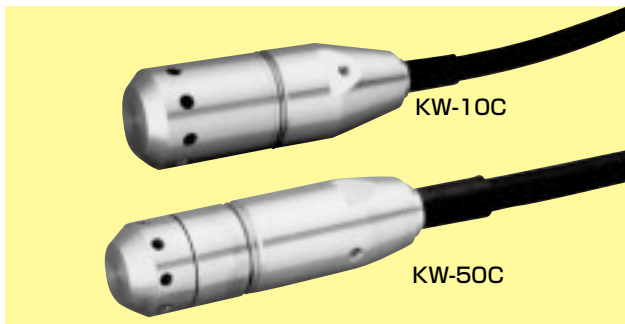
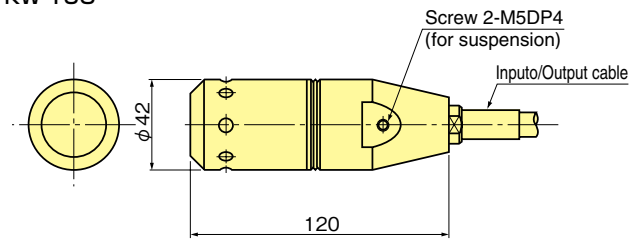


KW-C Water Level Transducer

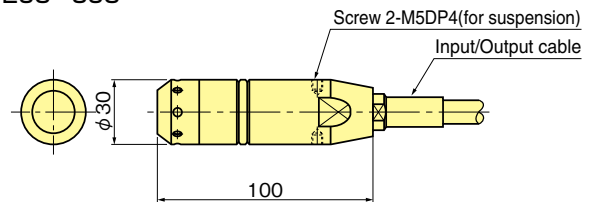
Built-in Arrestor



KW-10C



KW-20C~50C



The KW-C is a hydraulic water level transducer that measures the level of water in dams and rivers and the level of under-ground water in ground in landslide areas. Effects of changes in atmospheric pressure do not need to be compensated, so high-accuracy measurement can be made.

Note: The KW-C hydraulic water level transducer made with titanium is also available. Contact TML for detailed information.

Protection ratings : IP 68 equivalent

Specifications

Type	KW-10C	KW-20C	KW-30C	KW-50C
Capacity	10m	20m	30m	50m
Rated output	Approx. 1mV/V (2000×10 ⁻⁶ strain)			
Non-linearity	0.2%RO		0.3%RO	
Temperature effect on zero	0.03%RO/°C			
Compensated temperature range	0~+50°C (no icing)			
Temperature range	-20~+60°C (no icing)			
Input/output resistance	350Ω			
Recommended exciting voltage	Less than 3V			
Allowable exciting voltage	10V			
Weight	700g	250g		

Input/output cable : KW-10C : φ 11.5mm 0.5mm² 4-core shielded vinyl cable with air-vent pipe, 13m
 KW-20C : φ 11.5mm 0.5mm² 4-core shielded vinyl cable with air-vent pipe, 23m
 KW-30C : φ 11.5mm 0.5mm² 4-core shielded vinyl cable with air-vent pipe, 33m
 KW-50C : φ 11.5mm 0.5mm² 4-core shielded vinyl cable with air-vent pipe, 53m

