



# KOENIG Expander

High performance sealing device  
for fluid power components



Protected by Swiss and World patents.  
Made in Switzerland.

Hydraulic and pneumatic components necessitate the motion of fluid through hollow spaces. If it is necessary to produce these galleries by drilling from the outside then any unrequired entrances thus produced have to be effectively sealed. Mass production techniques dictate that the system of sealing must be safe, simple, clean and speedy at the same time giving adequate performance even when high operating pressure conditions prevail.

This has all been changed by a new system of sealing devices known as Koenig-Expanders. The use of the Koenig-Expander both HK and MB Series provides an alternative clean, reliable, speedy and cost saving method. Solve your sealing problems the modern way, use Koenig-Expanders, There is one to suit your application, cleanly, efficiently, reliably and economically no

tapping operation needed ordinary commercial hole tolerances, no need to ream suitable for mass production applications for high corrosion resistance:

the MB Series

for direct application in drilled holes:

the HK Series

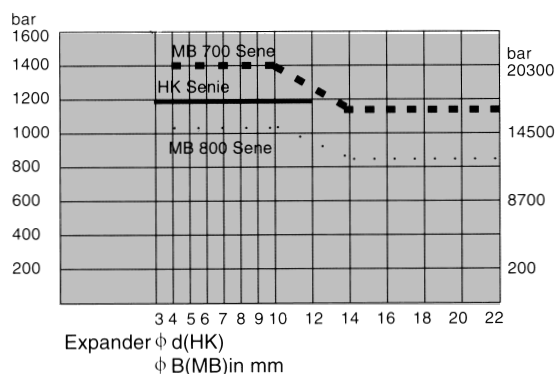
for mass applications: rational light hand tools for the HK Series

for superior performance and economy

A team of engineers are permanently engaged on research development, proofing and controlling to keep the Koenig-Expander system safe, simple and economical.

seal in Koenig-seal out doubt

Until now the usual methods employed for such sealing have been by taper plugs, various types of headed screws with washers, dowel pins, welding, brazing or the use of proprietary sealants. All of these are either expensive because of the requirement to provide threads in the components to be sealed, are bulky or have protrusions outside the component configuration. They are often questionable in their effectiveness or can run the risk of contamination of the fluid.



#### Performance Reliability and Economy

expenditure per closing device, fully set up	sealed threaded screws	
	MB 800 Senic	HK Senic
	Expander $\phi d$ (HK)	$\phi B$ (MB)

Pre-selection with regards  
to current base materials

Base material	HK Series	MB Series	
		stainless steel (MB 700)	steel (MB 800)
gray cast GG30	●	●	●
iron GGG50	●	●	●
steel 50 kp/mm <sup>2</sup>	○	●	△
100kp/mm <sup>2</sup>	△	●	△
aluminium med strength	○	●	○
alloy high strength	△	●	△
brass, bronze	△	●	△



- No problem
- Testing Recommended
- △ Consult our Engineering Department

### ■ Companion of automation age

In the previous operation of pointed connecting circuit, melt connecting, and printing agent, etc., some small objects always mixed inside and thus created operational problems. Now, if you use this expander, all of such problems will be solved. It is highly reliable, and designed at a low cost.

### 自動時代的伙伴

#### KOENIGEXPANDER

從以前的鉸形接續管塞，溶接，上洩劑等操作時，常有小垃圾類的小東西混入而引起作業工時上的問題，所以若使用這種擴張式銅塞器的話，這些問題皆能解決，而且它的信賴性高，並且依低成本所設計出的產品。

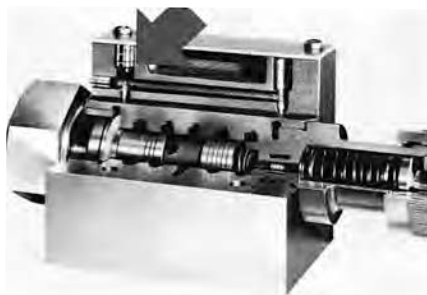


### ■ MB Series

The MB type expander is designed according to the ball shaped and shaped ferrule, seeming like press in a ball. As for this series, it is to change the horizontal radiation expansion, apply pressure on the ferrule and press the penetrating hole.

