



W/B Processing Tolerance Creation Standard

KES S – R212

(EST.) 1987 – 03 – 01

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1. Processing tolerance creation standard

1.1 Prolog

Parts assembly tolerance (Parts assembly tolerance table) is made by the data, in doing design manufacture of a demand, to satisfy condition about several dimension grades that is demanded with parts in advance, as analyzing it with definite numerical value, to reflect in demanded design manufacture for the data.

Also, it is important as flowing item that taking knowledge about the processing tolerance.

- * You are acquainted with a requirement as making a vehicle. In short, it is a prerequisite for body engineer.
- * You are acquainted with a extent as making a parts. Eventually, it is a requirement for designer.
- * There is no the progress of work etc. that does not think a demand degree. Cause, it is a prerequisite for engineer.

Thus, processing tolerance is very important not only for plan design to do but also for confirmation of early part investigation result at the check part, which it is use of the standard until proper inspection id decided.

This manual combines a guide to educate a creator short-term as soon as possible uniting upper the point and the purpose. It is the standard book of the tolerance creation, which it makes out standard items of the tolerance creation.

1.2 Scope of tolerance creation

(1) Scope of tolerance table preparation publication

Sorts of tolerance table \ Parts drawing	Investigation drawing	Advance drawing	Production drawing
Movement tolerance specification parts list	O	O	O
Parts tolerance table, demand designing outside official from the investigation drawing only	O		
Parts tolerance table, inside official only	O		
Parts tolerance table, demand designing inside official from the advance drawing only		O	
Assembly parts tolerance table, outside official only		O	
Assembly tolerance		O	
Parts tolerance, which is established newly from advance drawing, outside official only		Interior (i) Exterior (e)	
Parts tolerance, which is established newly from production drawing, outside official only			Interior (i) Exterior (e)
Parts tolerance, which it isn't pass by flow	Mediate for a demand in each time.		

(2) Scope of tolerance creation

Establish tolerance under item only, it dose not establish with the exception of this as scope of a demand guarantee (Only guarantee).

- (a) Direction of exterior tolerance
- (b) Direction of interior tolerance
- (c) Direction of design explanation data and design drawing
- (d) Direction of complete standard
- (e) Direction of protection significant parts list
- (f) Direction of waterproof and rust prevention concern sensible drawing
- (g) Direction of movement tolerance specification parts list
- (h) The thing that satisfy body assembly manual No 1, 2

(i) The thing that satisfy various kind of connection condition

- ① Connection of spot
- ② Connection of bolt
- ③ Connection of hemming
- ④ Connection of ARC, GAS welding
- ⑤ Connection of WGW welding
- ⑥ Connection of fastener and clip
- ⑦ Filling material coating face
- ⑧ Connection face of adhesive and tape
- ⑨ Seal face
- ⑩ Others (Attached etc. of rubber parts)

(j) Hole drawing locations of longitude and latitude, and pitch tolerance

(k) Flange width tolerance for intensity insurance

(l) Position of a tan, tolerance of depth, and trim tolerance

(m) The thing about width, height, overall length restriction

1.3 Precondition of tolerance creation

- (1) This manual is published, targets the panel thickness is less than 1.6mm.
- (2) Because tolerance range, size, and usage cannot calculate theoretically, calculate it according to past actual results. Thus if it is within tolerance as connection state of cross-parts, it generates adjustment within tolerance; you should create tolerance on the assumption that adjustment within tolerance is possible.
- (3) To manufacture parts that does not alter drawing dimension, it is to be symmetry tolerance in principle.
- (4) It does not alter tolerance that is indicated product drawing. The thing that is necessary to alter is to be evaluation object.

(5) In case of creating movement tolerance as product technical treatment, maximum movement is to be 2.0m/m.

Thus, distance from the drawing dimension to the center of tolerance is not over this.

(6) Scope of guarantee only that does not create tolerance shows as following table.

	Face	Flange width	Trim coming and going	Hole		
				Diameter	Location of resin	Pitch
Tolerance	± 2.0	± 2.0	± 2.0	± 2.0	2.0	± 2.0

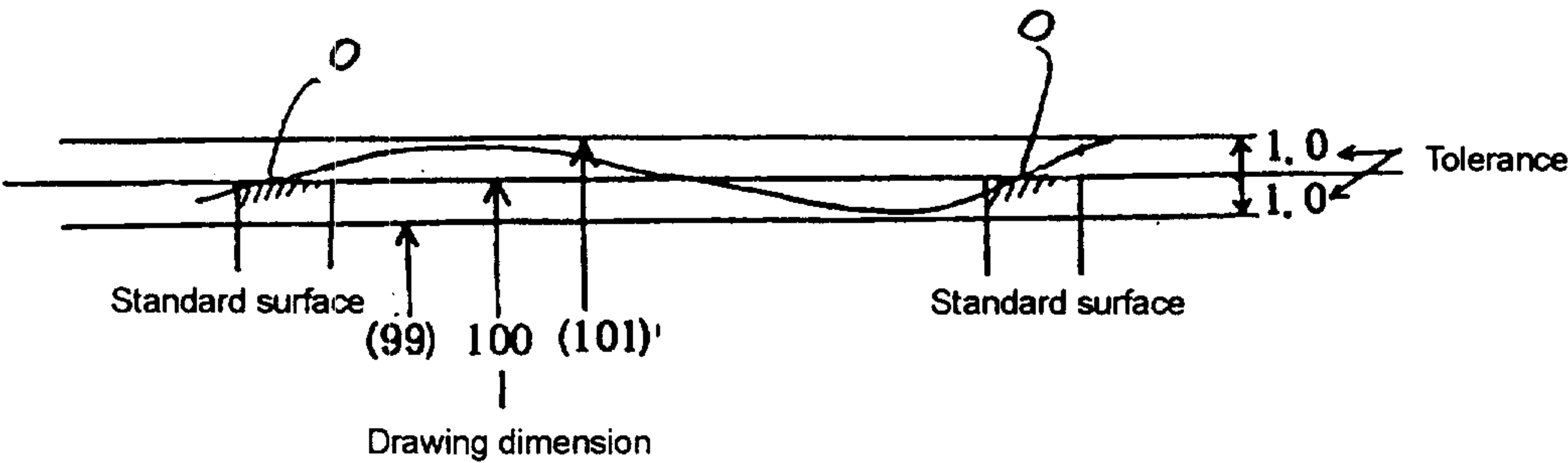
(7) As passing over scope of guarantee only, in case of obstruction of assembly rarely, the thing that is guaranteed within the above tolerance as adjusting pertinent part.

(Adjusted dimension with quality control department)

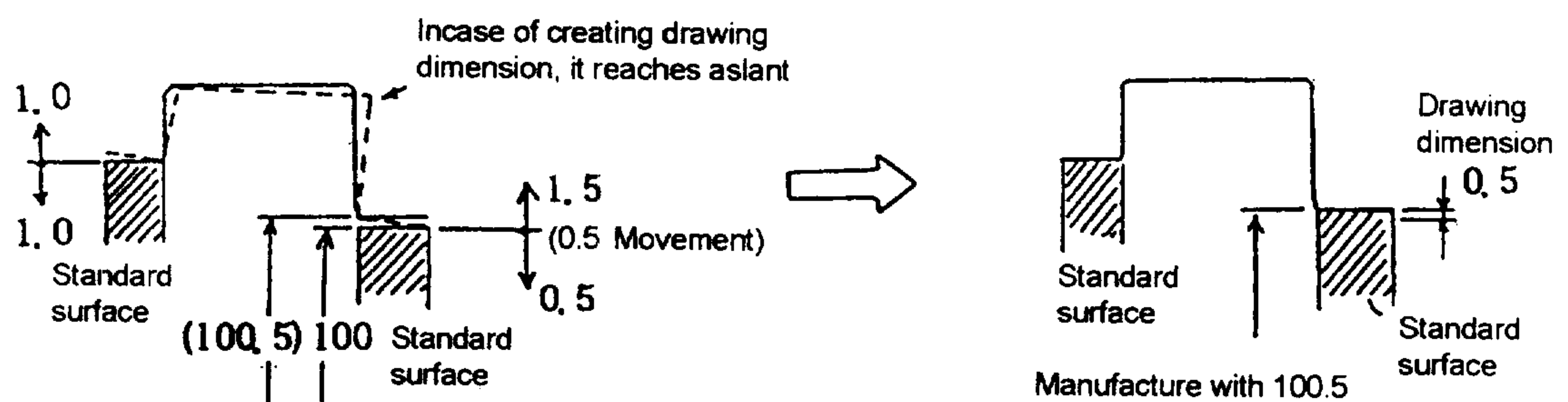
(8) In case of requesting degree over construction process of only, it create tolerance assuming spot fit.

(9) Consideration of tolerance of the face including plane of reference (&, S)

(a) In case of existing symmetry tolerance at the face including plane of reference, tolerance is to be 0 with plane of reference; it indicates allowance of upper and lower limit with other parts. (It dose not permit inclination)



- (b) In case of existing movement tolerance at the face including plane of reference, because products is made in a target of the center of tolerance, plane of reference in each demand creates as moving quantity from drawing dimension to the center of tolerance. But, because it does not create as moving a measurement line, tolerance does not change.



