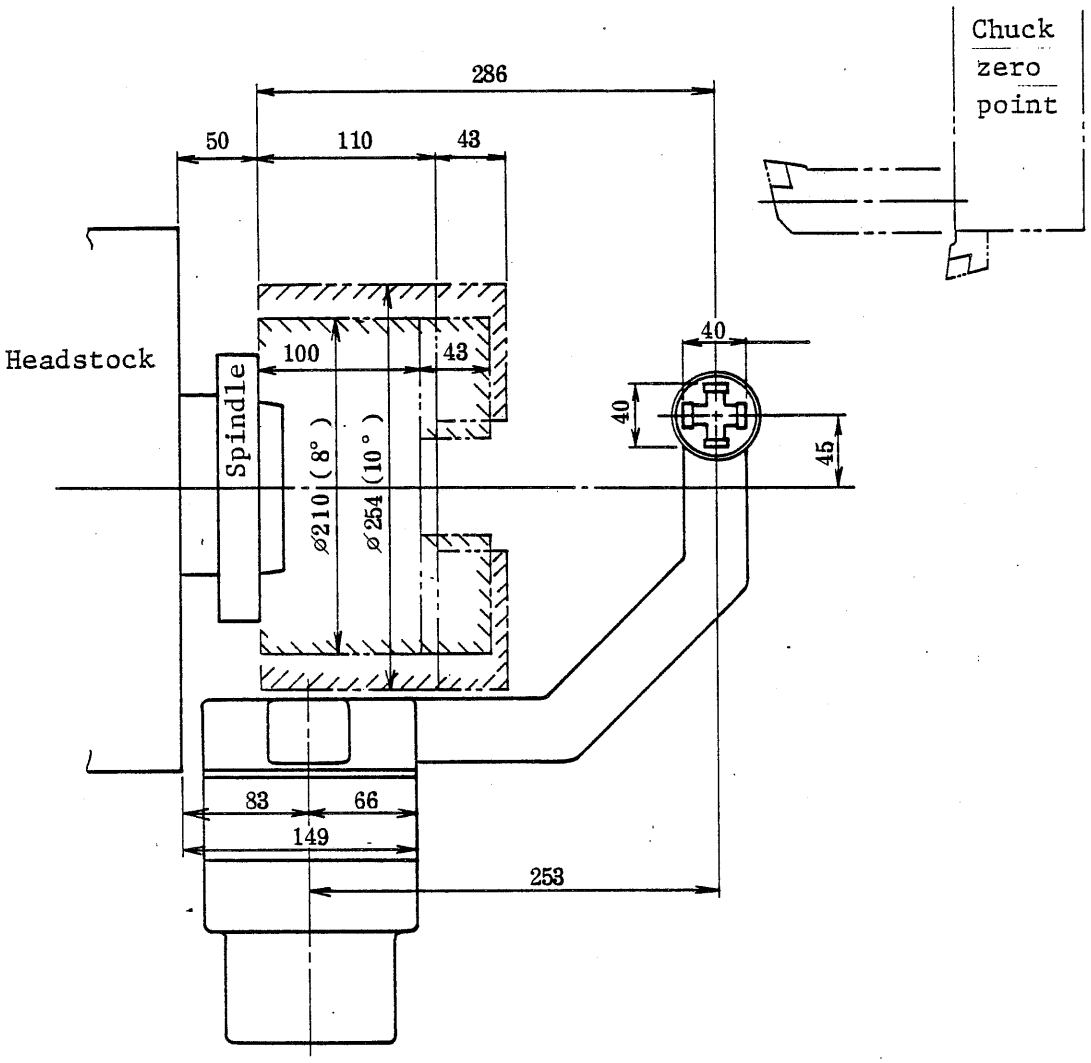


Note: To check for possible tool setter arm, chuck jaw, interferance first turn off the power, then after placing one of the chuck jaws on top swing the arm manually.

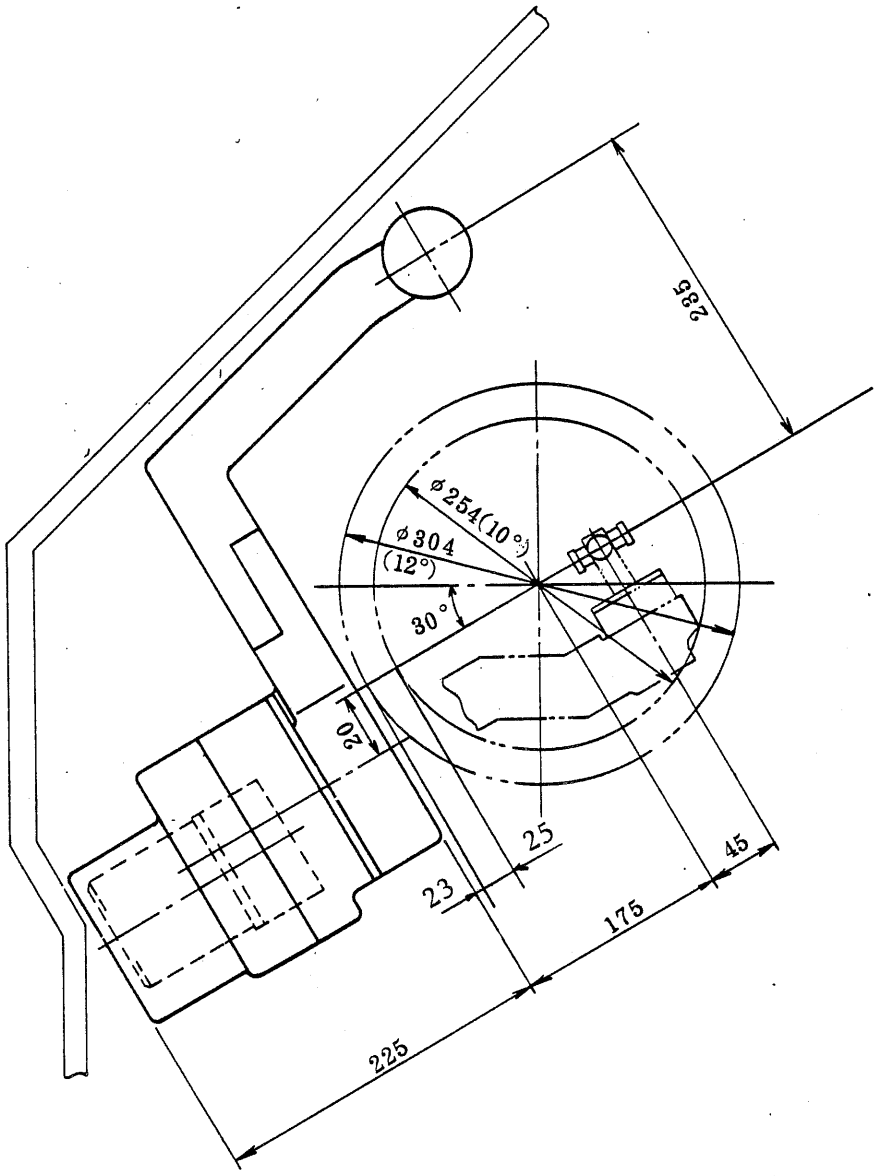
No.	Chuck		Dimensions (in mm)				
	Maker	Type	A	B	C	D	E
1	HOWA	H01MA - 10	110	43	153	ϕ254	54.6
		H07MA - 10	122	44	166	ϕ254	47.5
		H027M - 10	127	44	171	ϕ254	44.6
		H05M - 10	160	33	193	ϕ254	30.8
		H011MB - 10	145	65	210	ϕ254	19.1
		H018M - 10	155	45	200	ϕ254	26.0
		H021MB - 10	140	59	199	ϕ254	26.7
		H022M - 10	130	54	184	ϕ254	36.6
		H024M - 10	130	54	184	ϕ254	36.6
		H012MA - 10	180	64	244	ϕ315	▲26.5
		H01MA - 12	125	53	178	ϕ304	20.1
		H07MA - 12	155	54	209	ϕ304	1.4
		H027M - 12	160	64	224	ϕ304	▲ 8.6
		H012M - 12	200	64	264	ϕ375	▲61.9
		H022M - 12	122	63	185	ϕ304	16.1
		H05M - 12	165	36	201	ϕ304	6.5
2	KITAGAWA	UVE - 250K	196	43	239	ϕ350	▲35.7
		UVE - 315K	185	51	236	ϕ410	▲56.8
		KTNC - 250A	125	50	175	ϕ250	43.8

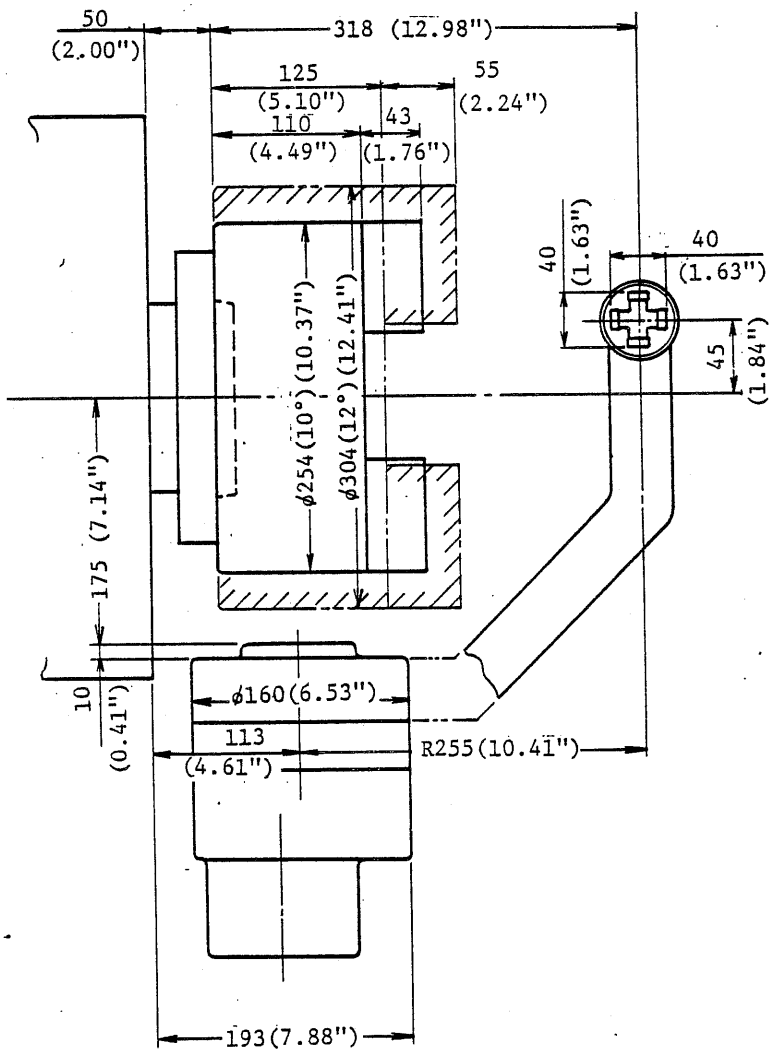
7. DIMENSIONAL DRAWING OF TOOL SETTER AND CHUCK (QT 10N, QT 10N M/C)




Chuck
zero
point
286
50
110
43
Headstock
Spindle
100
43
40
40
45
ø210 (8°)
ø254 (10°)
83
66
149
253

8. DIMENSIONAL DRAWING OF TOOL SETTER AND CHUCK (QT 20N)





Standard machining DIA. ϕ270

Max. machining DIA. ϕ300

9. PRECAUTIONS

1. Dust and Water-proof Rubber Boot

- Twisting the rubber boot can cause the probe to malfunction or shorten its life. Do not turn the protective cover.
  When replacing the rubber boot, push the protective cover straight, do not bend the rubber boot.