KB-B Inclinometer



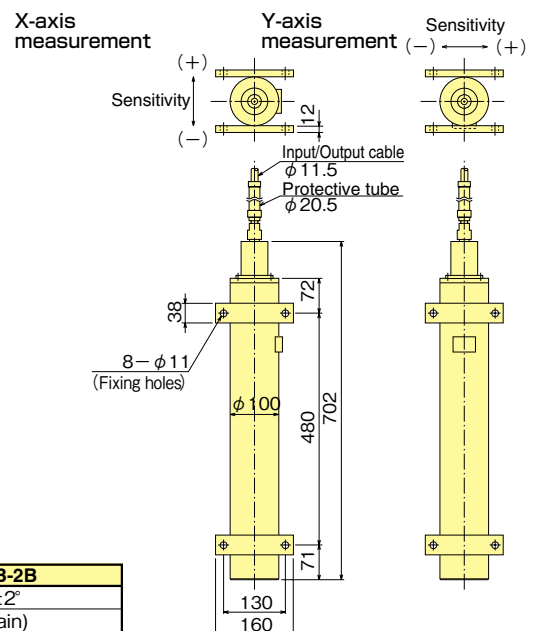
The KB-B inclinometer is used to measure the inclination of structures subject to strong impact or the inclination of piles when they are driven into the ground. It is set on an excavation bucket for the diaphragm wall construction method to monitor and control the conditions of vertical excavation work. Two models are available: one for X-axis measurement and the other for Y-axis measurement. The difference between these two models is the difference in the directions of measurement relative to the mounting surface.

Protection ratings : IP 68 equivalent

Specifications

Type	KB-05B	KB-1B	KB-2B
Capacity	±0.5°	±1°	±2°
Rated Output	0.75mV/V (1500×10 ⁻⁶ strain) / 1mV/V (2000×10 ⁻⁶ strain)		
Non-linearity	2%RO		
Temperature range	-20~+60°C		
Input/output resistance	350Ω		
Recommended exciting voltage	Less than 6V		
Allowable exciting voltage	10V		
Weight	15kg	14kg	14kg

Input/output cable : φ 11.5mm 0.75mm² 4-core shock-resistive shielded chloroprene cable 3m

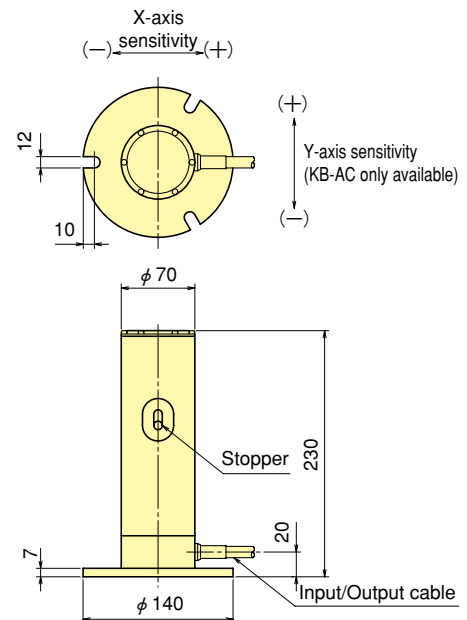


KB-AB/KB-AC Inclinator



The KB-AB and KB-AC are low-capacity inclinometers. They are used to monitor the conditions of inclination of proximity structures built by urban civil engineering works. The KB-AB measures inclination in one direction, while the KB-AC measures inclination in both X and Y directions.

Protection ratings : IP 67 equivalent



Specifications

Type	KB-1AB	KB-2AB	KB-5AB	KB-1AC	KB-2AC	KB-5AC
No. of measuring axis	1			2		
Capacity	$\pm 1^\circ$	$\pm 2^\circ$	$\pm 5^\circ$	$\pm 1^\circ$	$\pm 2^\circ$	$\pm 5^\circ$
Rated Output	1mV/V (2000 $\times 10^{-6}$ strain)					
Non-linearity	0.5%RO					
Cross sensitivity	-			3%RO		
Temperature range	-20 \sim +60 $^\circ$ C					
Input/output resistance	350 Ω					
Recommended exciting voltage	Less than 2V					
Allowable exciting voltage	5V					
Weight	5kg					

Input/output cable : KB-AB : ϕ 9mm 0.5mm² 4-core shielded chloroprene cable 2m
 KB-AC : ϕ 9mm 0.3mm² 8-core shielded vinyl cable 2m