- * Treat as the same thing about standard floor (E, e), correction standard (CK), inspection tool bedplate (CO), measuring tools bedplate (J) etc.

(10) Concerning spring back

Because processing tolerance creates necessary tolerance according to the relation of parts facing each other, with the same shape against inferior situation of other plastic deformation about spring back, it does not consider especially for tolerance creation.

Thus, because quantity of spring back is include tolerance, if it escapes from tolerance , you should consider a counterplan to hold within tolerance.

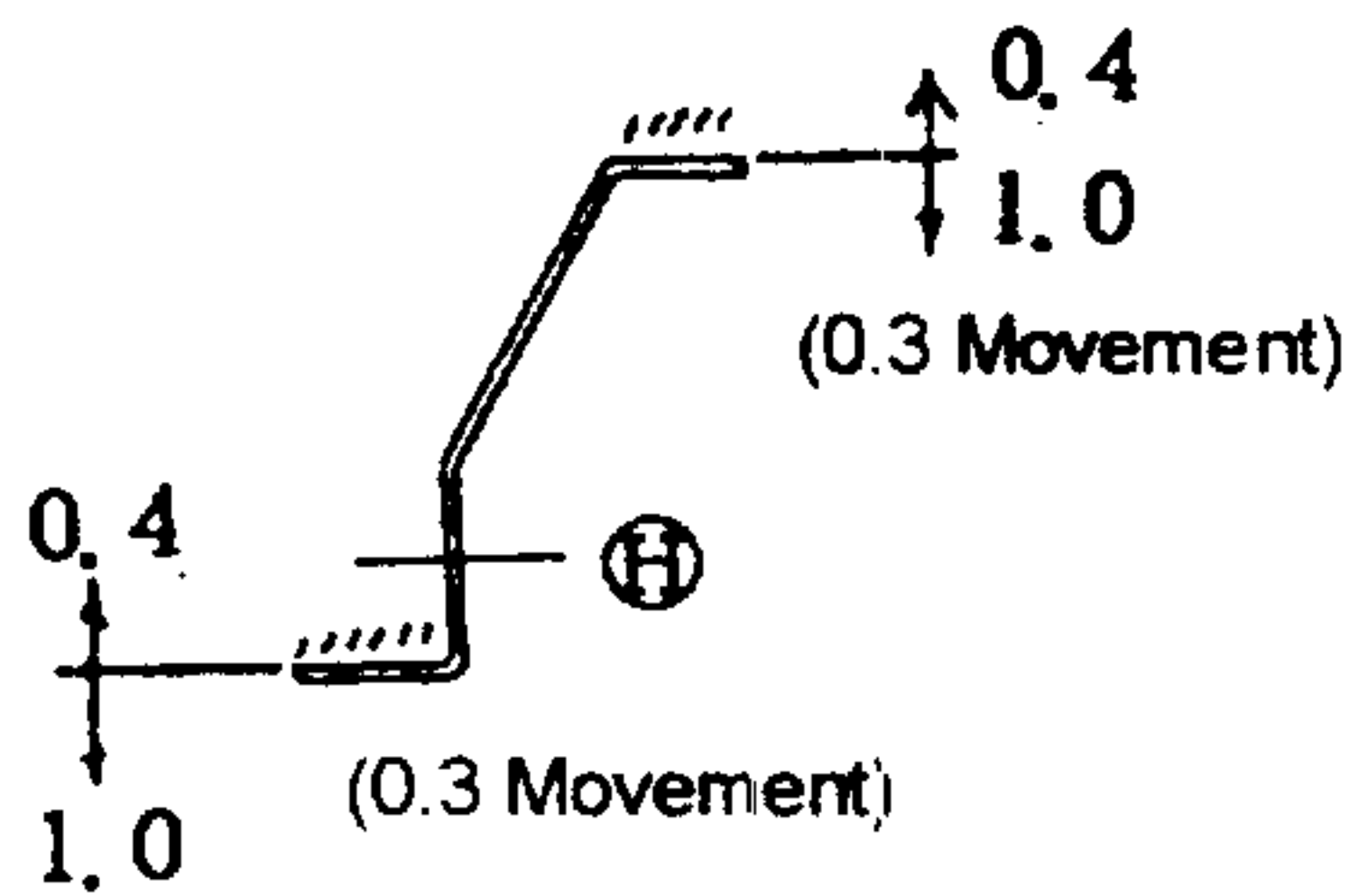
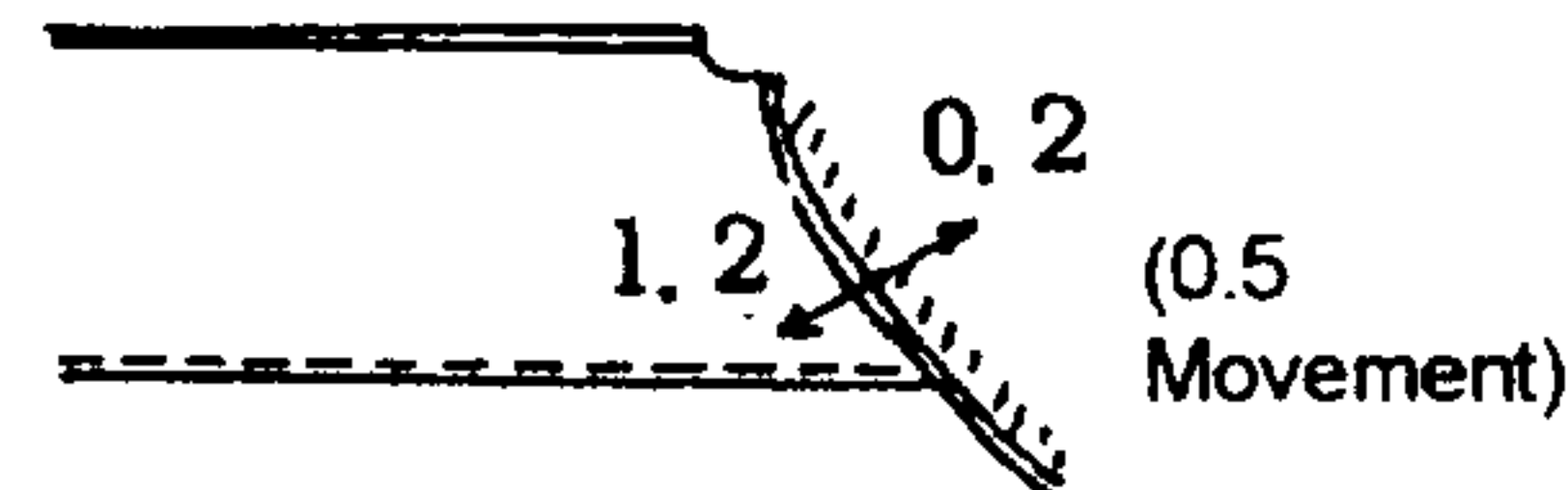
(Except special section of summation)

(11) Treatment of tolerance value of movement

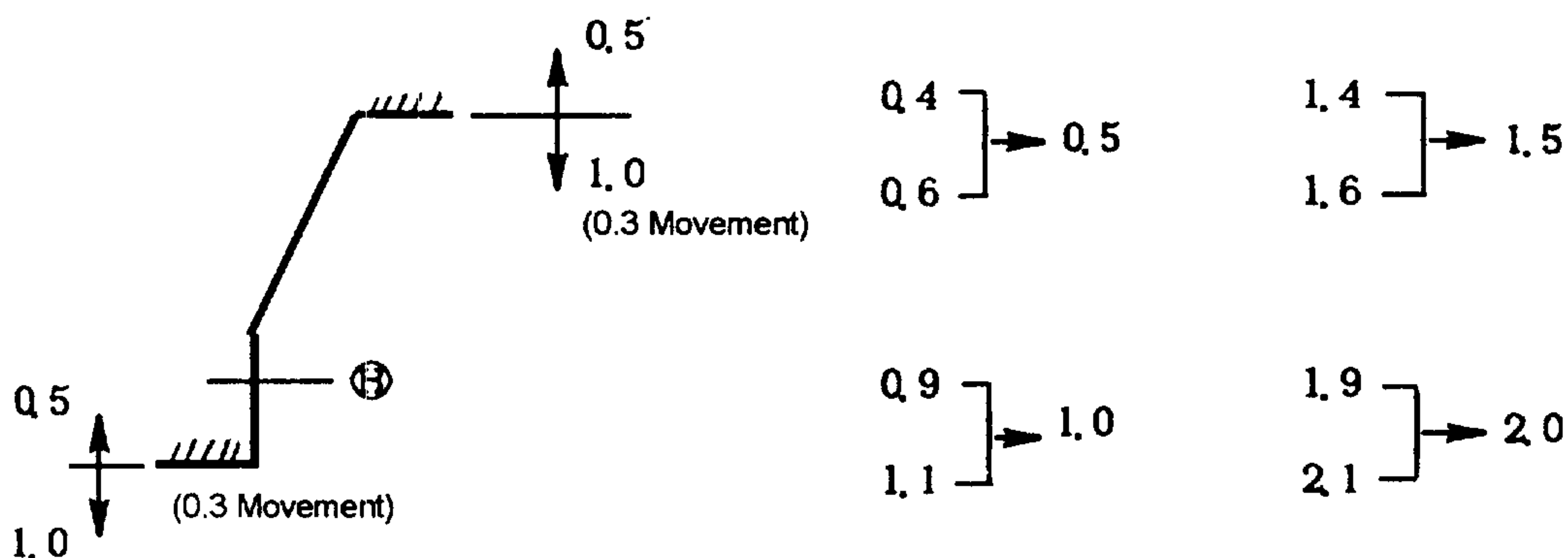
As creating tolerance, it should specify as follows about treatment of tolerance value in case of applying to movement tolerance.