- As the rubber boot is used for a long time, chips and coolant may accumulate inside the protective cover. Remove the protective cover and clean it from time to time. Also, check the rubber boot for damage.

2. Putting Blade Tip to Contact

- Make sure that the blade tip is applied to the contact straight.

- Do not force the blade tip beyond the stroke (relief). If forced, the plunger will not return properly. If the plunger is not returned, the output remains off.

- The speed at which the blade tip is applied to the contact affects the response of the digital scale. Select a suitable speed which is not too high.

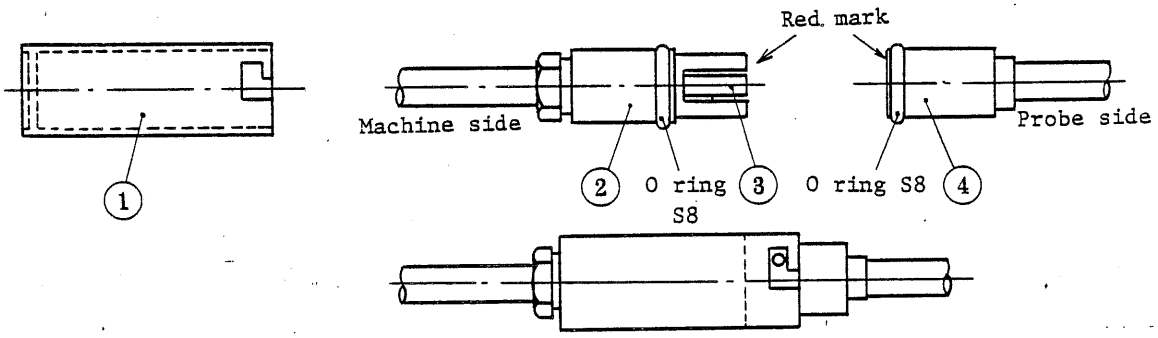
3. Disassembly and Assembly of Relay Connector

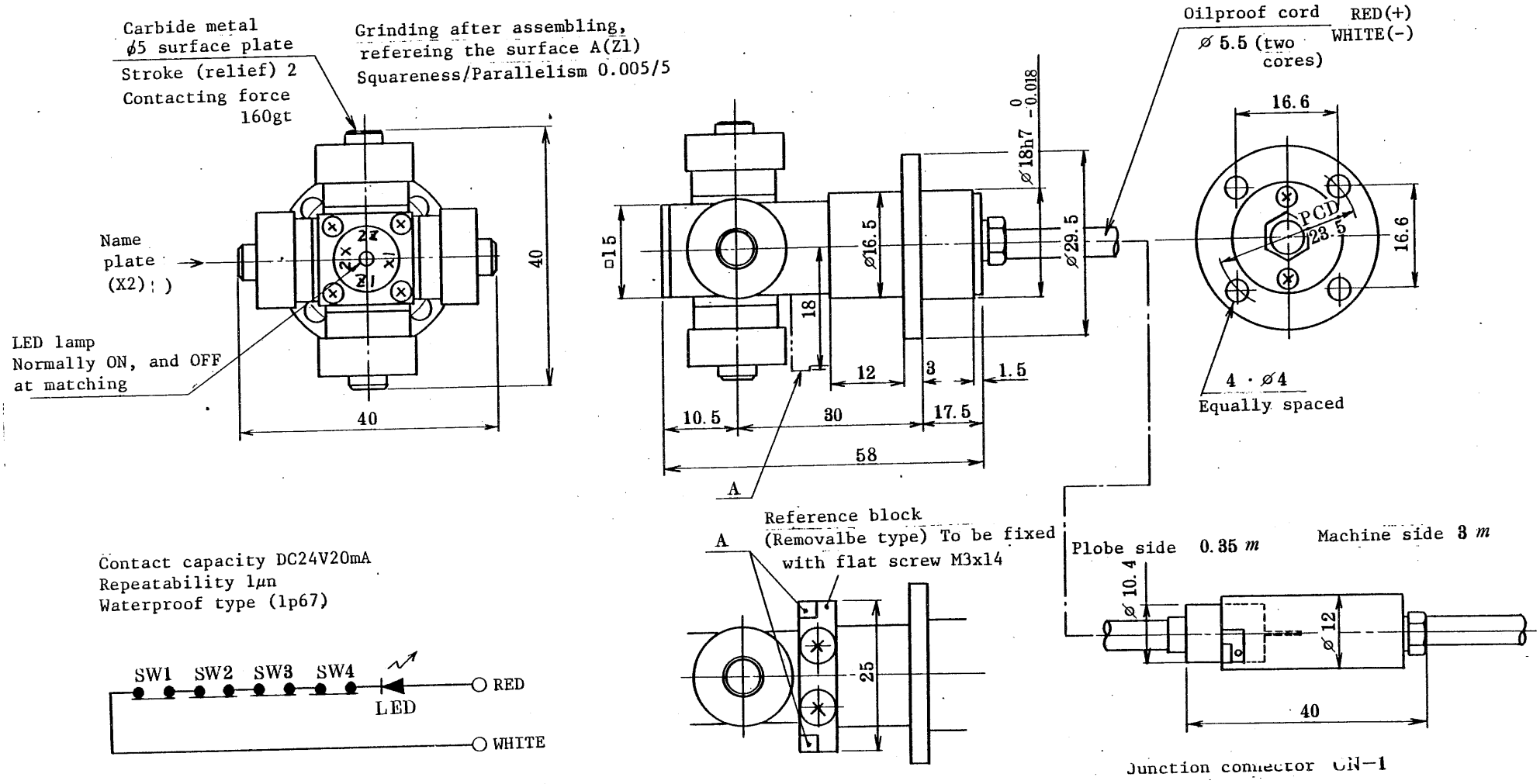
1. Turn cover ①. Slide it to the machine end and remove it.

2. Extract plug ④ while holding receptacle connector ③ on socket ② with the fingers. Do not pull the plug without holding the receptacle connector.

3. For assembly, in the reverse order of disassembly.

4. If the socket and plug have red marks, line them up when inserting the plug into the socket.





MS05E×4 LED--SLP-102(SANYO)

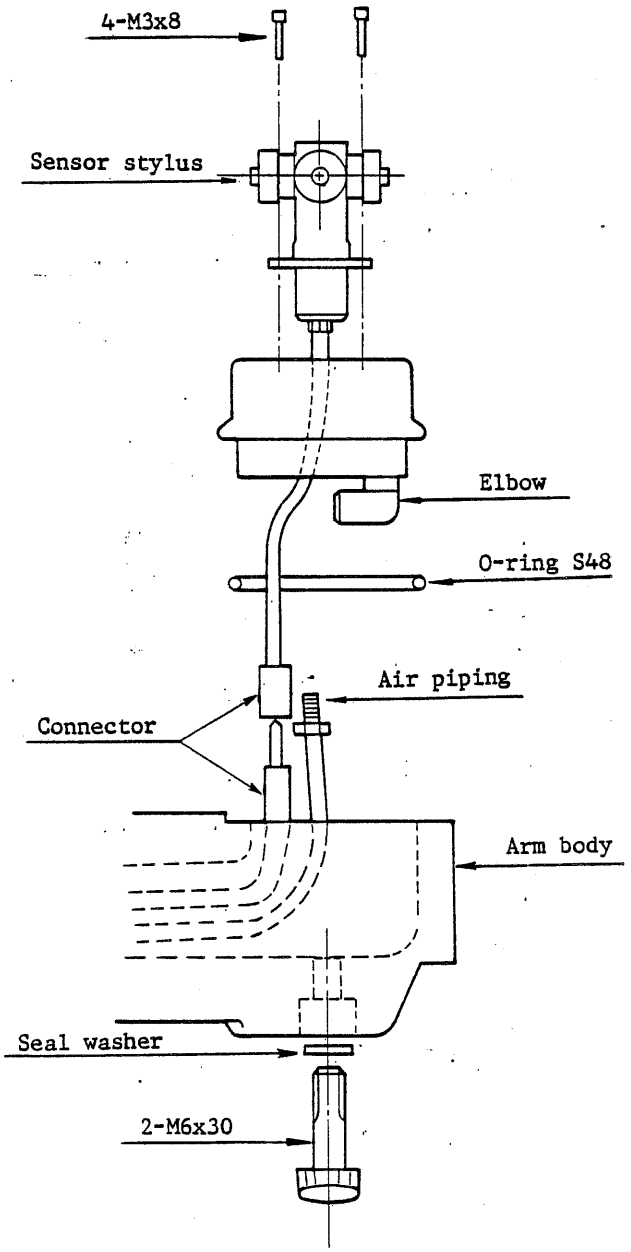
Mazak

10. TOOL SETTER DISASSEMBLY AND ASSEMBLY

10-1 Sensor Disassembly and Assembly

Disassembly the sensor unit according to the steps below for check or replacement.

Disassembly and assembly outline



Disassembly and assembly steps

1) Return the turret to the zero point and press menu [TOOLSET MEASURE] on the TOOL SET screen.

2) Remove two M6x30mm long hexagon socket headed bolts.

3) Pull the sensor out of the arm. This pull-out stroke should be reduced to the minimum required for the air pipe to be removable at the elbow, so as to facilitate the treatment of air pipe upon assembly.

4) Remove the air pipe from the elbow.