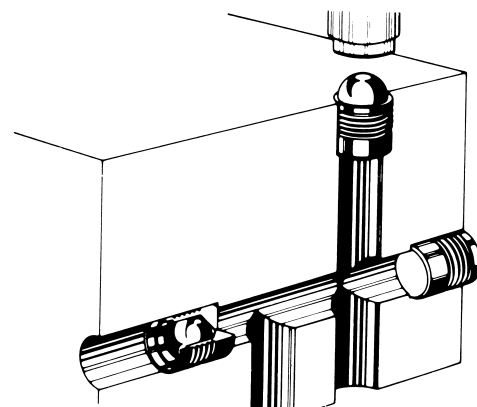
### MB系列

MB型的銅塞器：擴張器是有球狀和筒狀的系列所設計。就像打進球之事而此系列它是改變橫方向的放射線的膨脹，在管套上加上壓力而押入貫通穴。



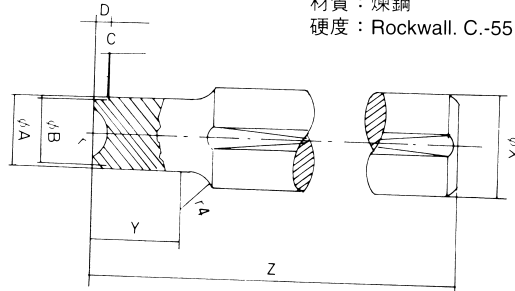
Material  
材質

管 套

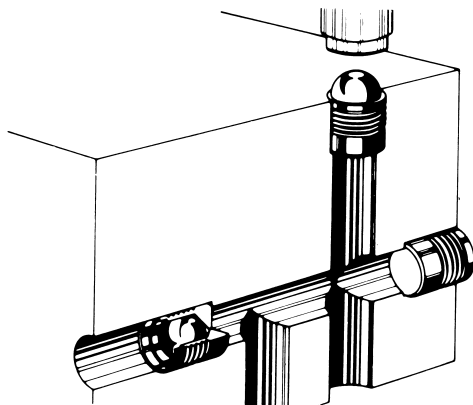


■ 打進用之活具

材質：煉鋼  
硬度：Rockwell. C.-55



Type 型式	Sleeve 管套	Hardness of Sleeve 管套的硬度	Ball 球
MB 600-XXX MB 600-XXX	stainless steel steel DIN X 12CrNiS 18/8 AISI 303 不鏽鋼鋼質	HB 250 HB 250	Stainless steel X5Cr-Ni1819 AISI 304 不鏽鋼鋼鐵質
MB 700-XXX MB 700-XXX	DINX12 CrNiS 18/8 AISI 303		X5Cr-Ni1819 AISI 304
MB 800-XXX MB 800-XXX	Steel DIN-C15 鋼質 DIN-C15	HB 200 HB 200	Steel DIN 100 Cr6 鋼質 DIN 100Cr6



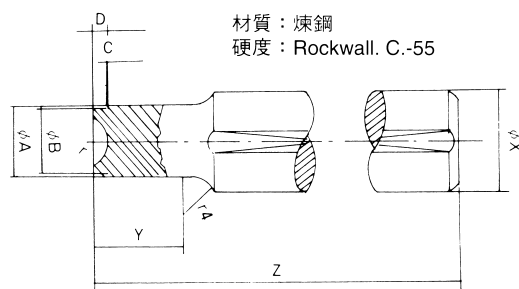
### What makes it outstanding?

- The setting operation requires no special tooling. It can be effected by an ordinary press equipped with a corresponding plunger. In case of small runs, insertion can also be effected by means of a hammer and suitable punch.
  - Comprehensive range from 4 mm to 22 mm diameter
  - The plugs are available in three different materials:
    - MB 600 Series (all stainless steel)
    - MB 700 Series (stainless steel sleeve)
    - MB 800 Series (steel zinc plated and yellow passivated)
- a tolerance on hole diameter of  $\pm 0.1\text{mm}$  ( $\pm 0.004\text{inch}$ ) - also a normal commercial finish

Installation is simple.