Accessory

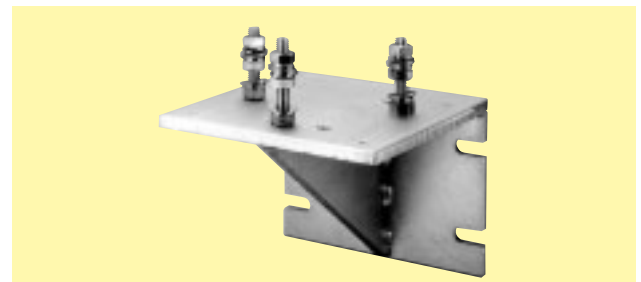
Protective Cover KBF-13

This cover protects the KB-AB/KB-AC inclinometer installed to structure from mechanical damage.



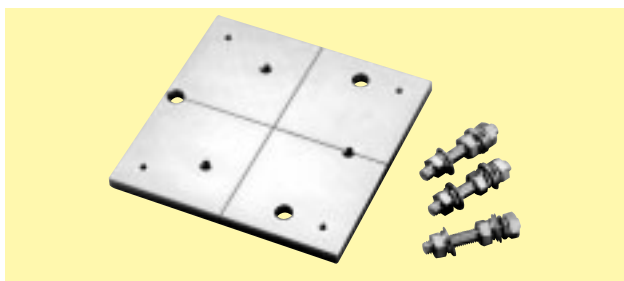
Wall Mount Fitting KBF-14

This fitting is used to mount the KB-AB/KB-AC inclinometer to walls of structure.



Flat Mount Fitting KBF-15

This fitting is used to mount the KB-AB/KB-AC inclinometer to flat surface.



Level KBF-16

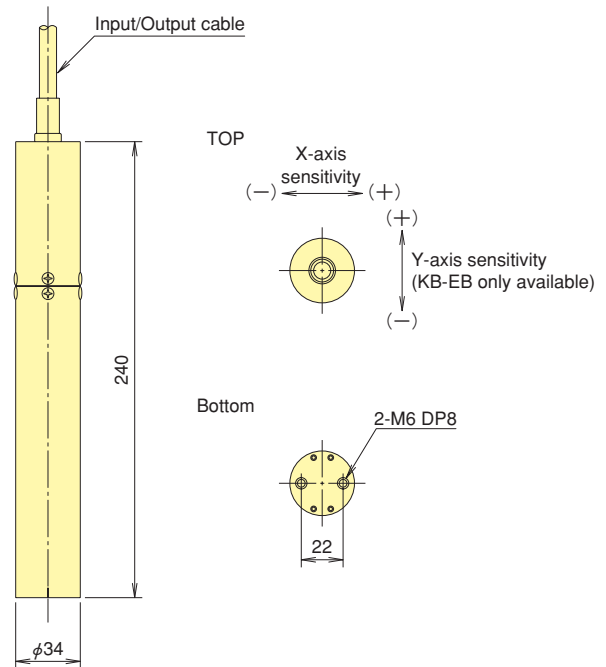
This level is standardly supplied to the KB-AB/KB-AC inclinometer.



KB-DB/KB-EB Inclinometer



KB-DB (1-axis) / KB-EB (2-axis)



The KB-DB and KB-EB inclinometers are suitable for monitoring the conditions of structures being constructed or measuring the behavior of structures for a long period. The KB-DB is for measurement in one direction, while the KB-EB is for simultaneous measurement in both X and Y directions.