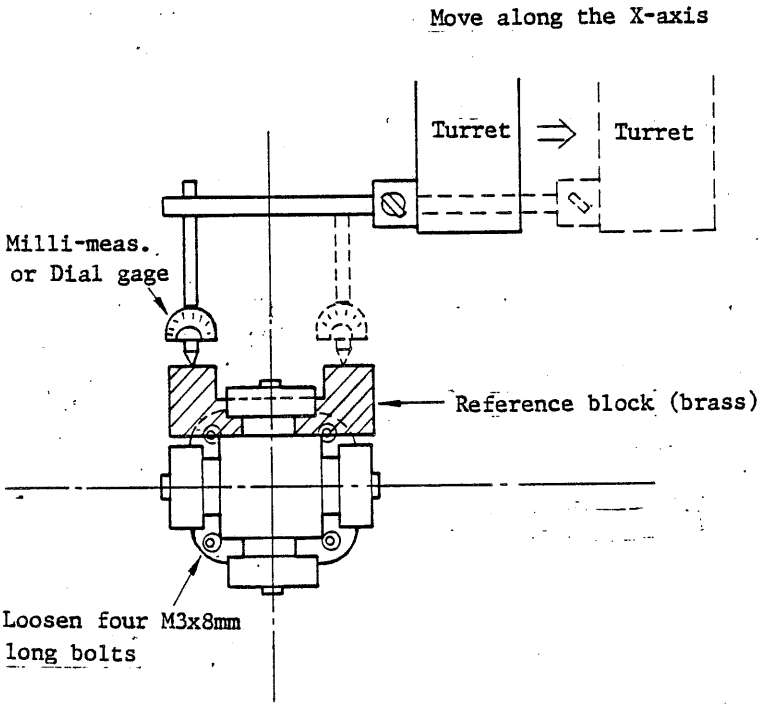
5) Pull out the sensor unit and disconnect the wiring from the connector.

6) Unfasten four M3x8mm long bolts and remove the sensor stylus.

7) To reassemble, reversely follow the steps in accordance with which the new sensor has been disassembled.

In this stage, use utmost care to treat the spacer, wiring and air piping and to handle O-rings.

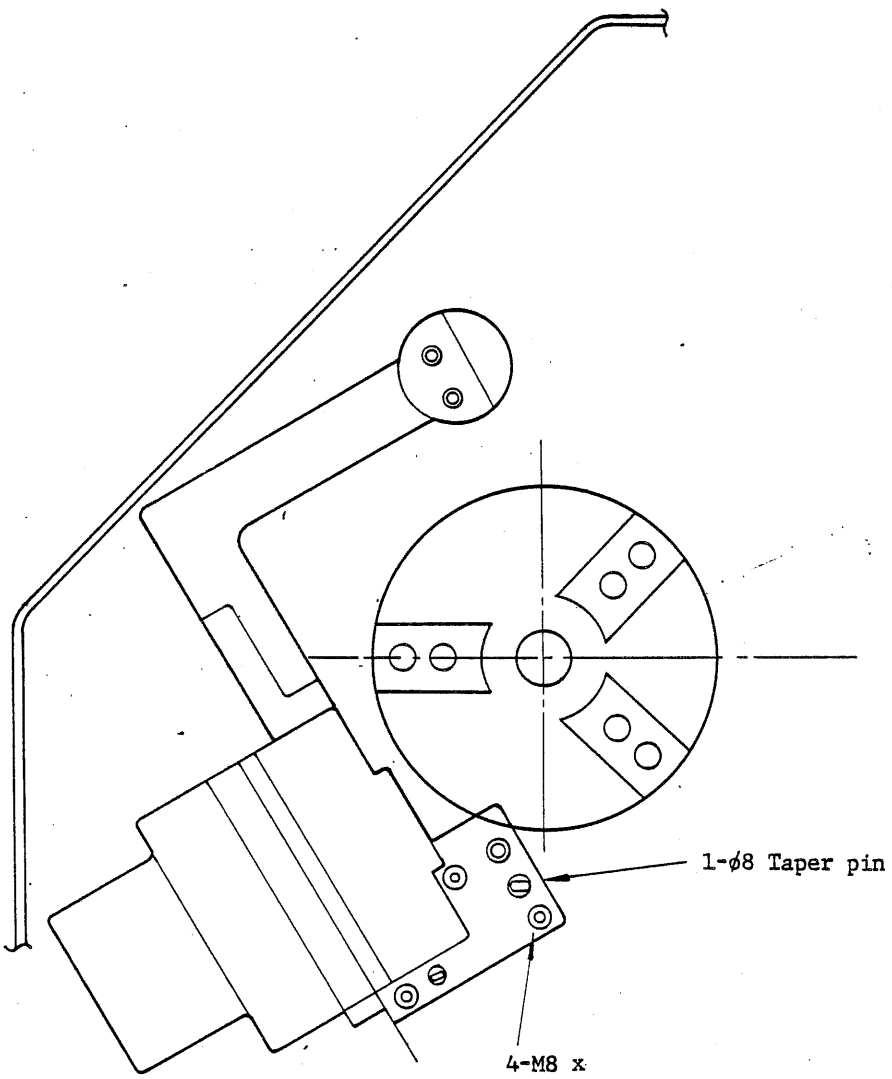
8) Upon completion of the replacement operation, then carry out centering. As illustrated, set a measuring instrument (Milli-meas. or a 1/1000 dial gage, if Milli-meas. is unavailable) on the turret and make the sensor parallel with the turret reference block (brass). Four M3x8mm long bolts must be loosened before doing this.



9) Within a range of ±2 microns in parallelism for the X-axis. Tighten four M3x8mm long bolts after paralles centering.

10-2 Steps of Removing and Mounting the Tool Setter Body

Those workpieces which swing at a large stroke or have a large outside diameter may not be machined because they interfere with the tool setter. In such a case, follow the steps given below to remove or change the tool setter body.



Replacement steps

1) Turn off the main switch, with the tool setter accommodated.

2) Remove the cover on the motor side (left while facing the motor).

3) Remove the cannon of the electrical wiring connected to the tool setter unit and the air pipe.

4) Refer to Fig. 1 and use a pin puller to pull out two ϕ8mm taper pins.

5) Remove four M8x hexagon socket headed bolts and the tool setter body.
* Use care not to drop the body which weighs heavy.

6) After completion of the removal, use attached cover packing to plus the electrical wiring holes on the face cover.

7) Short-circuit the terminals TDRE and +24N on the electrical control panel. Then, remove has been completed.

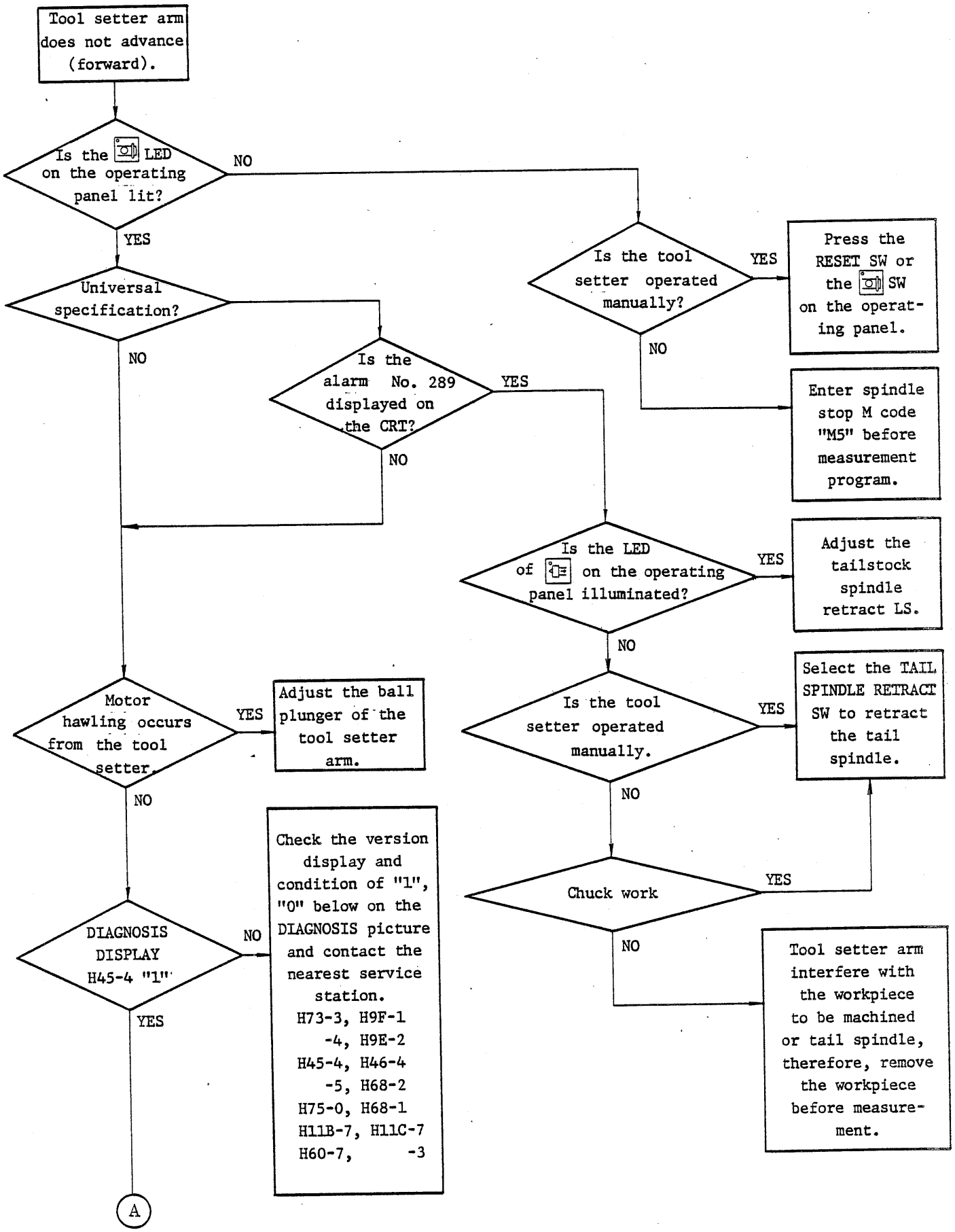
8) To install the tool setter body, reversely follow the above-mentioned steps.