Here is what you do:

#### ■打進用之治具



### 使用方法

#### 1.孔的確認

- 孔的誤差和表面粗度正確嗎？  
孔的誤差  $B \pm \begin{smallmatrix} 0.1 \\ 0 \end{smallmatrix}$  (B = 直徑)  
孔表面精度 8~40S
- 孔的口徑和下孔的口徑正確嗎？  
標準尺寸表的d尺寸以下

#### 2.插入

在段差範圍裡插入expander  
這時候管套的邊緣從機器表面，請於裡面插入。

#### 3.球的打入

球的打入B依別表的expander的口徑，而使用治具打入，打入後球是從管套0.0~1.0mm的裡面打入。

#### 取出

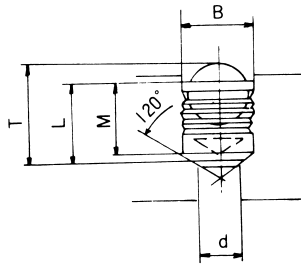
expander是半永久的封孔式而所設的，所以不用考慮取出的困擾性，但實際若有錯誤而必要取出的情形亦很簡單，祇要用切削工具將球和管套一起取出即可。  
若expander的球之硬度是Rock wall C.45請用carbide chip的切削工具取出。

#### ■打進治具尺寸法(mm)

口徑 caliber	r	A	B	C	D	$\phi X$ h9	Y	Z
4	1.5	3.8	2.6	0.4	0.9	10	10	100
5	2	4.8	3.6	0.4	1.1	10	12	100
6	2.5	5.8	4.6	0.4	1.2	10	15	100
7	3	6.8	5.6	0.4	1.4	10	18	100
8	3.5	7.8	6.6	0.4	1.5	10	20	100
9	4	8.8	7.5	0.4	1.7	14	22	100
10	4.5	9.8	8.5	0.4	1.9	14	25	100
12	5.5	11.7	10.5	0.4	2.2	14	30	150
14	6.35	13.7	12.2	0.4	2.5	20	35	150
16	7	15.7	13.4	0.6	2.9	20	40	150
18	8	17.7	15.4	0.6	3.2	20	45	150
20	9	19.7	17.4	0.8	3.8	25	50	150
22	10	21.7	19.4	0.8	4.1	25	55	150

## ● 標準規格 (xxx=材質表示) / Type of specification

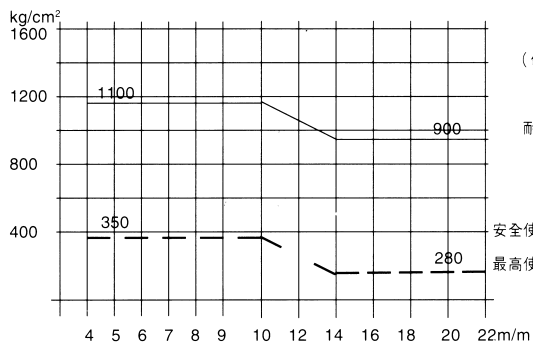
TYPE 型式	B h9	d max. mm	d approx. inch	L ±	M ±0.1	~T~	Gewicht weight kg/0/00
MBxxx-040	4.0	3.3	1/8"	0.1	3.7	5.2	0.35
MBxxx-050	5.0	4.3	5/32"	4.0	5.2	7.0	0.70
MBxxx-060	6.0	5.3	3/16"	5.5	6.2	8.6	1.15
MBxxx-070	7.0	6.4	1/4"	6.5	7.2	10.1	1.90
MBxxx-080	8.0	7.4	9/32"	7.5	8.2	11.7	2.75
MBxxx-090	9.0	8.4	5/16"	8.5	9.7	13.7	4.10
MBxxx-100	10.0	9.4	11/32"	10.0	10.7	15.2	5.50
MBxxx-120	12.0	10.6	13/32"	11.0	12.7	18.0	9.40
MBxxx-140	14.0	12.7	1/2"	13.0	14.4	20.8	14.40
MBxxx-160	16.0	14.7	9/16"	15.0	16.4	23.7	21.70
MBxxx-180	18.0	16.7	21/32"	17.0	18.4	26.3	31.40
MBxxx-200	20.0	18.7	23/32"	19.0	21.4	30.5	44.70
MBxxx-220	22.0	20.7	13/16"	22.0	24.4	34.2	59.30



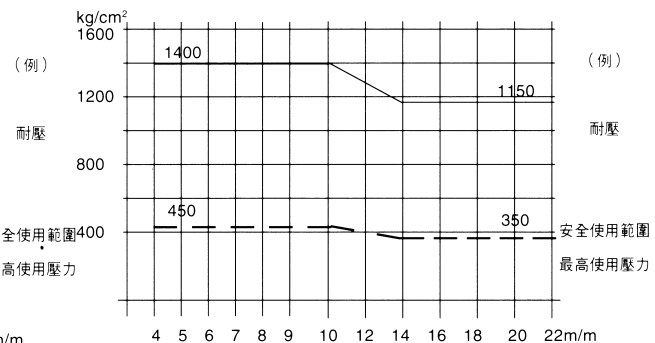
d=下孔

- 公差為0~+0.1mm以內。 ● MB600是3~φ10之8種類

## MB800系列 (Series)



## MB800系列 (Series)



- 依Expander硬度和本體材質型式選擇
- Brinell硬度和Expander型式之關係
  - HB ≤ 200 MB700 NB800
  - HB ≤ 250 MB600 NB700
- 例FC25 (HB240) → MB600 NB700
- FCD45 (HB200) → MB700 NB800
- S43C (HB170) → MB700 NB800