The thing of 「Movement tolerance specification parts list 」 should be moved enough by quantity that is applicable to the center of tolerance.

Example :



However, it should be multiple tolerances by 0.1m/m from operation range of $\pm 0.1\text{m/m}$ at examination standard book published the quality management department.



(12) Concerning movement quantity of convicted movement tolerance

Movement quantity of convicted movement tolerance shall specify as follows.

(a) Tolerance of platform depth ($^{+0.5}_0$) is to be the center of tolerance with $+0.25\text{m/m}$, movement quantity shall be 0.3m/m as rounding off the numbers to two decimal places.

(b) Concerning hole diameter tolerance ($^{+0.5}_0$), movement quantity shall be 0.2m/m as considering standard punch diameter.

Moreover, concerning hole diameter tolerance ($^{+0.2}_0$), movement quantity shall be $+0.1\text{m/m}$ to aim at the center of tolerance; it is regardless of standard punch diameter.

(c) Notch depth ($^{+0}_{-3.0}$) of waterproof counterplan place of trim tolerance is to be below 1.0m/m to aim that movement quantity shall be 2.0m/m .

(d) Concerning platform depth tolerance of exterior panel WGW part ($^{+0}_{-0.4}$), movement

quantity shall be -0.2m/m to aim at the center of tolerance.

(13) Concerning general tolerance

Add cumulative tolerance that displays without dimension at the examination report of parts as based on tolerance of KS ordinary grade, there is under table approaching at the present situation.

In case of generating assembly problem at the part that does not create tolerance, it can adjust within following tolerance. However, if you hope to whole place and special specific character, whether you create pertinent data as extracting at the following table, if it has the same condition of the past model, create tolerance with reference to this.

Application Process division accumulation division		Dimension division Error accumulation division			Less than 30			30 ~ 100			100 ~ 300			300 ~ 1000		
					KS	A type	B type	KS	A type	B type	KS	A type	B type	KS	A type	B type
Position tolerance at standard Width, length, height, hole pitch, blanking exterior, hole	Process 1				± 0.5	± 0.9	± 1.0	± 0.7	± 1.1	± 1.2	± 1.0	± 1.4	± 1.5	± 1.5	± 1.9	± 2.0
	Process 2				± 0.7	± 1.1	± 1.2	± 1.0	± 1.4	± 1.5	± 1.4	± 1.8	± 1.9	± 2.1	± 2.5	± 2.6
	Process 3				± 0.9	± 1.3	± 1.4	± 1.2	± 1.6	± 1.7	± 1.7	± 2.1	± 2.2	± 2.6	± 3.0	± 3.1
General shape except a circle	Process 1				± 0.8	± 1.2	± 1.3	± 1.1	± 1.5	± 1.6	± 1.6	± 2.0	± 2.1	± 3.4	± 2.8	± 2.9
	Process 2				± 1.1	± 1.5	± 1.6	± 1.6	± 2.0	± 2.1	± 2.3	± 2.7	± 2.8	± 3.4	± 3.8	± 3.9
	Process 3				± 1.7	± 2.1	± 2.2	± 1.9	± 2.3	± 2.4	± 2.8	± 3.2	± 3.3	± 4.2	± 4.6	± 4.7

(* When evolving to examination standard book, it arrange with 0.5 multiple over ± 0.5 , ± 0.7 , ± 1.0 rounding off the numbers to three decimal places.)

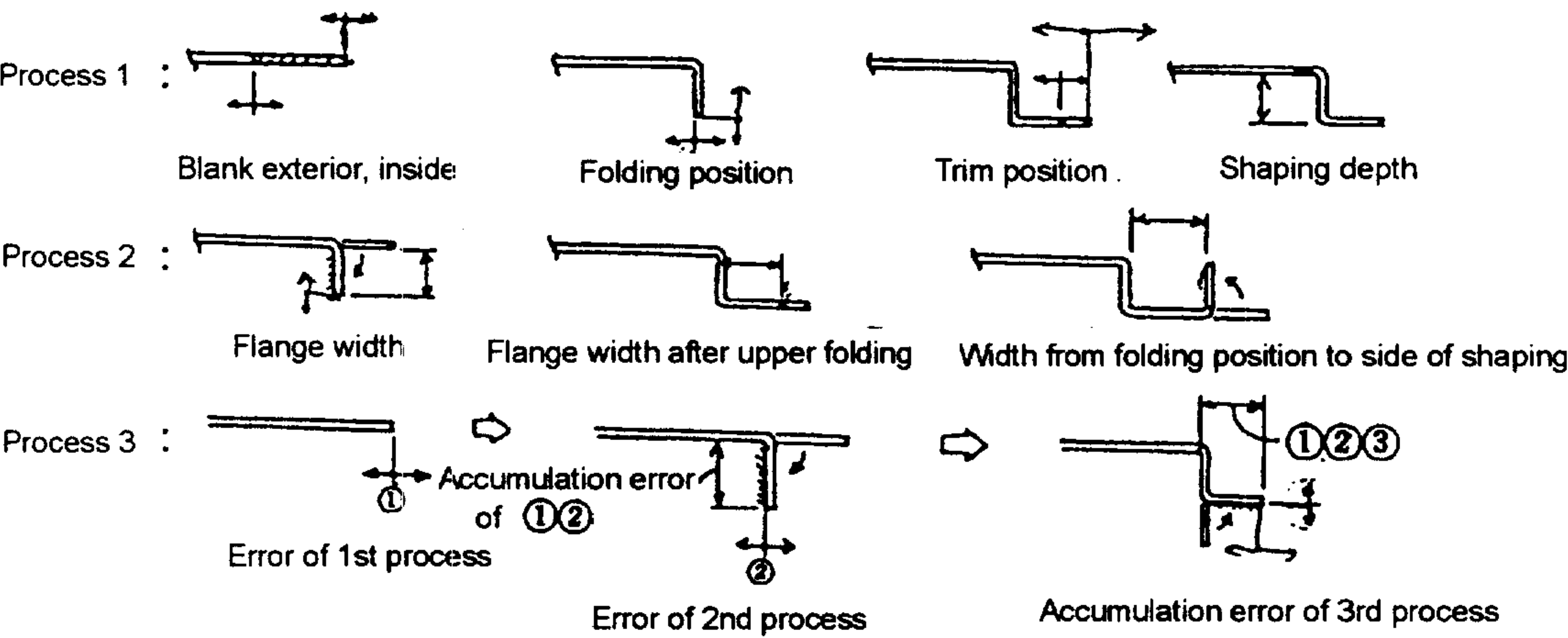
* Explanation of error accumulation division

KS : The thing that can ignore because error of investigation tool and measurer is small.

A type : The thing that adds error of investigation tool and error of measurer at tolerance of the ordinary grade.

B type : The thing that adds error of dimensions table, error of investigation tool and error of measurer at tolerance of the ordinary grade.

• Explanation of process accumullation division



1.4 Parts processing tolerance table preparation process

(1) Basic data concerning tolerance creation

(a) Parts drawing earlier

(The whole number including design parts) (Design)

(b) Exterior tolerance, interior tolerance (Design-quality management)

(c) Design explanation data (Design)

- Production attention point
- Structure explanation drawing
- Body shell drawing etc.