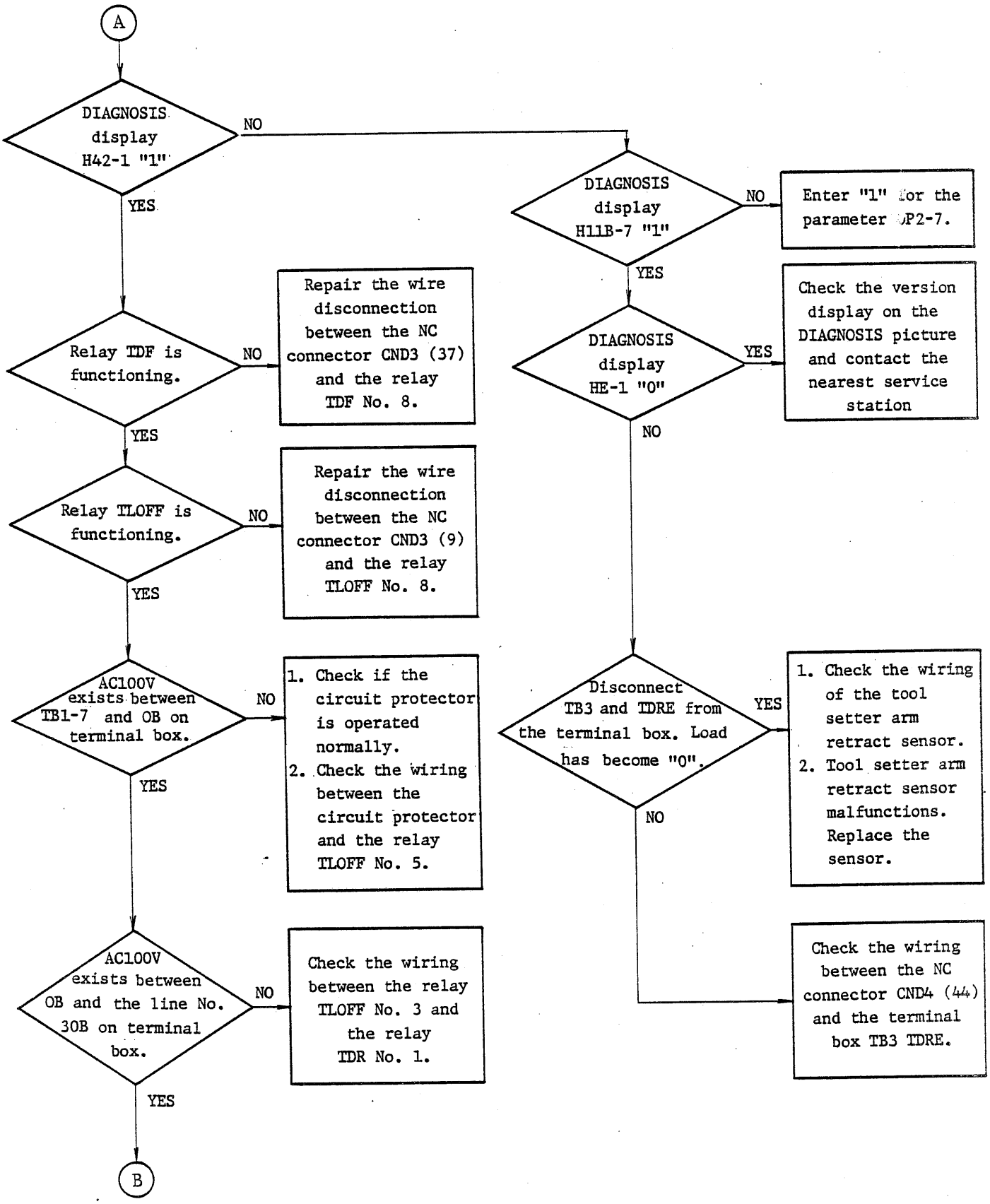
10-3 Troubleshooting

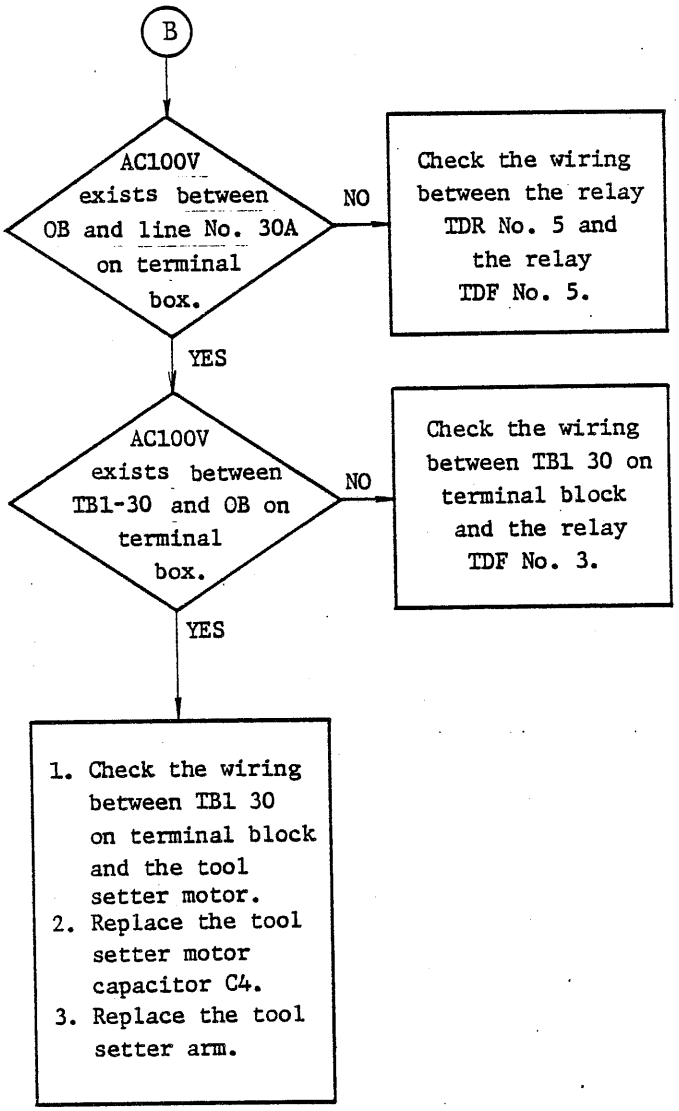
For troubles referred to below, follow the troubleshooting steps and take appropriate action.

Note: To be turn off the main breaker before the wiring confirmation.

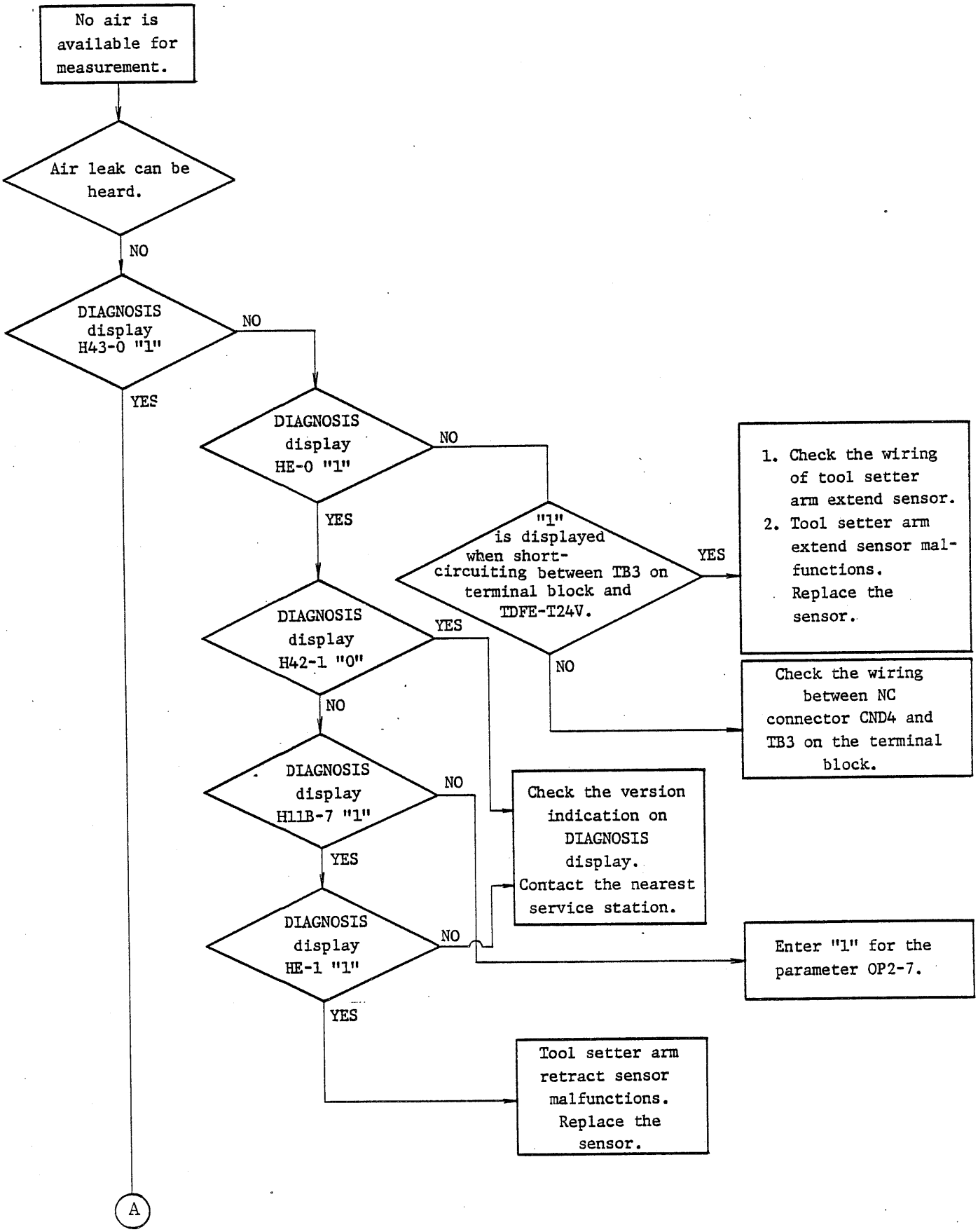
(1) Tool Setter Arm does not advance.