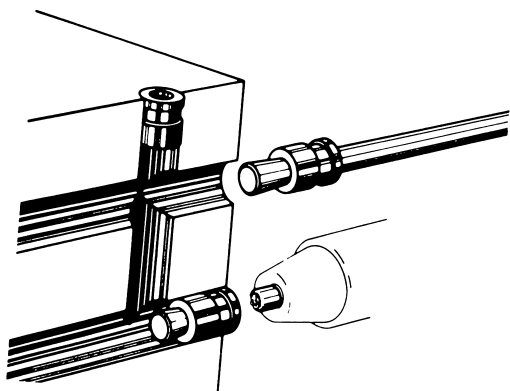
## The principle of MB Series performance

This design is built around the pressure/expansion principle: by radially expanding a sleeve closed at one end by means of an expansion ball, which when driven or pressed home into the bottom of the sleeve converts the axial forces into a radially effected expansion of the sleeve. The teeth formed by the machining of annular grooves in the periphery of the sleeve are thus forced into the surrounding component material providing an effective leak proof seal.

## HK系列 ( SERIES )

## How does it work?

A very high precision aluminium alloy sleeve is assembled into a steel mandrel which is slightly tapered at the sleeve end. The other end of the mandrel is clenched in the jaw of a slightly modified standard blind rivet setting tool, while the sleeve end is inserted into the hole to be plugged. Actuation of the tool withdraws the mandrel so that the fat end rapidly expands the sleeve. At a predetermined point the sleeve is squeezed against the component material the mandrel breaks below the flush line of the hole leaving it neatly and effectively sealed. And the whole process takes about five to ten seconds.



## What does it need?

To obtain high proof pressure rating it is to observe

- a minimum roughness between Rt 8 and 40 microns metric- resp. 80 to 400 micro inches CLA-in the hole; a normal commercial finish.
- a tolerance on hole diameter of  $-0+0,1\text{mm}(0,004\text{inch})$ - also a normal commercial finish

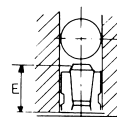
## What makes it outstanding?

- foolproof consistent sealing is controlled by the design and tensile strength of the mandrel and by the setting tool's inability to function incorrectly, rather than by operator skill
- inspection procedures reduced to a simple visual check
- comprehensive range of standard and over-size plugs from 3 to 12 mm diameter
- workpiece damage is avoided
- pure mechanical sealant
- setting process at the component

## Material

## ● 材質

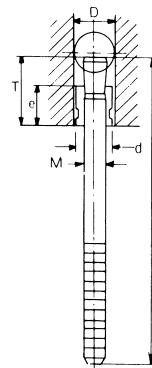
型 式 TYPE	栓 pin	管套 sleeve
HKxxx-CK11-xxx	steel DIN60spb20	鋁合金aluminium DIN:AL-Mg · SI · pb
HKxxx-CK55-xxx		sleeve DIN