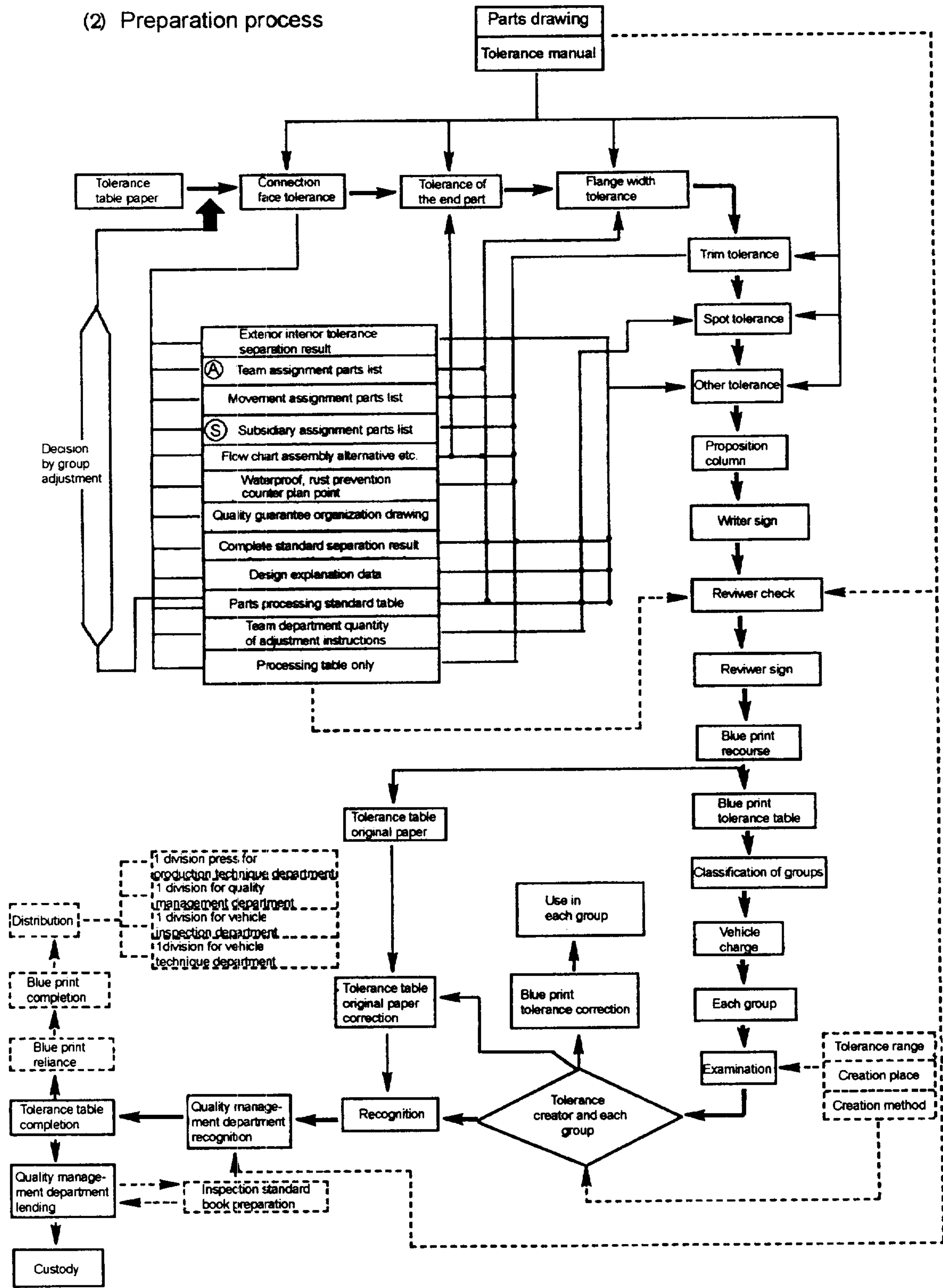
(d) Security parts list (Quality management)

(e) Complete standard (Quality management)

(f) Parts processing standard table ()

(g) Team quantity of adjustment instructions	()
(h) Team assignment parts list	()
(i) Flow chart	()
· Assembly alternative	()
· Body assembly flow chart	()
· Vehicle assembly flow chart	()
· Body sub assembly processing table	()
· Processing table only	()
(j) Waterproof, rust prevention counterplan point drawing	()
(k) Quality guarantee organization drawing	()
(l) (Vehicle width, vehicle height, vehicle length regulation)	()
(m) Parts list	(Planning or quality management)

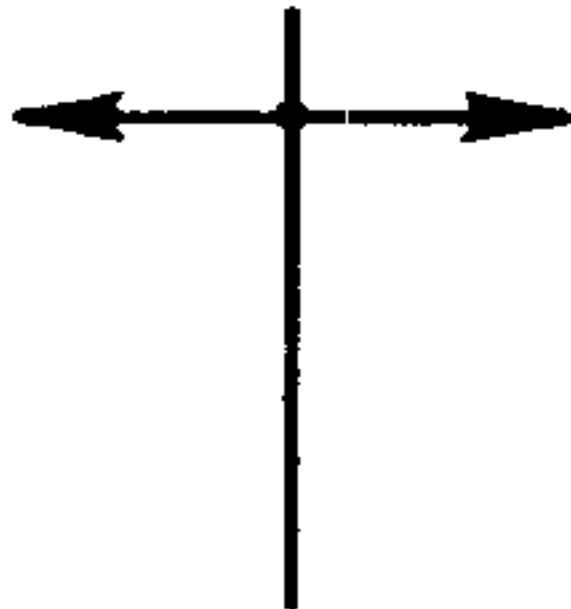
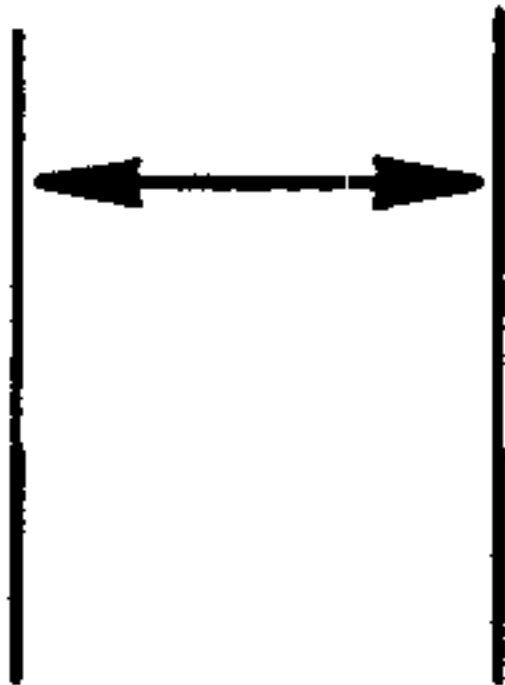
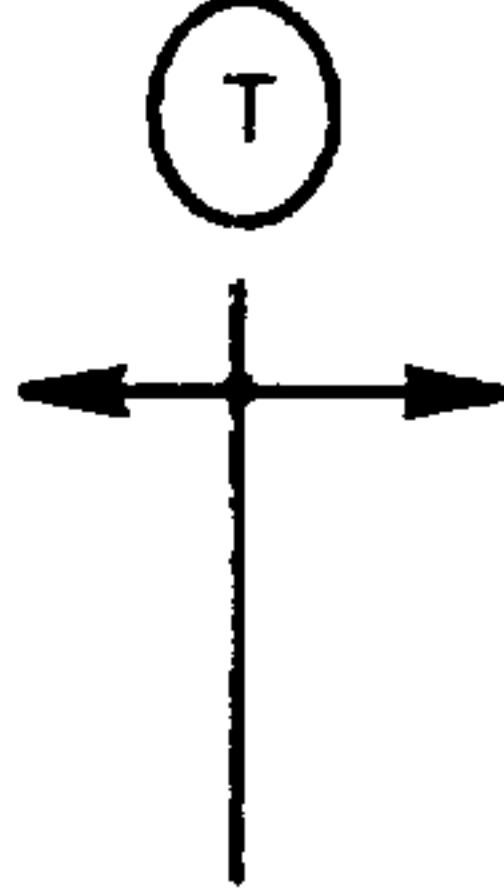
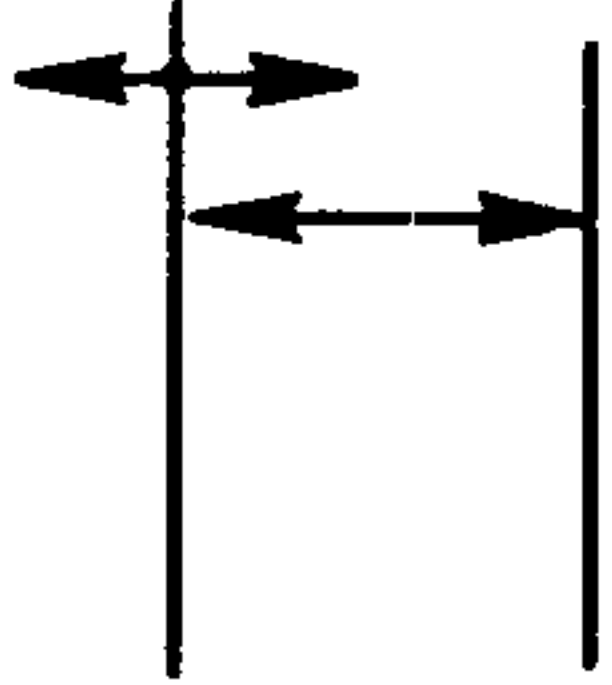
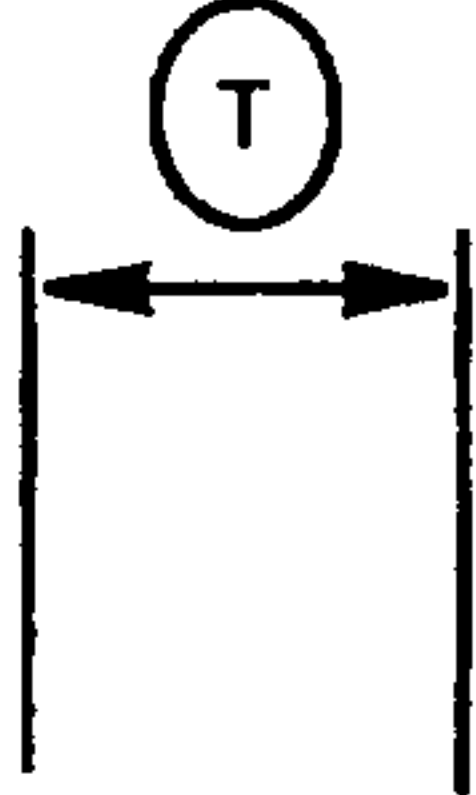
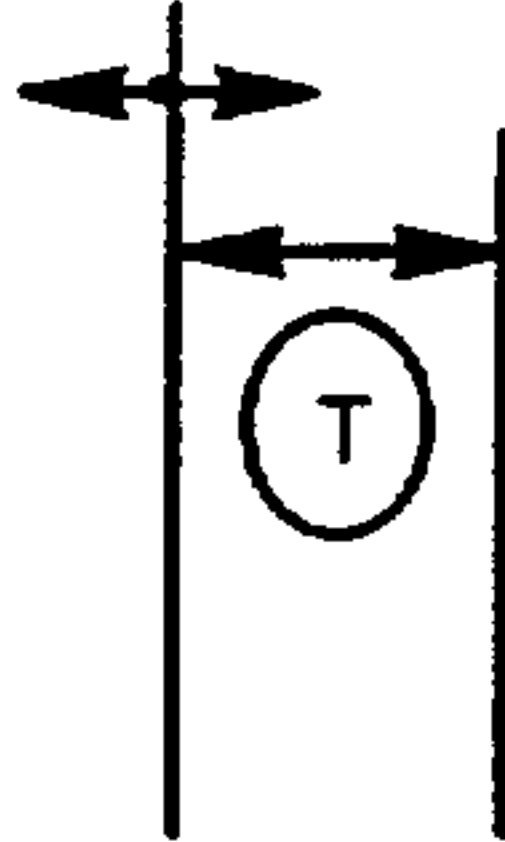
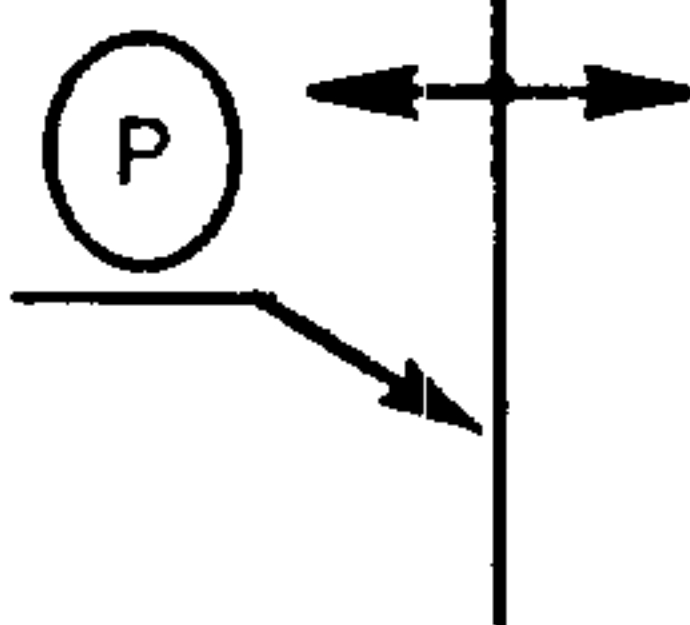
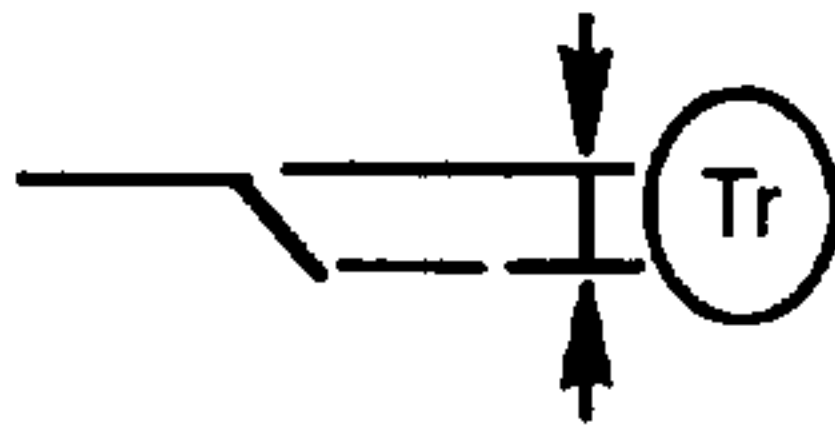
(2) Preparation process