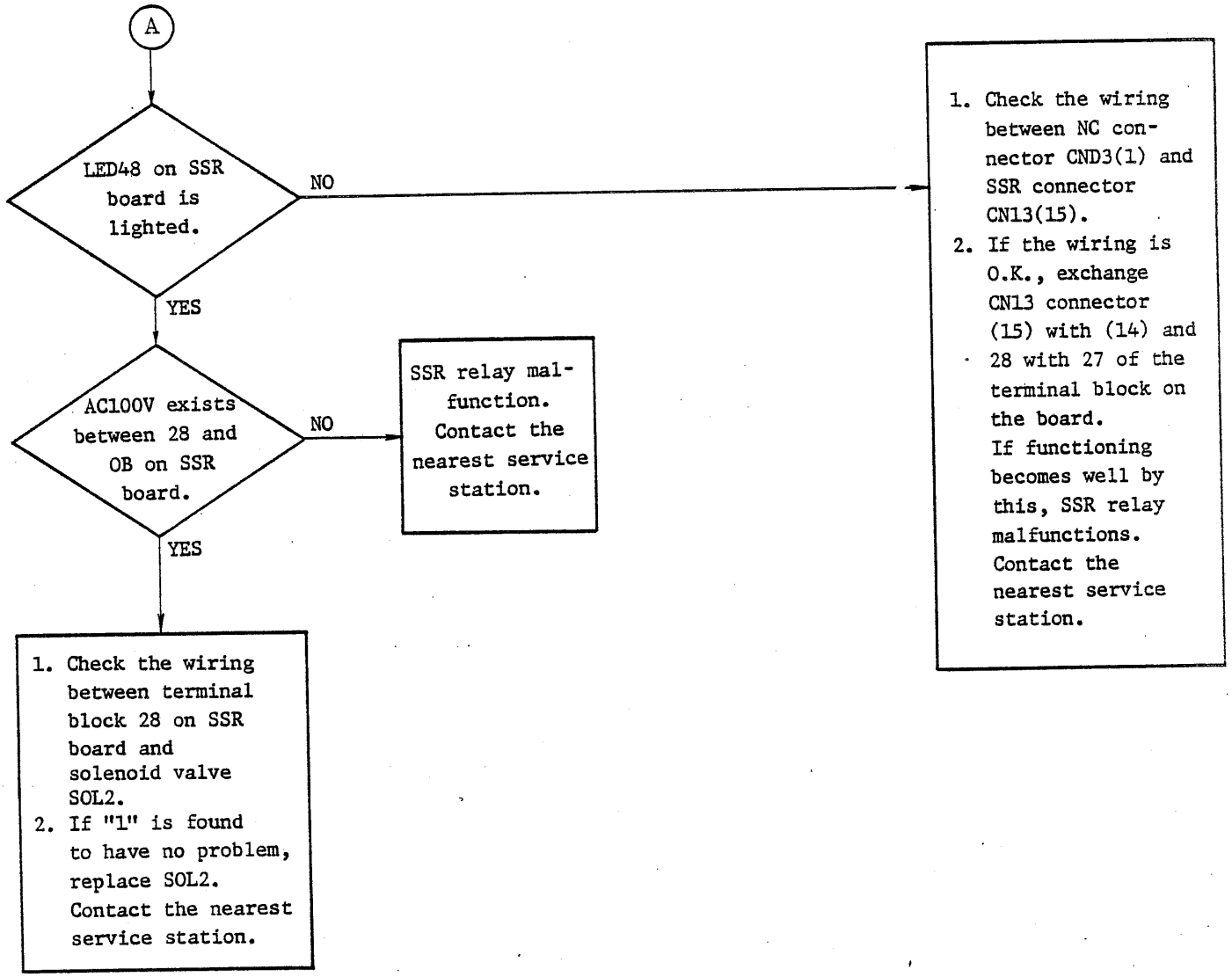



A
DIAGNOSIS display H42-1 "1"
NO
YES
Relay TDF is functioning.
NO
Repair the wire disconnection between the NC connector CND3 (37) and the relay TDF No. 8.
YES
Relay TLOFF is functioning.
NO
Repair the wire disconnection between the NC connector CND3 (9) and the relay TLOFF No. 8.
YES
AC100V exists between TB1-7 and OB on terminal box.
NO
1. Check if the circuit protector is operated normally.
2. Check the wiring between the circuit protector and the relay TLOFF No. 5.
YES
AC100V exists between OB and the line No. 30B on terminal box.
NO
Check the wiring between the relay TLOFF No. 3 and the relay TDR No. 1.
YES
B
DIAGNOSIS display H11B-7 "1"
NO
Enter "1" for the parameter MP2-7.
YES
DIAGNOSIS display HE-1 "0"
YES
Check the version display on the DIAGNOSIS picture and contact the nearest service station
NO
Disconnect TB3 and TDRE from the terminal box. Load has become "0".
YES
1. Check the wiring of the tool setter arm retract sensor.
2. Tool setter arm retract sensor malfunctions. Replace the sensor.
NO
Check the wiring between the NC connector CND4 (44) and the terminal box TB3 TDRE.

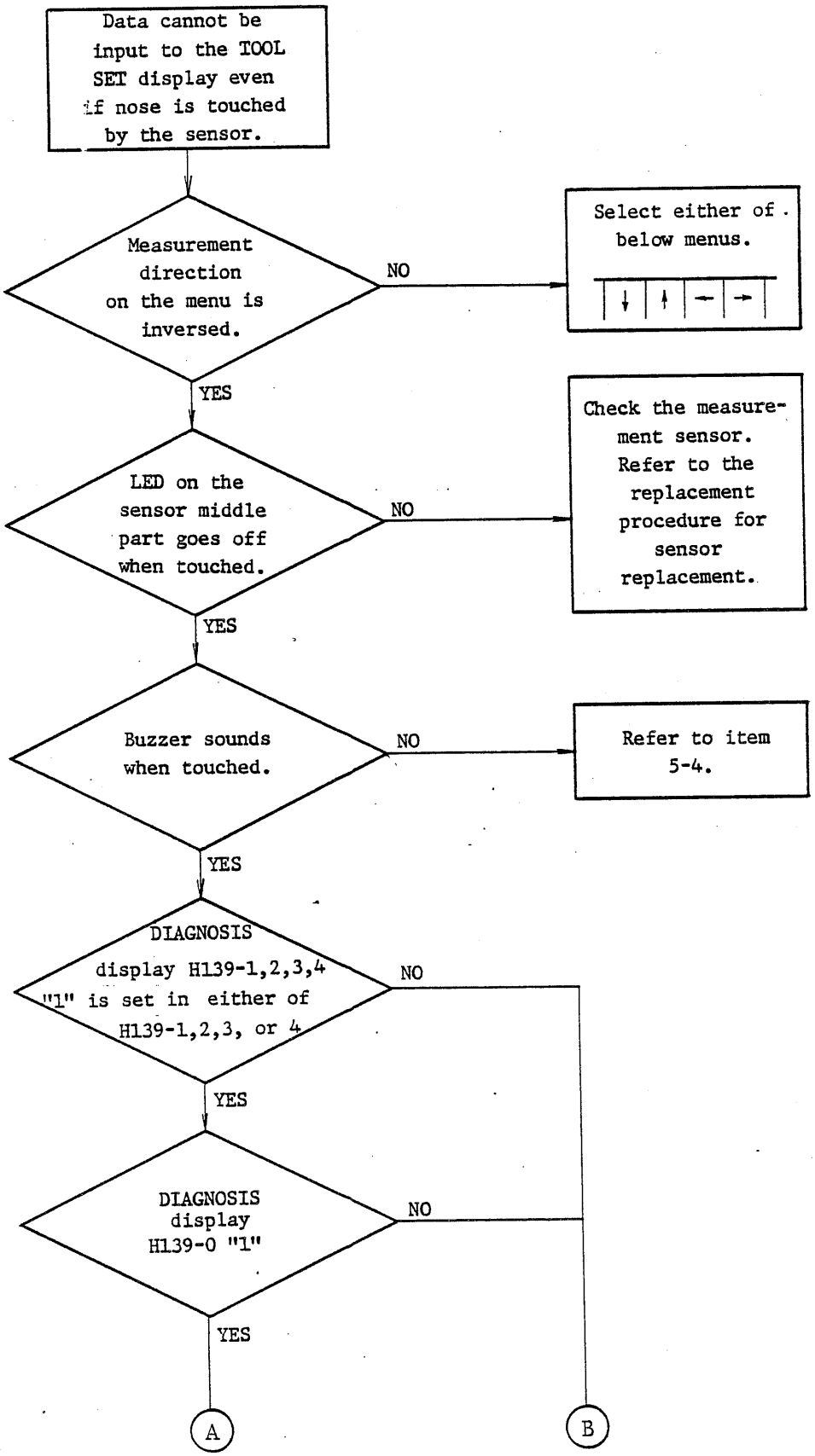

B
AC100V exists between OB and line No. 30A on terminal box.
NO
Check the wiring between the relay TDR No. 5 and the relay TDF No. 5.
YES
AC100V exists between TB1-30 and OB on terminal box.
NO
Check the wiring between TB1 30 on terminal block and the relay TDF No. 3.
YES
1. Check the wiring between TB1 30 on terminal block and the tool setter motor.
2. Replace the tool setter motor capacitor C4.
3. Replace the tool setter arm.

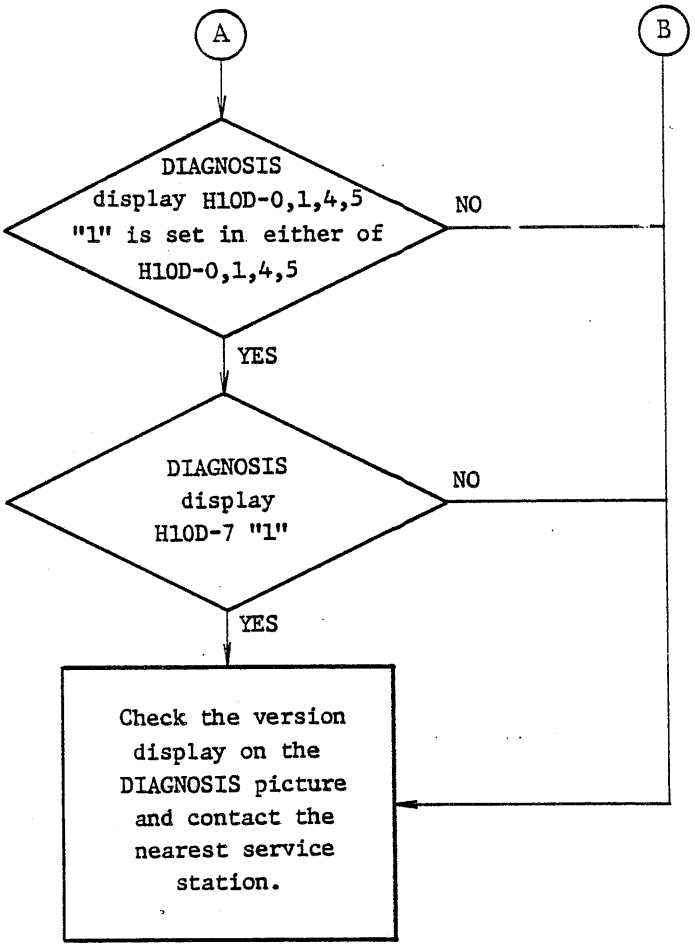
(2) No Air is Available for Measurement.