Protection ratings : IP 67 equivalent

Specifications

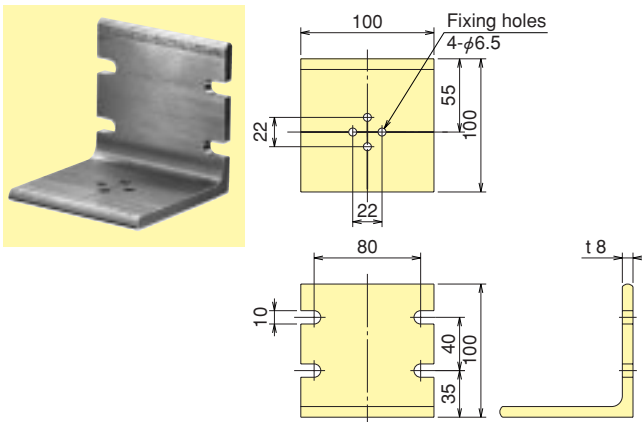
Type	KB-5DB	KB-10DB	KB-5EB	KB-10EB
No. of measuring axis	1		2	
Capacity	±5°	±10°	±5°	±10°
Rated Output	1mV/V (2000×10 ⁻⁶ strain)			
Non-linearity	0.5%RO			
Cross sensitivity	—		3%RO	
Temperature range	-20~+60°C			
Input/output resistance	350Ω			
Recommended exciting voltage	Less than 2V			
Allowable exciting voltage	5V			
Weight	1.3kg	1.3kg	1.3kg	1.3kg

Input/output cable : KB-DB : φ9mm 0.5mm² 4-core shielded chloroprene cable 2m
 KB-EB : φ9mm 0.3mm² 8-core shielded vinyl cable 2m

Accessory

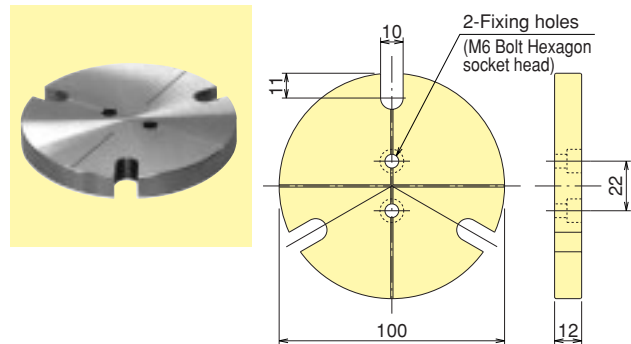
Wall Mount Fitting KBF-17

This fitting is used to mount the KB-DB/KB-EB inclinometer to walls of structure.

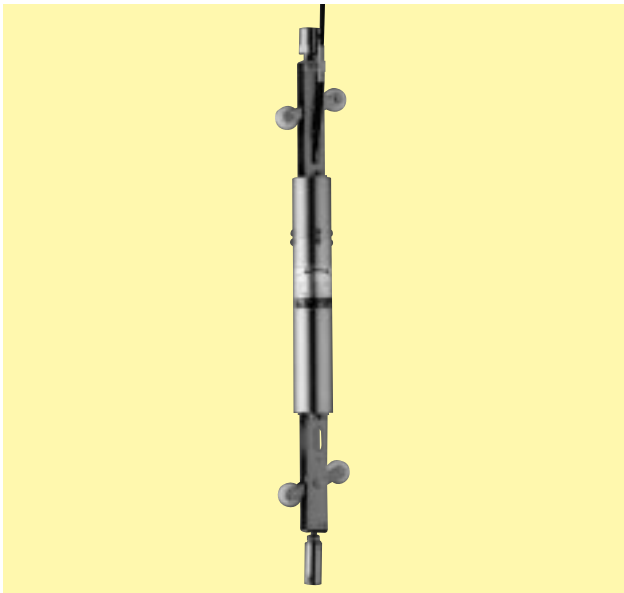


Flat Mount Fitting KBF-18

This fitting is used to mount the KB-DB/KB-EB inclinometer to flat surface.