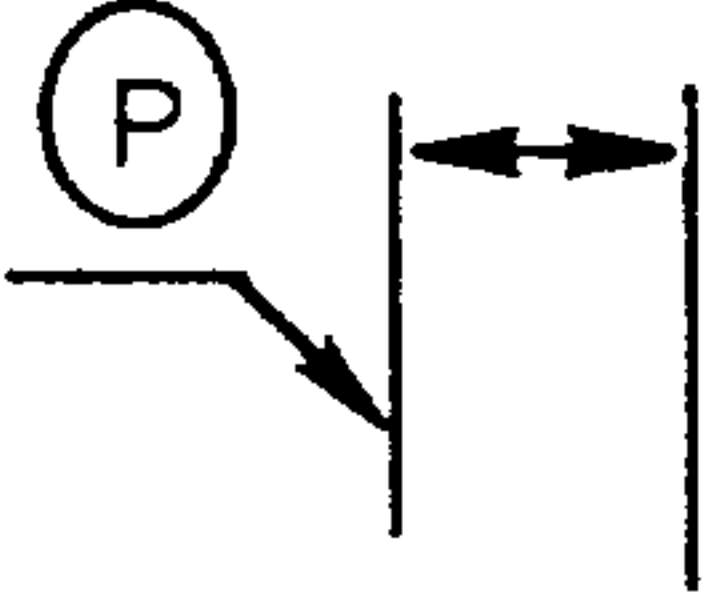
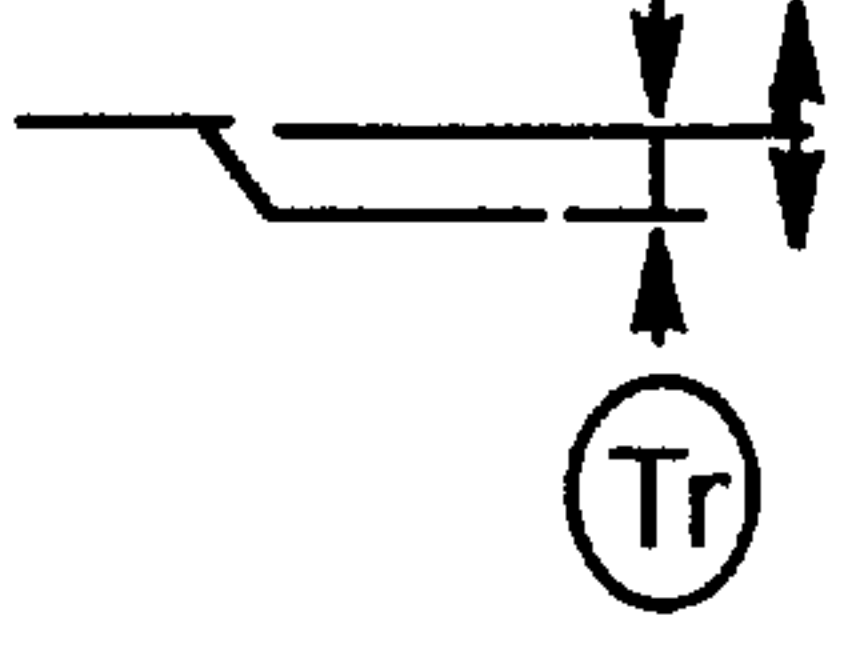
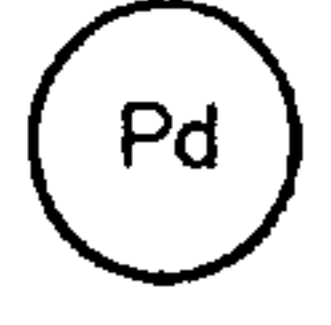
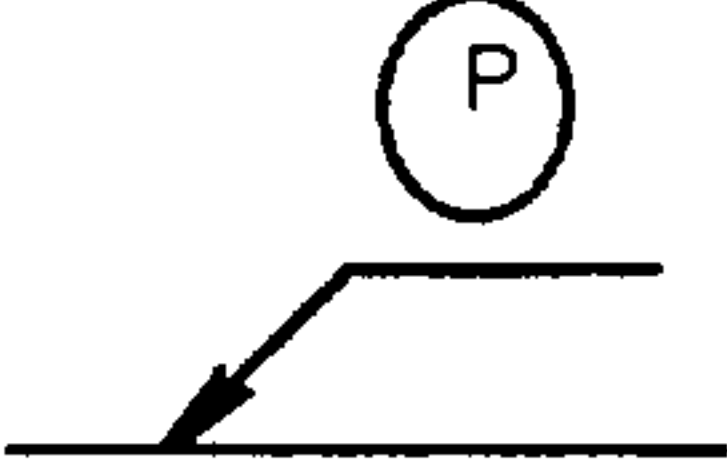
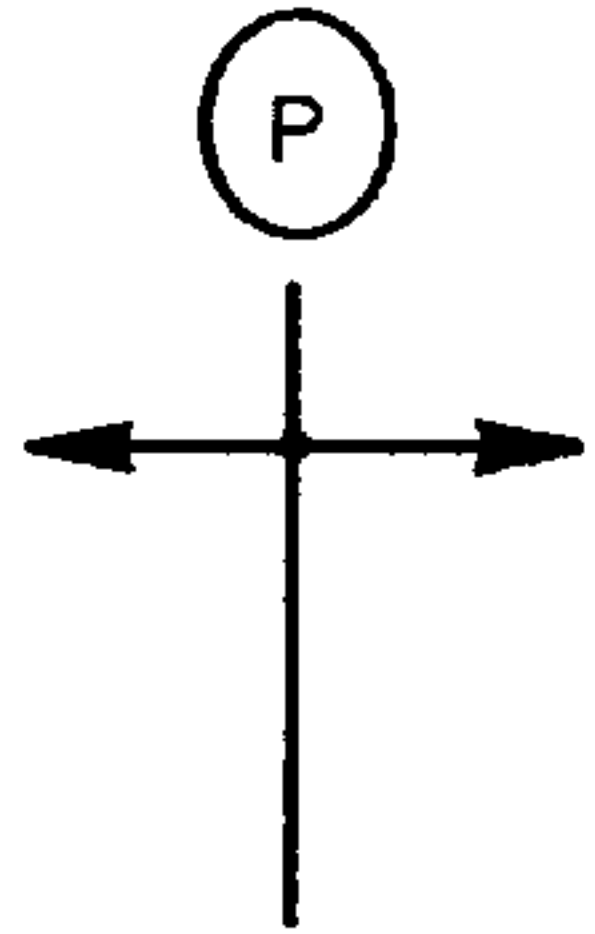
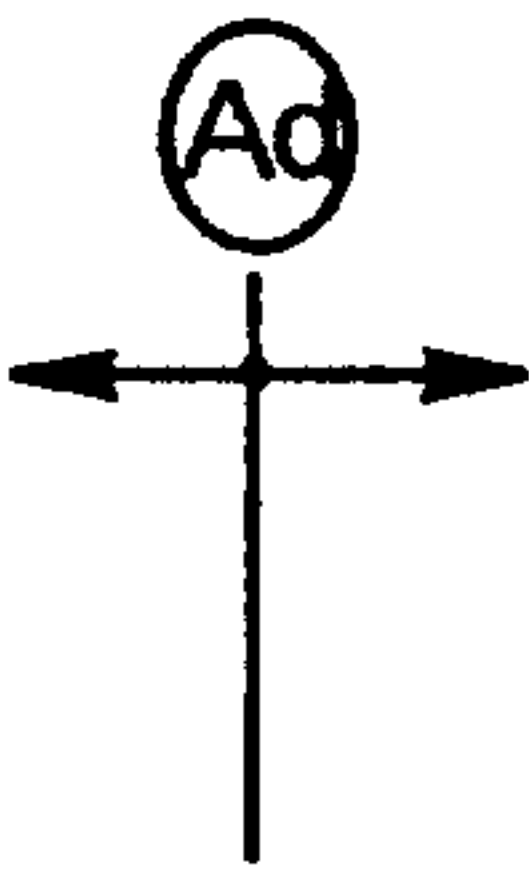
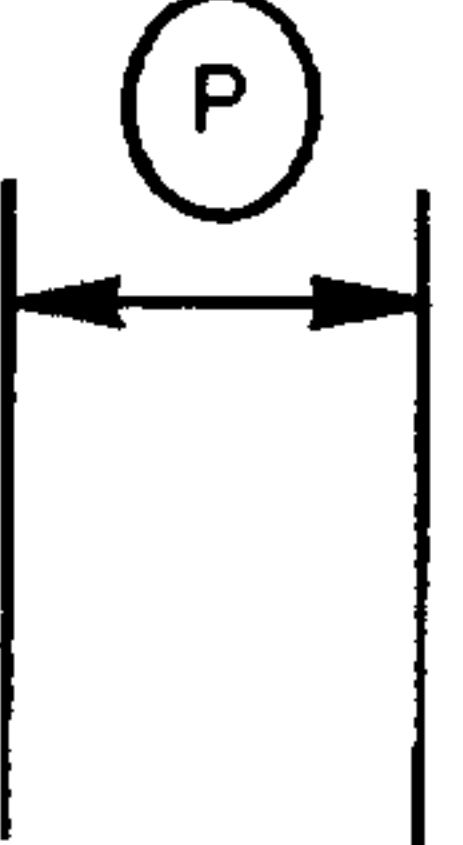
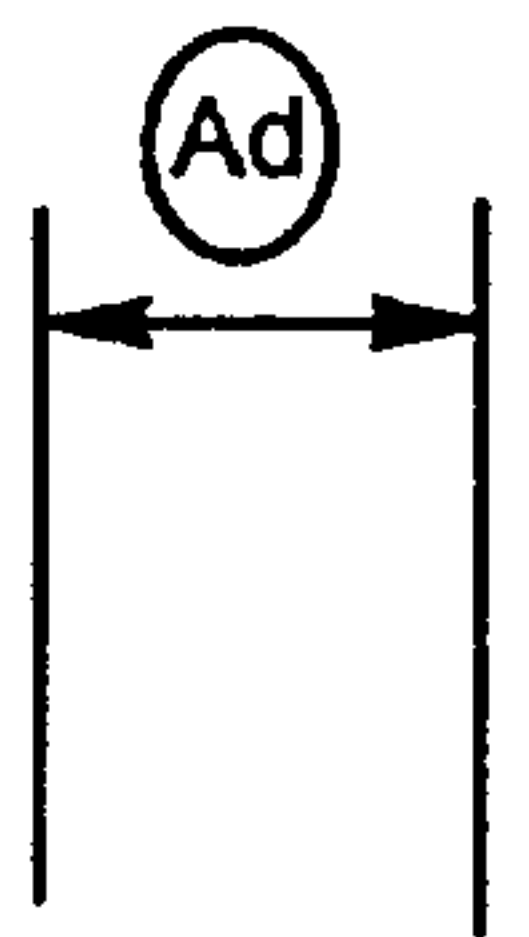
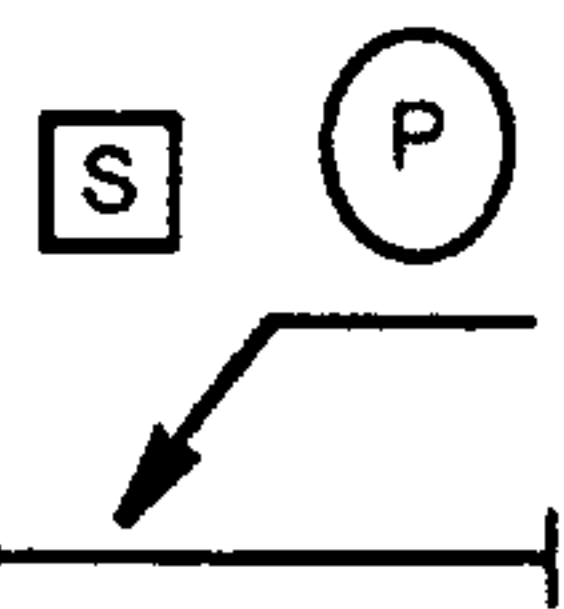