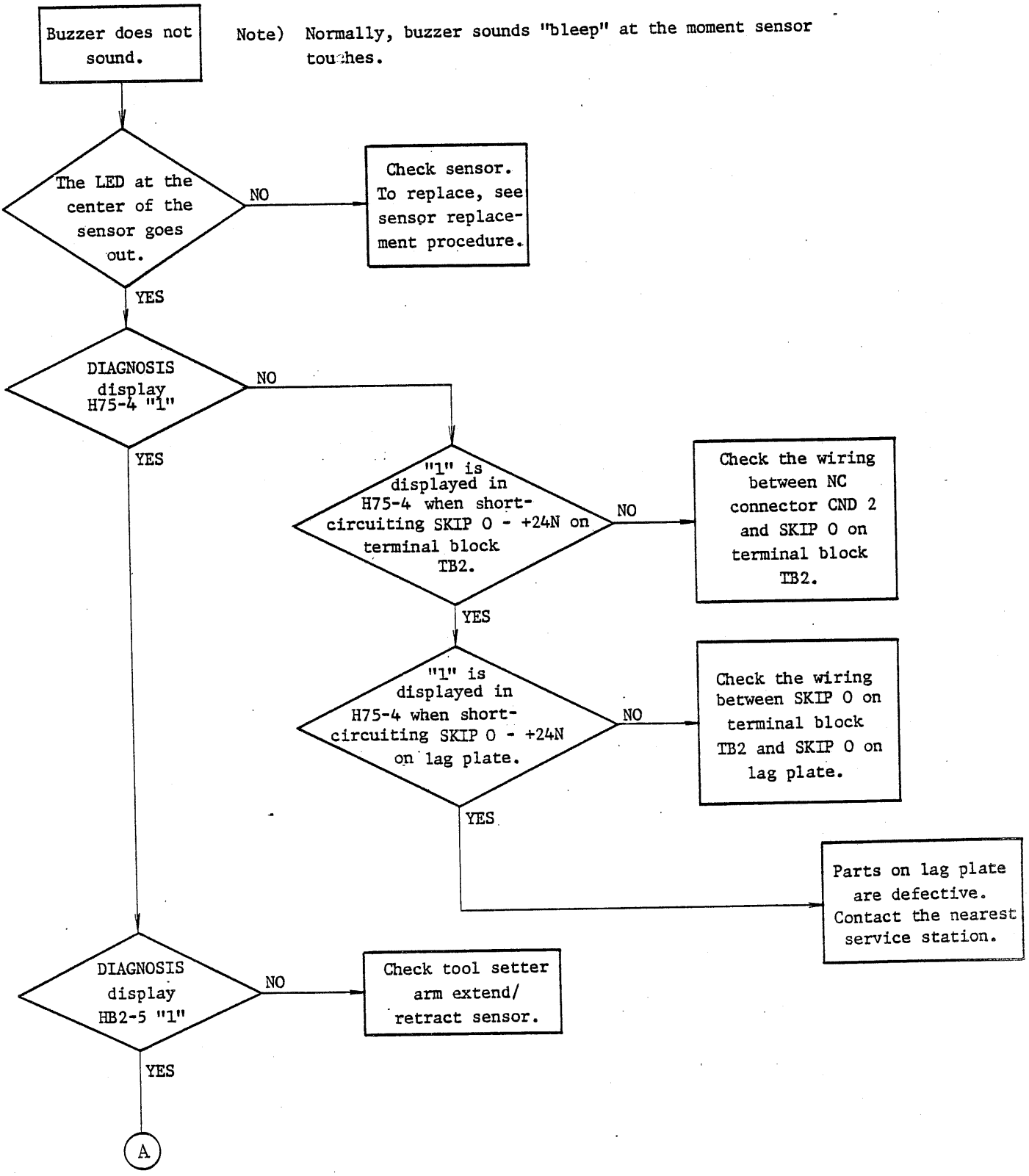

A
LED48 on SSR board is lighted.
NO
YES
1. Check the wiring between NC connector CND3(1) and SSR connector CN13(15).
2. If the wiring is O.K., exchange CN13 connector (15) with (14) and 28 with 27 of the terminal block on the board.
If functioning becomes well by this, SSR relay malfunctions.
Contact the nearest service station.
AC100V exists between 28 and OB on SSR board.
NO
SSR relay malfunction.
Contact the nearest service station.
YES
1. Check the wiring between terminal block 28 on SSR board and solenoid valve SOL2.
2. If "1" is found to have no problem, replace SOL2.
Contact the nearest service station.

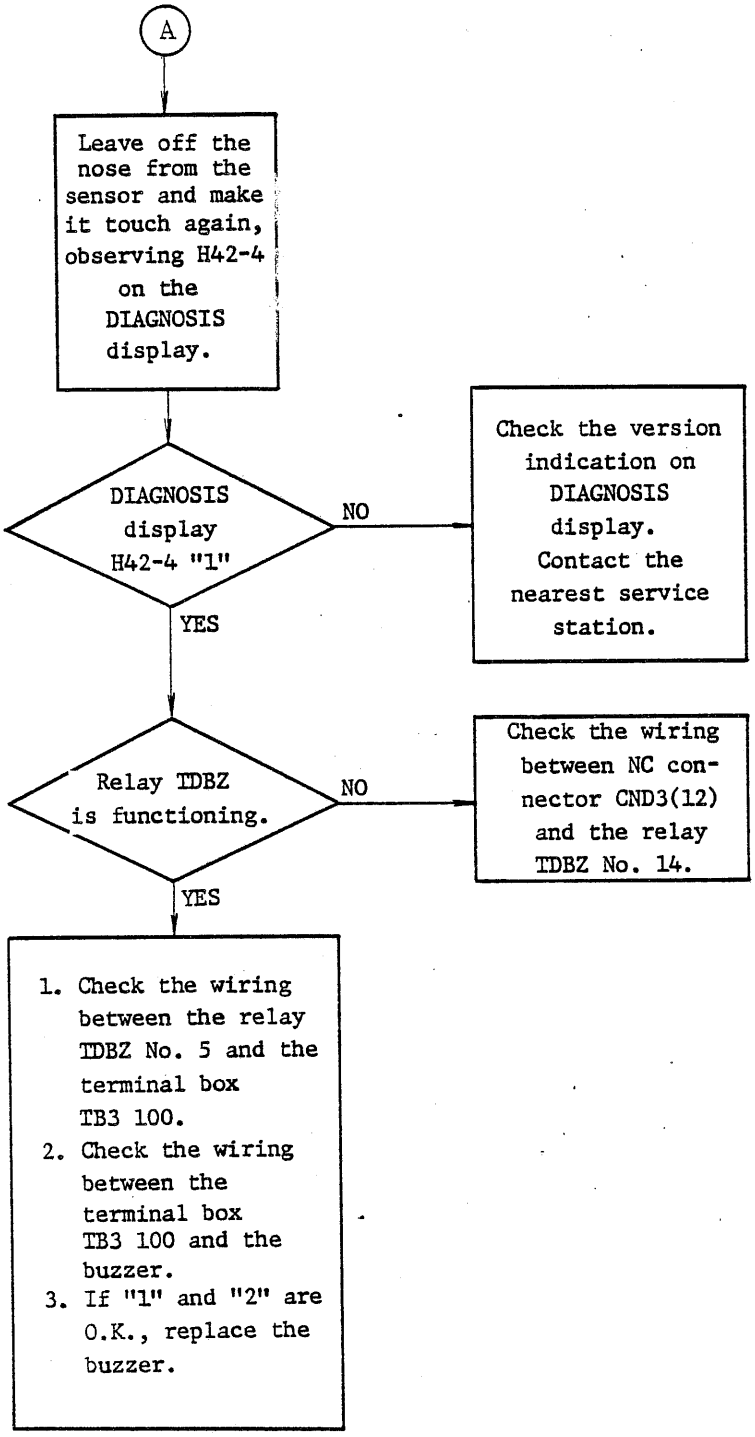
(3) Data cannot be entered on the TOOLSET Screen even if the Tip Touches.