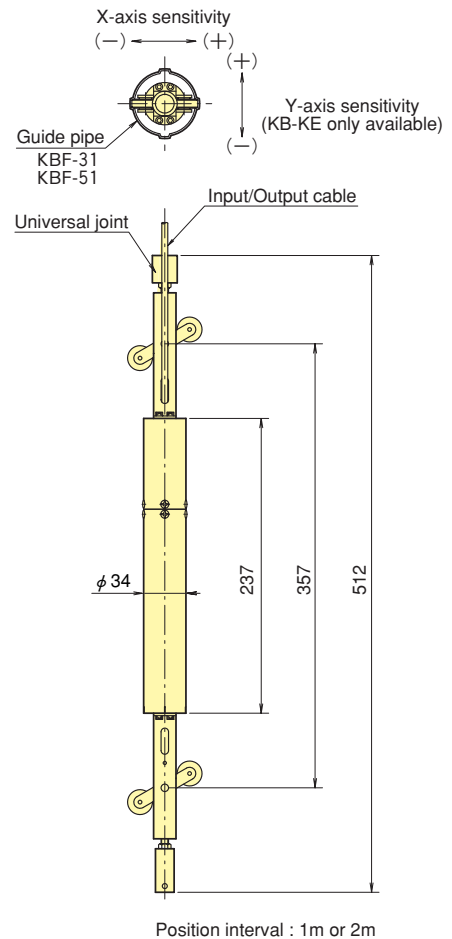


KB-JE/KB-KE Inclinometer



KB-JE and KB-KE Inclinometer are multi-layer inclinometers to measure landslide and displacement of retaining wall. Special Guide pipe and Relay rod are pre-installed perpendicular to structures and the inclinometers are installed and connected on different levels at multiple measuring points up to 15 levels. Automatic measurement is available with our Data Logger. Graphical slope monitoring is also available with Data Logger TDS-602. The KB-KE is a bi-axial model. Arrester-integrated model is available.

Protection ratings : IP 68 equivalent



Specifications

Type	KB-5JE	KB-10JE	KB-5KE	KB-10KE
No. of measuring axis	1		2	
Capacity	±5°	±10°	±5°	±10°
Rated Output	1mV/V (2000×10 ⁻⁶ strain)			
Non-linearity	0.5%RO			
Cross sensitivity	—		3%RO	
Temperature range	-20~+60°C			
Input/output resistance	350 Ω		Input 175 Ω/Output 350 Ω	
Recommended exciting voltage	Less than 2V			
Allowable exciting voltage	5V			
Weight	1.5kg		1.5kg	

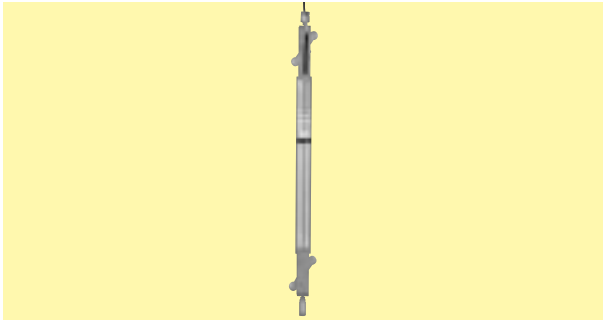
Input/output cable

KB-JE : φ 4.6mm 0.14mm² 4-core shielded vinyl cable 2m

KB-KE : φ 4.6mm 0.08mm² 6-core shielded vinyl cable 2m

(For details, refer to pages 41~44.)

KB-KD Inclinometer



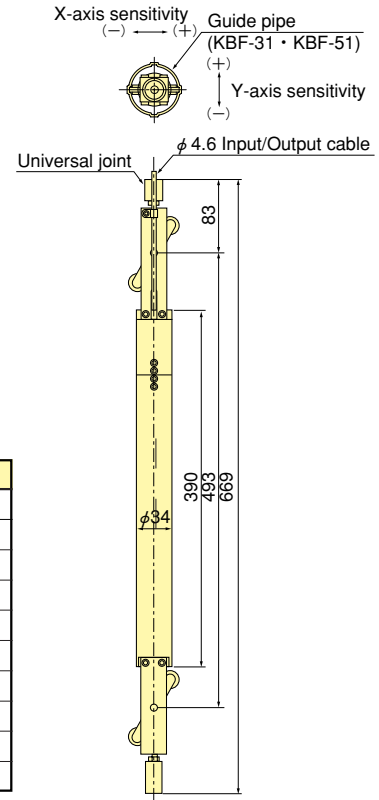
The KB-KD inclinometer is a high-output, multi-layer inclino-meter. It is used together with an aluminum guide pipe KBF-31 and an ABS guide pipe KBF-51-2.