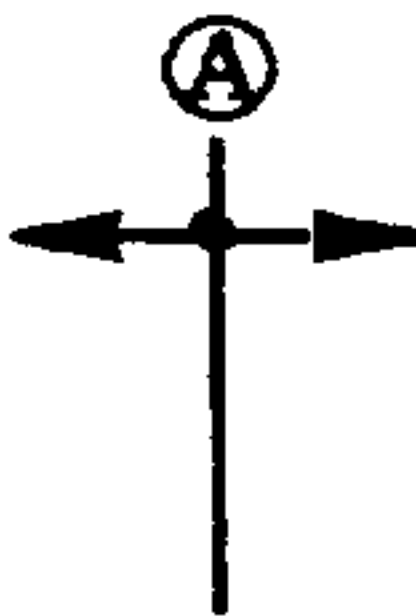
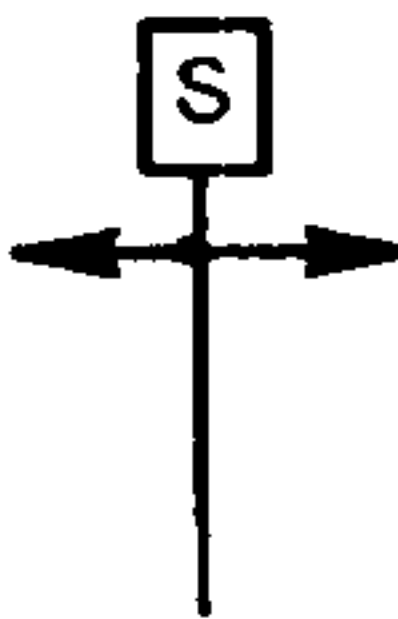
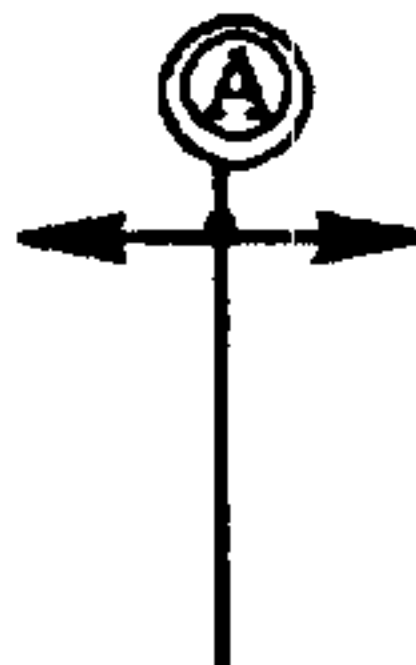
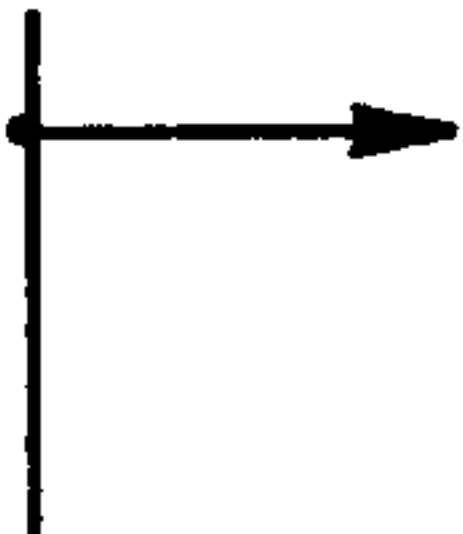
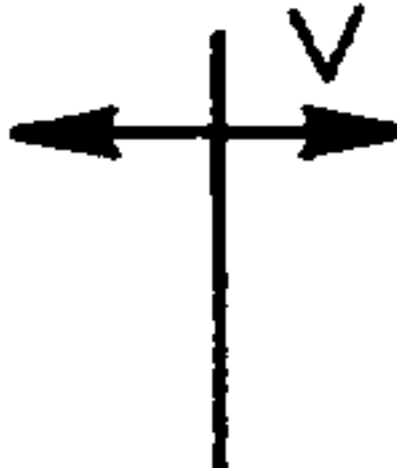
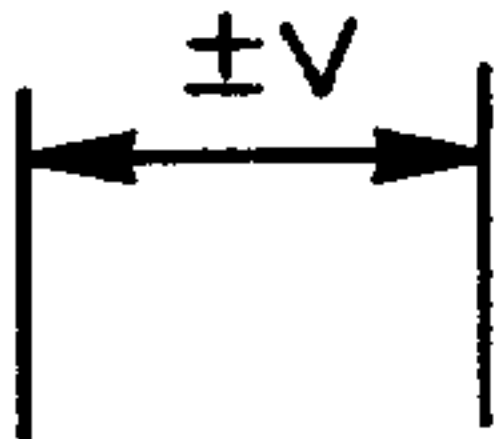
1.5 Sign for using tolerance creation