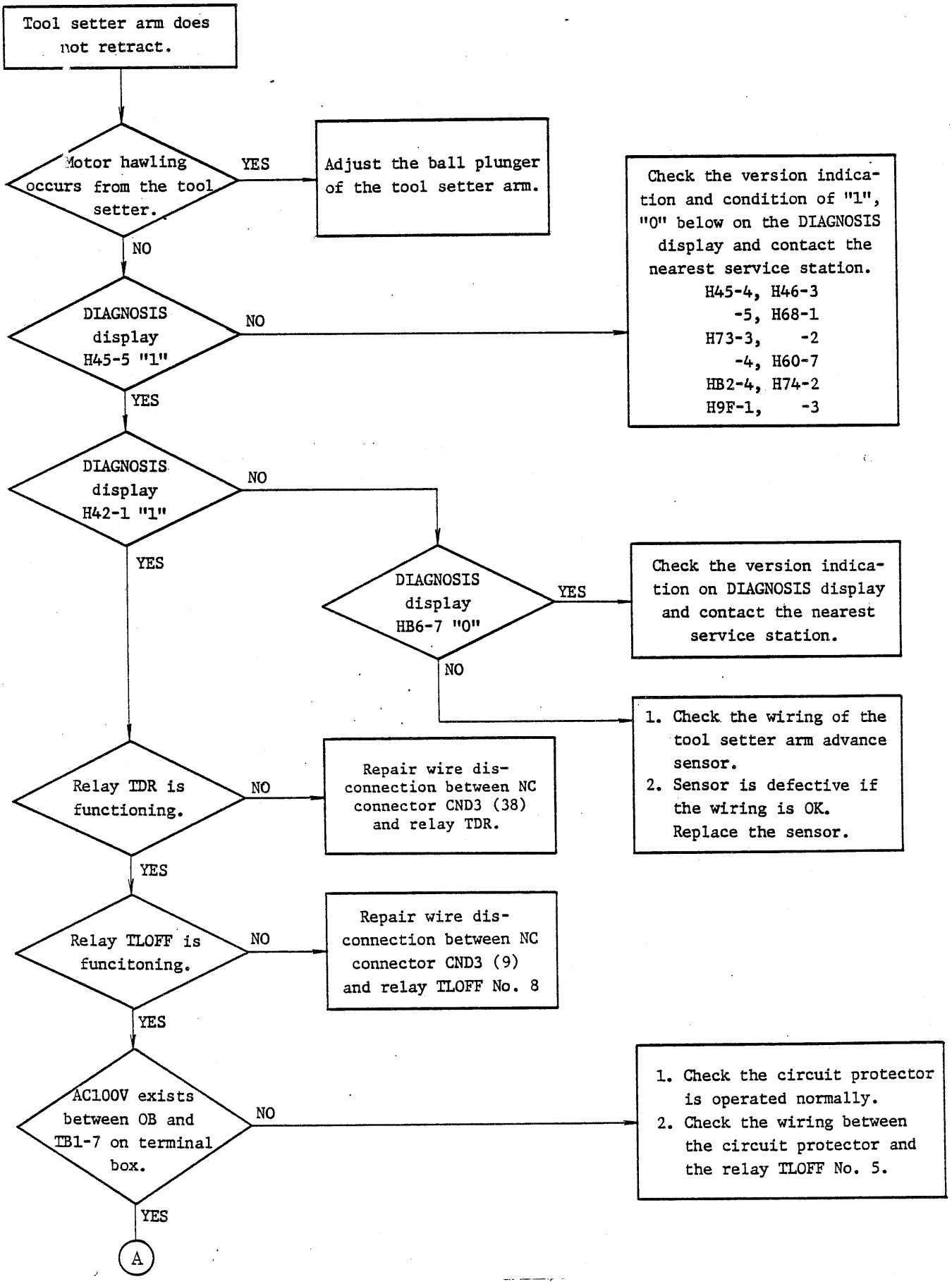

A
B
DIAGNOSIS
display H10D-0,1,4,5
"1" is set in either of
H10D-0,1,4,5
NO
YES
DIAGNOSIS
display
H10D-7 "1"
NO
YES
Check the version
display on the
DIAGNOSIS picture
and contact the
nearest service
station.

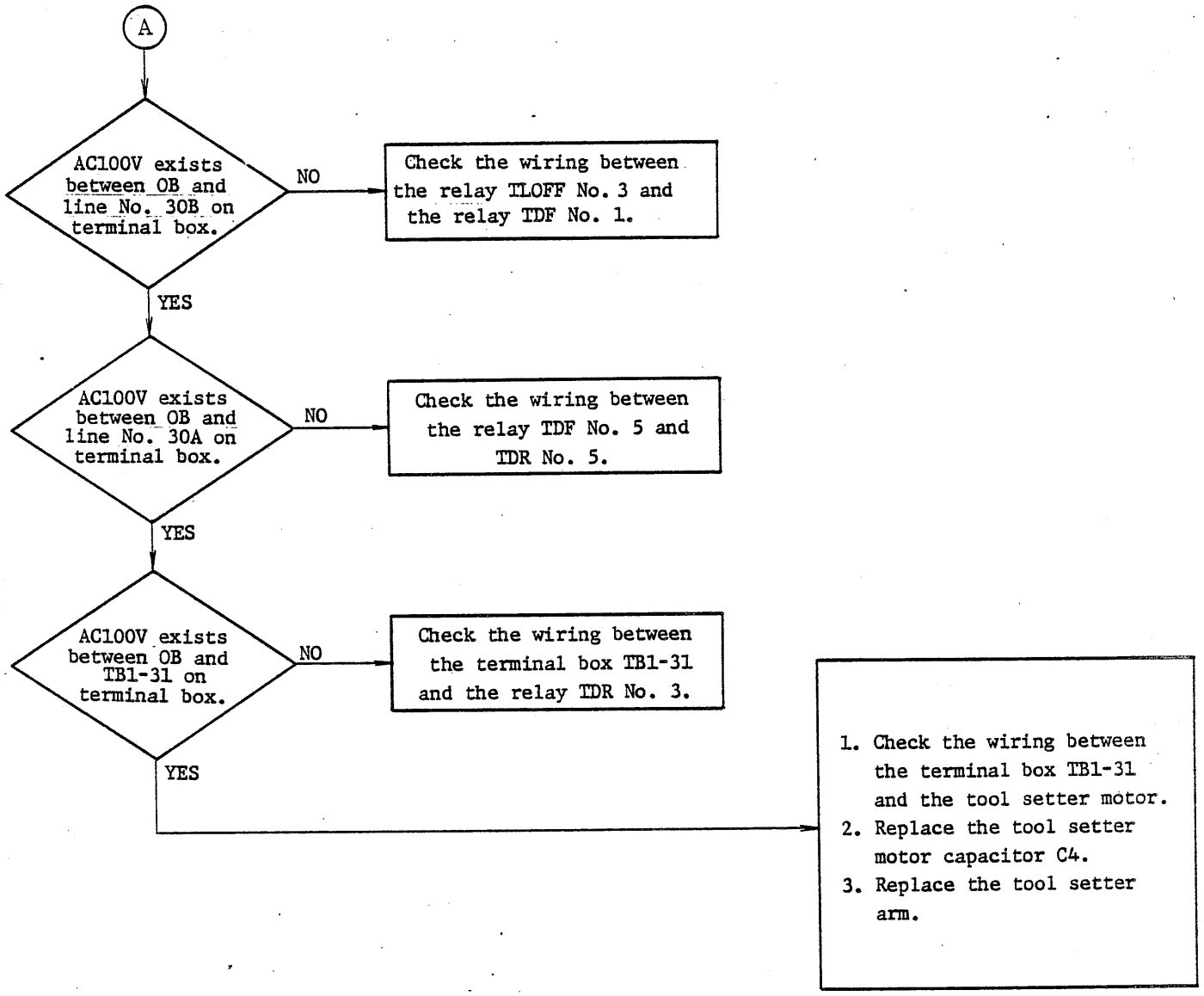
(4) Buzzer does not Sound when Measurement Data are enterd.



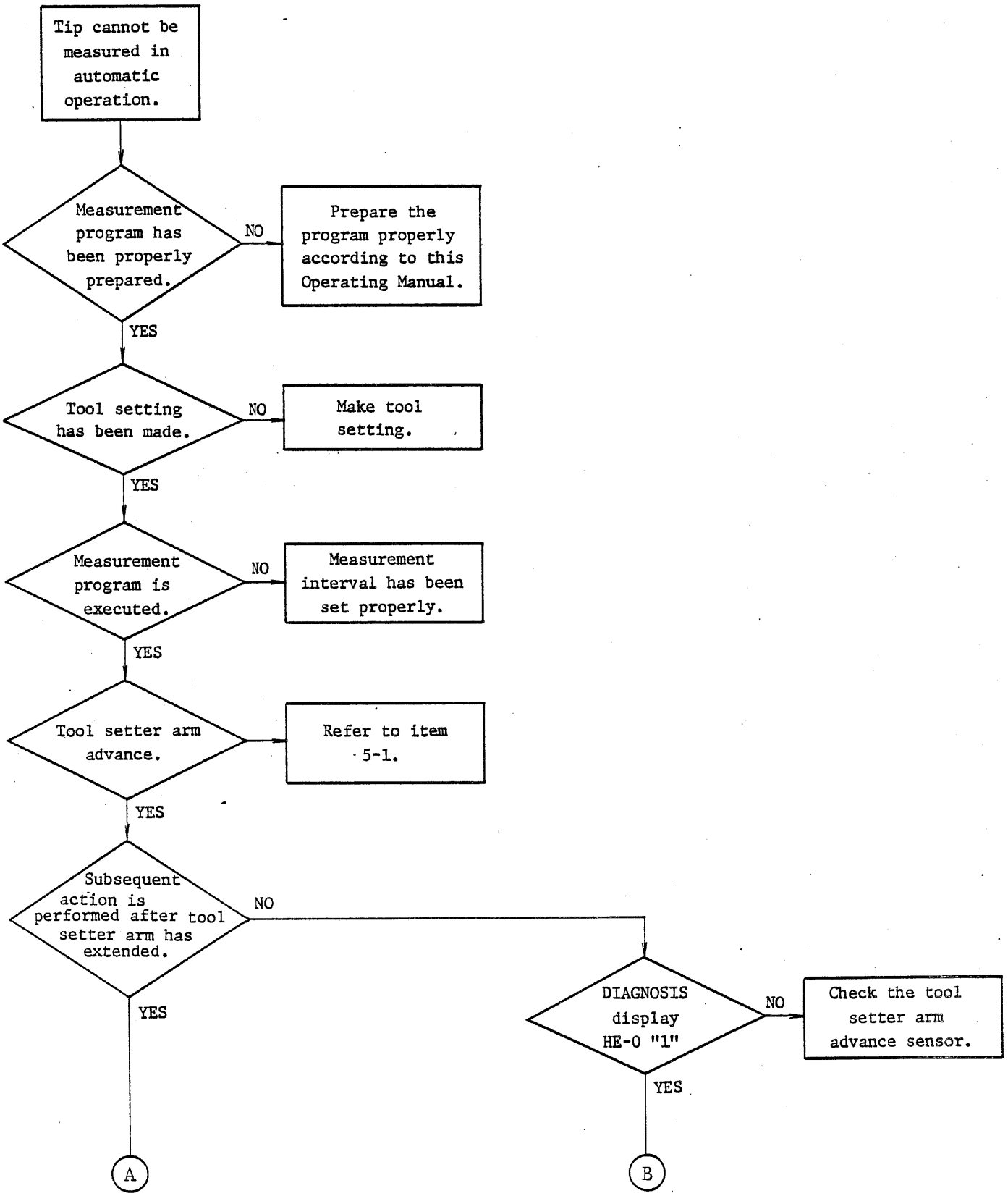

A
Leave off the nose from the sensor and make it touch again, observing H42-4 on the DIAGNOSIS display.
DIAGNOSIS display H42-4 "1"
NO
Check the version indication on DIAGNOSIS display. Contact the nearest service station.
YES
Relay TDBZ is functioning.
NO
Check the wiring between NC connector CND3(12) and the relay TDBZ No. 14.
YES
1. Check the wiring between the relay TDBZ No. 5 and the terminal box TB3 100.
2. Check the wiring between the terminal box TB3 100 and the buzzer.
3. If "1" and "2" are O.K., replace the buzzer.