Protection ratings : IP 68 equivalent

Specifications

Type	KB-5KD	KB-10KD
No. of measuring axis	2	
Capacity	$\pm 5^\circ$	$\pm 10^\circ$
Rated Output	1.5mV/V (3000 $\times 10^{-6}$ strain)	
Non-linearity	0.5%RO	
Cross sensitivity	3%RO	
Temperature range	-20~+60 $^\circ$ C	
Input/output resistance	Input 175 Ω / Output 350 Ω	
Recommended exciting voltage	Less than 2V	
Allowable exciting voltage	5V	
Weight	2.2kg	

Input/output cable : ϕ 4.6mm 0.08mm² 6-core shielded vinyl cable 2m



KB-P Inclinometer

Built-in Arrestor



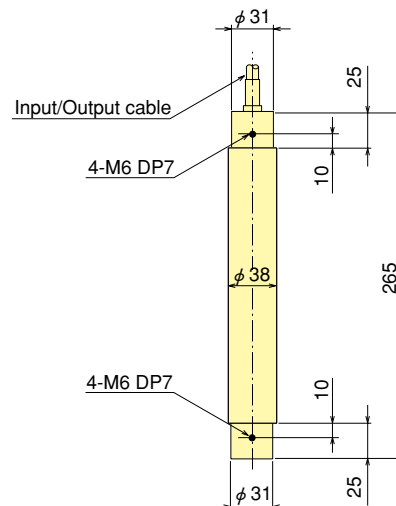
The KB-P inclinometer is used to measure the displacement of ground caused by landslides or the displacement of structures. Multiple KB-P inclinometers are attached to a special relay pipe, inserted into a borehole 66 mm or larger in diameter, and secured at multiple measurement positions. Grout is injected into the borehole to secure the inclinometers in position.

Protection ratings : IP 68 equivalent

Specifications

Type	KB-5P	KB-10P
Capacity	$\pm 5^\circ$	$\pm 10^\circ$
Rated Output	1mV/V (2000 $\times 10^{-6}$ strain)	
Non-linearity	1%RO	
Temperature range	-20~+60 $^\circ$ C	
Input/output resistance	350 Ω	
Recommended exciting voltage	Less than 2V	
Allowable exciting voltage	5V	
Weight	1.5kg	

Input/output cable : ϕ 6mm 0.35mm² 4-core shielded chloroprene cable 2m



Accessory

Relay Pipes

KBF-41P-1 (1m)

KBF-41P-2 (2m)

These Relay pipes are used to pre-connect the multiple layers of inclinometers.

Extension Pipes

KBF-41L-1 (1m)

KBF-41L-2 (2m)

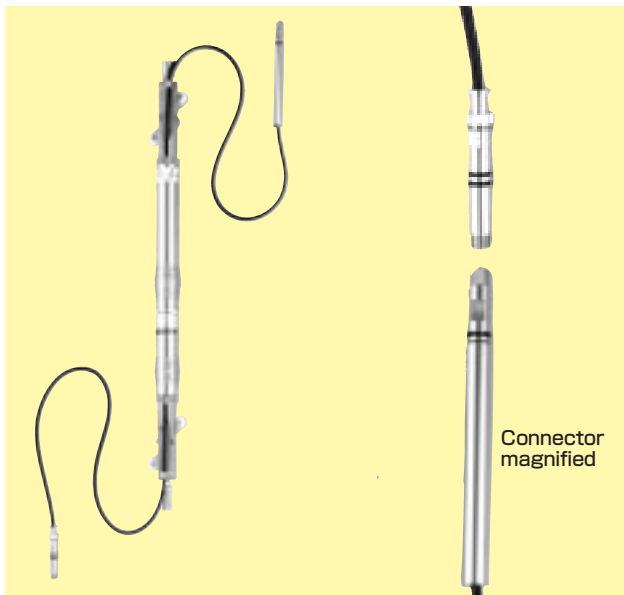
These Extension pipes are used to extend pipes when the distance between inclinometers is longer than 2m.