(1) Sign for using tolerance creation and explanation

You should symbolize as follows, considering simplification of tolerance entry and facility of reading at tolerance table.

Sign	Meaning of sign	Sign	Meaning of sign
	Expression of position tolerance from the standard	 Note : 1	It shows 0.3m/m movement to devise facility of fit
	Expression of single width (Length, height) without regard to the standard		It shows 0.3m/m movement of position tolerance from the standard to devise facility of fit
	Expression of position tolerance from the standard and width (Length, height) from that place		It shows 0.3m/m movement of single width (length, height) tolerance without regard to the standard to devise facility of fit
	Expression of a plane figure		It shows 0.3m/m movement of position tolerance from the standard and width (Length, height) tolerance from that place to devise facility of fit
	Expression of position tolerance from the standard and a plane figure from that face		It shows that is to be at single 「Floor depth $\begin{smallmatrix} +0.5 \\ 0 \end{smallmatrix}$ 」 without regard to the standard

Sign	Meaning of sign	Sign	Meaning of sign
	Expression of position tolerance with datum plane and width (Length, height) from that place		It shows position tolerance from the standard of datum plane measuring depth and it is to be at 'Floor depth $\begin{smallmatrix} +0.5 \\ 0 \end{smallmatrix}$ ' from that place.
	Expression of parallel difference	 Note :3	It shows that adjustment is needed.
	Expression of single plane figure without regard to the standard	 Note : 2	It shows at 'Floor depth $\begin{smallmatrix} +0.5 \\ 0 \end{smallmatrix}$ '.
	Expression of position tolerance from the standard and parallel difference		As requiring adjustment, it shows that position tolerance from the standard is to be purpose tolerance up to 1PP.
	Expression of single width (Length, height) tolerance and parallel difference without regard to the standard		It does not relate with the standard, it shows at the purpose tolerance up to 1PP for requiring adjustment with single width (Length, height) tolerance.
 Note :4	It shows tolerance only of result analyzing sub assembly tolerance one time.	 Note :6	It shows security parts.
	It shows tolerance only of result analyzing sub assembly tolerance two times.		Connection is designated with security place, it shows a single plane figure without regard to the standard.

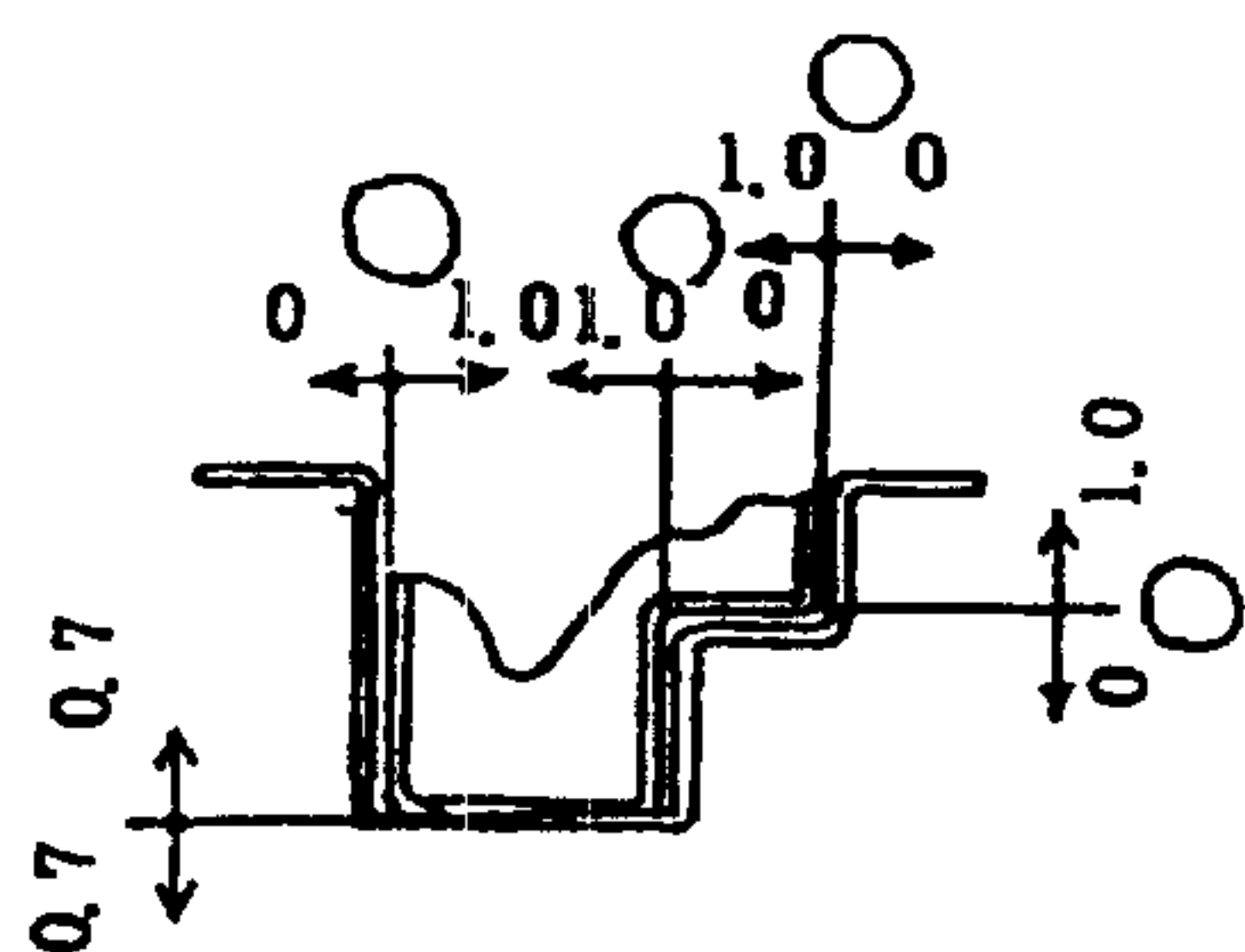
Sign	Meaning of sign	Sign	Meaning of sign
	It shows position tolerance from standard with tolerance only of result analyzing sub assembly tolerance one time		Junction is designated by the security place, and it shows position tolerance of the standard.
	It shows position tolerance from standard with tolerance only of result analyzing sub assembly tolerance two time		It shows single "An interval" without regard to the standard.
 Note :5	It shows waterproof counterplan place, and it is to be at 「notch depth 0 -3」		It shows complete lateral tolerance that position tolerance from the standard is lateral only in the direction of an arrow.
	It shows special counterplan direction of notch with inline as notch of waterproof counterplan place.		It shows guarantee only that does not designate tolerance.
	It shows hole movement of position tolerance from the standard.		It shows that position tolerance from the standard is to be lateral regulation tolerance.
	It shows single pitch tolerance without regard to the standard.		It shows that single width (Length, height) tolerance is to be lateral regulation tolerance without regard to the standard.