## SIZE

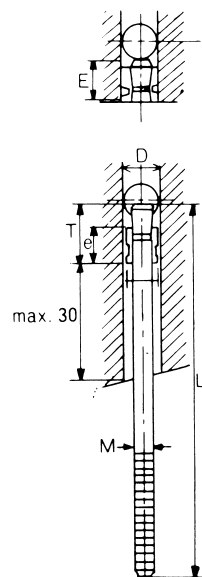
## ● 標準規格 / SPECIFICATION

型式 TYPE	d		e		D		T max		M		L	
	mm	ins.	mm	ins.	mm	ins.	mm	ins.	mm	ins.	mm	ins.
HK030-CK11-111	3	.118	5	.197	3	.118	8	.394	2	.079	36.5	1.496
HK030-CL11-111	3	.118	9.5	.374	3	.118	15	.492	2	.079	42	1.654
HK040-CK11-111	4	.158	5	.197	4	.158	10	.315	2.2	.087	38	1.496
HK050-CK11-111	4	.158	9.5	.374	4	.158	15	.532	2	.079	42	1.654
HK060-CK11-111	5	.197	6	.236	5	.197	11	.394	2.8	.110	41	1.614
HK070-CL11-111	6	.236	6.5	.256	6	.236	12	.394	2.8	.110	43	1.693
HK080-CK11-111	7	.276	7	.276	7	.276	12.5	.414	3	.118	43	1.693
HK090-CK11-111	8	.315	9.5	.374	8	.315	15.5	.532	4.5	.177	38	1.496
HK100-CK11-111	9	.354	9.5	.374	9	.359	16.5	.512	4.5	.177	38	1.496
HK100-CK11-111	10	.394	10.5	.413	10	.394	16.5	.551	6	.236	39	1.535

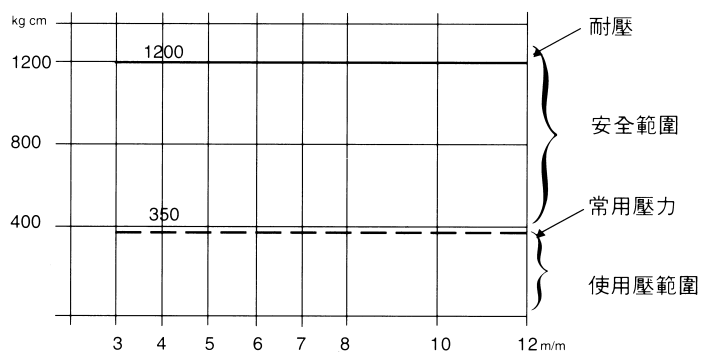


## ●長軸規格( Long size specification )

型式 TYPE	d		e		D +0.1 +.004 0 0		T max		M		L	
	mm	ins.	mm	ins.	mm	ins.	mm	ins.	mm	ins.	mm	ins.
HK040-CK11-211	4	.158	5	.197	4	.158	10	.394	2.2	.087	68	2.677
HK050-CL11-211	5	.197	6	.236	5	.197	11	.453	2.8	.110	71	2.795
HK060-CK11-211	6	.236	6.5	.256	6	.236	12	.472	2.8	.110	73	2.874
HK080-CK11-211	8	.315	9.5	.374	8	.315	15.5	.610	4.5	.177	68	2.677
HK090-CK11-211	9	.354	9.5	.374	9	.354	16.5	.650	4.5	.177	68	2.677
HK100-CL11-211	10	.394	10.5	.413	10"	.394	17	.630	6	.236	69	2.717
HK120-CK11-211	12	.472	12	.472	12"	.472		.669	6	.236	70	2.757
					"	+						
					+0.05 +0.02							
					0 0							



## ●壓力範圍／Pressure range



## ●使用方法及注意事項／NOTE：

- 1.孔的公差值  $D_{-0}^{+0.1}$  (D: Expander的直徑)
- 2.孔表面的精粗度 15S-40S

## ● MB800-040 (本體材質FC30) / Material

Pos.	孔徑	表面上精度(S)	壓力(kgf/cm <sup>2</sup> )
1	4.02	15	2400
2	"	18	2200
3	"	17	2600
4	"	15	2100
5	"	20	3000
6	4.12	15	2100
7	"	17	2100
8	"	18	2100
9	"	17	2200
10	4.13	18	2000

## ● MB700-090 (本體材質FC30) / Material

Pos	孔徑	表面上精度(S)	壓力(kgf/cm <sup>2</sup> )
1	9.00	18	3000
2	9.01	12	3100
3	9.02	15	3000
4	"	13	3100
5	9.09	13	3000
6	"	16	3000
7	9.10	13	3100
8	"	12	3100
9	9.11	14	2900
10	"	13	3100
11	9.01	15	3000
12	"	13	3000
13	9.02	18	3100
14	"	19	3000
15	9.09	14	3100
16	"	13	3000
17	9.11	12	3100
18	"	14	3000
19	"	15	3100
20	"	14	3000

## ● MB700-060

公差(Φ)	表面厚度(s)	Expander 口徑(Φ)	BUST壓力(kg/cm <sup>2</sup> )
6.05	17	5.98	1,700

- ・ 上記資料以外還有其它許許多多之資料，若有需知道請與公司連絡
- ・ MB型、HK型共同專用punch之資料，如有所需要、亦請與公司連絡。