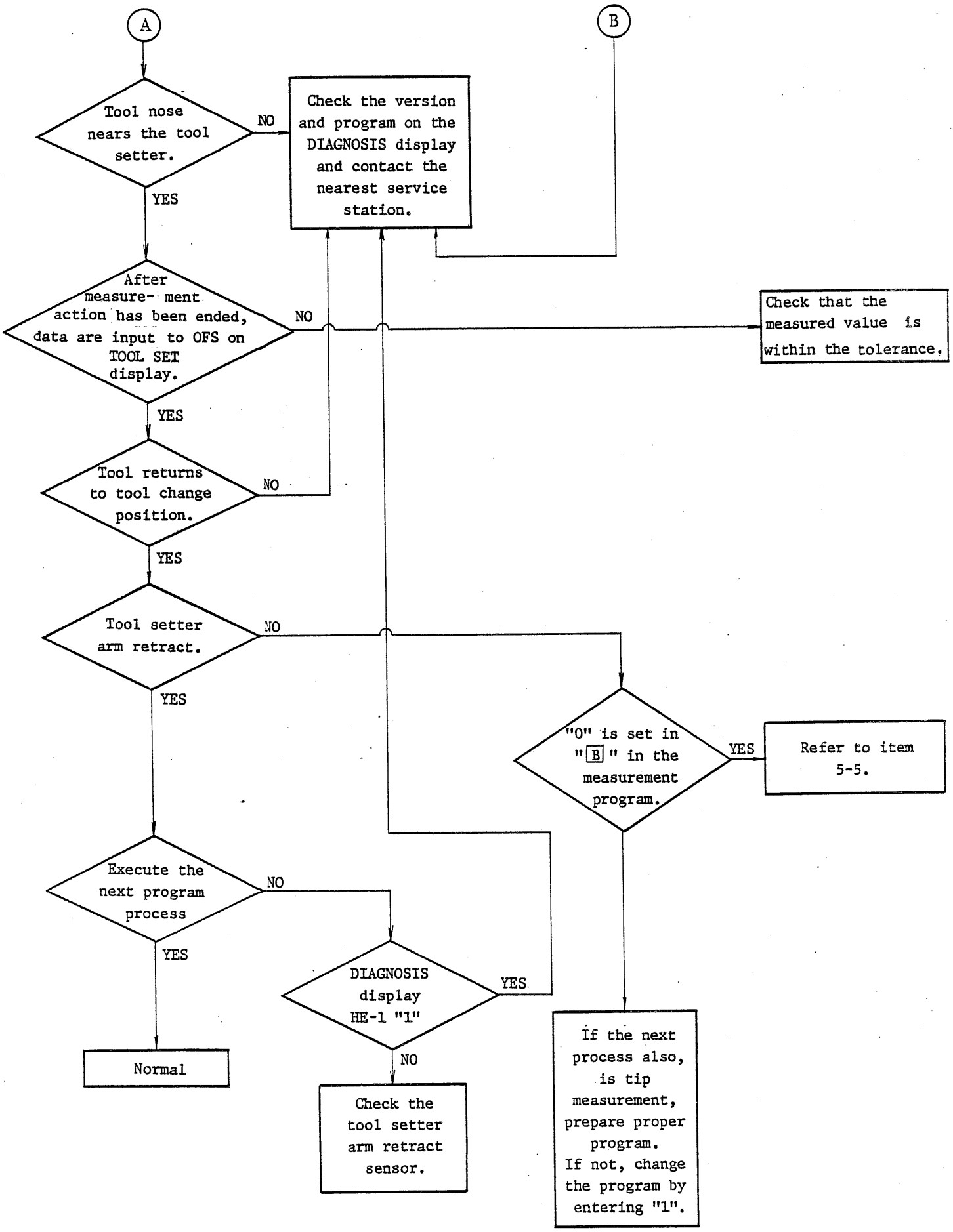
(5) Tool Setter Arm does not reverse.




A
AC100V exists between OB and line No. 30B on terminal box.
NO
Check the wiring between the relay TLOFF No. 3 and the relay TDF No. 1.
YES
AC100V exists between OB and line No. 30A on terminal box.
NO
Check the wiring between the relay TDF No. 5 and TDR No. 5.
YES
AC100V exists between OB and TB1-31 on terminal box.
NO
Check the wiring between the terminal box TB1-31 and the relay TDR No. 3.
YES
1. Check the wiring between the terminal box TB1-31 and the tool setter motor.
2. Replace the tool setter motor capacitor C4.
3. Replace the tool setter arm.

(6) Tip cannot be measured in Automatic Operation Mode.




A
B
Tool nose nears the tool setter.
NO
Check the version and program on the DIAGNOSIS display and contact the nearest service station.
YES
After measure- ment action has been ended, data are input to OFS on TOOL SET display.
NO
Check that the measured value is within the tolerance.
YES
Tool returns to tool change position.
NO
YES
Tool setter arm retract.
NO
YES
"0" is set in "B" in the measurement program.
YES
Refer to item 5-5.
Execute the next program process
NO
YES
DIAGNOSIS display HE-1 "1"
YES
NO
Normal
Check the tool setter arm retract sensor.
If the next process also, is tip measurement, prepare proper program.
If not, change the program by entering "1".

10-4 Alarm

Tool setter alarms are as follows.

Alarm No.	Message	Contents	How to release
181	MEASURE alarm	Tool measurement sensor does not turn on when the measurement has been completed. (In semi-automatic mode)	R
182	MEASURE SENSOR alarm	(1) Sensor turns on outside the measurement range. (In semi-automatic mode) (2) Sensor turns on during tool setting although no measurement dimensions have been selected. (In manual mode)	R
183	OFFSET alarm	Measurement error exceeds the maximum tolerance. (In semi-automatic mode)	R
184	OFFSER OVER	Measurement error exceeds half the tolerance range. (In semi-automatic mode)	R
278		CYCLE START switch is pressed when the tool setter forward sensor is ON.	R/C
284		RAPID or ZERO RETURN mode switch is pressed when both the "TOOL SET MEASURE" menu and the measurement direction are inverted.	R/C
287		(1) Forward or backward sensor does not turn on within 10 seconds of the start of the tool setter arm forward or backward movement. (2) Forward and backward sensors turn on simultaneously.	R/C
289		On Universal specification machine, the tool setter arm forward command is given when the tail spindle backward LED on the operation panel is not on.	R/C
291		On a Universal specification machine, an attempt was made to move the trail spindle forward when the tool setter arm backward sensor was not ON.	R/C

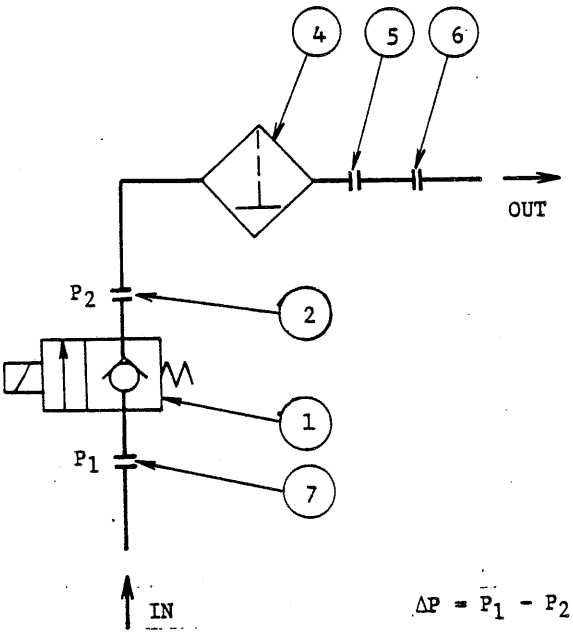
Note) No alarm message is given for alarm numbers 278, 284, 287, 289 and 291.

Note) How to release:

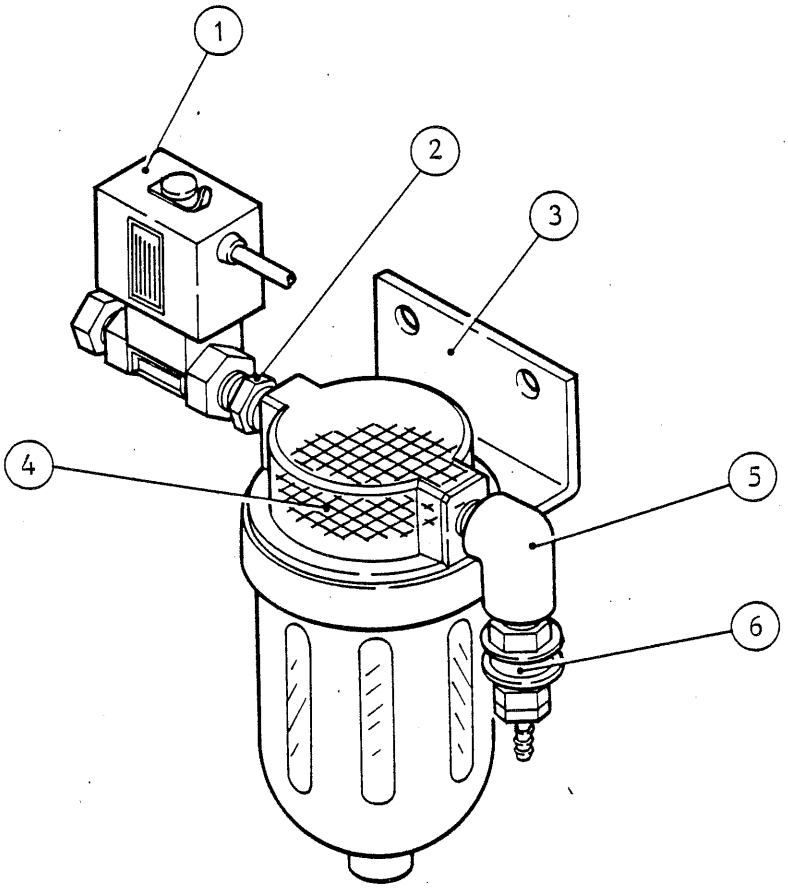
Use: R ..... RESET key

R/C ... RESET or CANCEL key

10-5 Tool Setter Air Blast Control Circuit 10N. (141) & 20N (142)



$\Delta P = P_1 - P_2 =$ (kg/cm^2)



No.	Part No.	Part Name	Maker	Q'ty
1	VX2130-021G	Solenoid valve	SMC	1
2	PT 1/4	Nipple	HITACHI	1
3	B-44	Bracket	SMC	1
4	AF211-02	Filter	SMC	1
5	DAV02	Elbow F/M	AOI	1
6	20PM30SH	Coupler	NITTOH	1
7	BUT 1/4 x 1/8	Bushing		1