(2) Annotation

Note : 1 T

It is the sign to devise facility of fit, after moving the center of tolerance to 0.3m/m about drawing dimension in the direction of fitting easy, interference direction rounds down to 0. (See .61-03)

Explanation according to the example

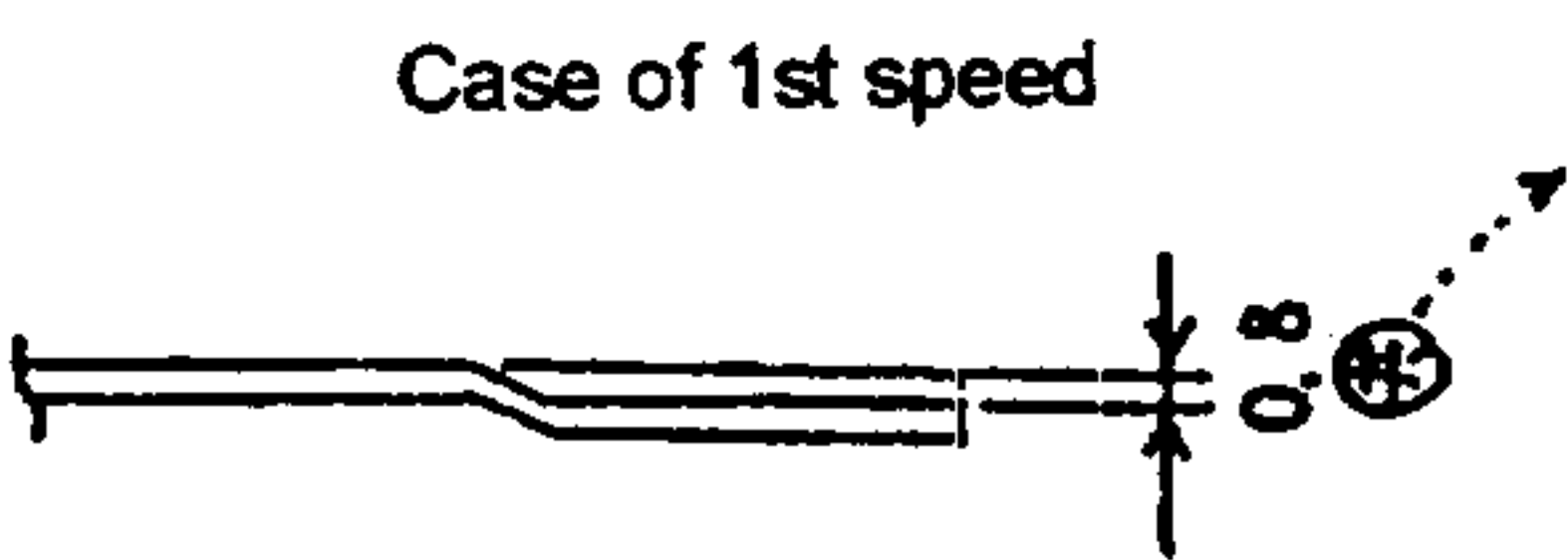


Transfer the center of (± 0.7) to 0.3m/m, it becomes $(\begin{smallmatrix} +0.4 \\ -1.0 \end{smallmatrix})$. Round down to +0.4 of the interference direction, it becomes $(\begin{smallmatrix} +0 \\ -1.0 \end{smallmatrix})$

Note : 2 Tr

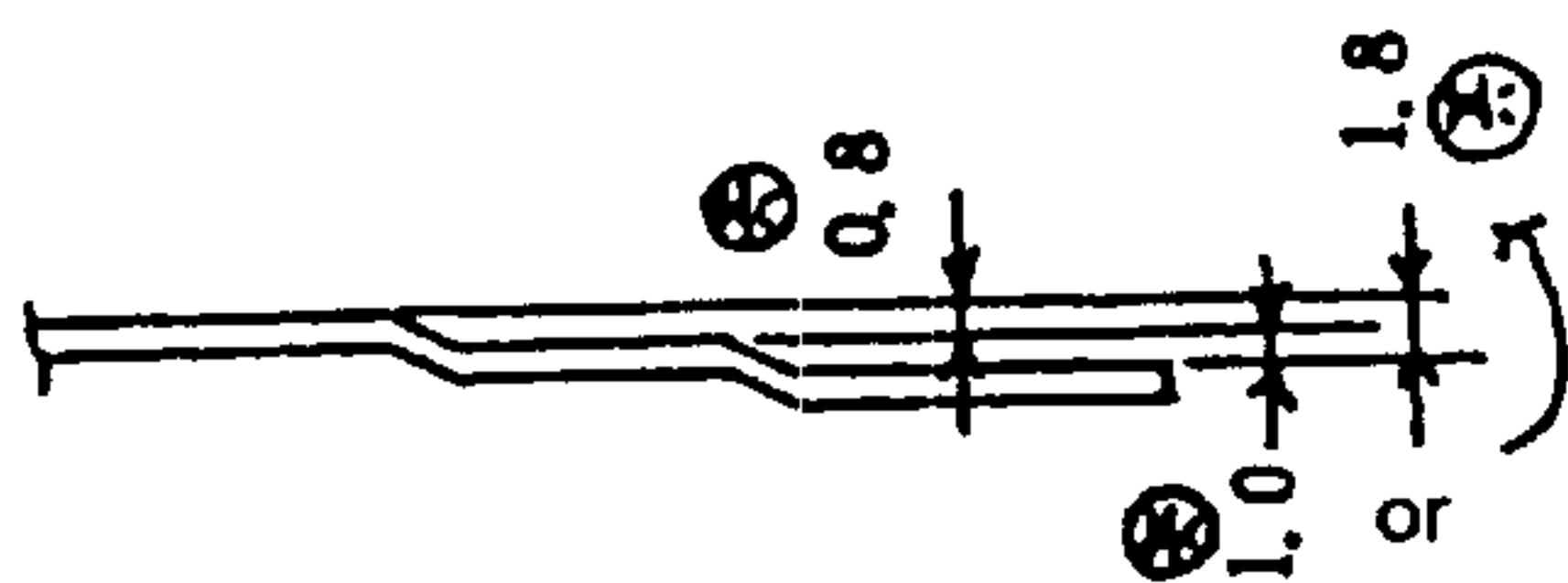
It shows the sign of (Floor depth $\begin{smallmatrix} +0.5 \\ 0 \end{smallmatrix}$) as establishing tolerance at the floor depth of connection face being joggle line. It does not write at the movement assignment list because this empty is to be common about whole floor depth.

Explanation according to the example



Products transfer $+0.3(+0.25)$ m/m to the center of tolerance, it manufactures that floor depth becomes 1.1m/m.

▪ Case of more than 2nd speed



It shall apply $(\begin{smallmatrix} +0.5 \\ 0 \end{smallmatrix})$ in each floor depth. Thus, purpose of the products manufactures that becoming 0.8m/m to 1.1m/m and 1.0m/m to 1.3(1.8 is 2.4)m/m.