Positioning Pin

KBF-42

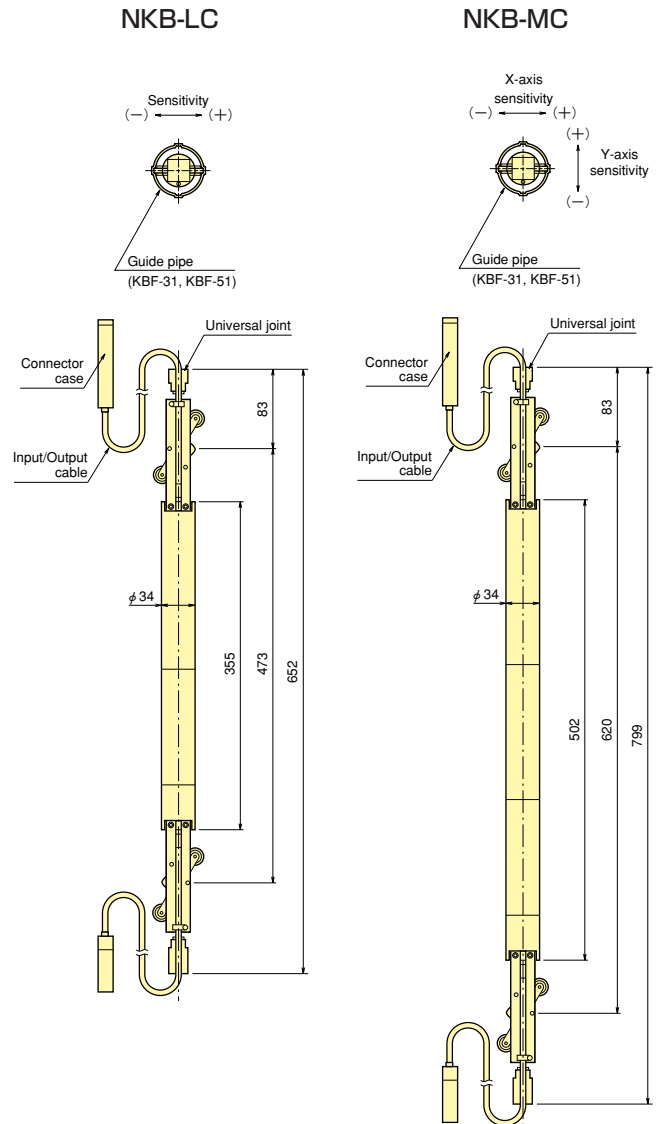
This pin is used to align the sensitivity direction of inclino-meters.

NKB-LC/NKB-MC Inclinometer



The NKB-LC and NKB-MC inclinometers were developed to measure the displacement of ground or structures automatically. After a special guide pipe is set in the ground or a structure vertically, these inclinometers are attached to a relay rod (KBF-33), inserted into the special guide pipe, and secured at a specified measurement position. They have built-in network modules so that data on the angle of inclination is transmitted by each cable of network modules. They are used to measure the displacement caused by landslides or the displacement of earth retaining walls. The NKB-LC is for measurement in one direction, while the NKB-MC is for simultaneous measurement in both X and Y directions.

Protection ratings : IP 68 equivalent



Position interval : 1m or 2m

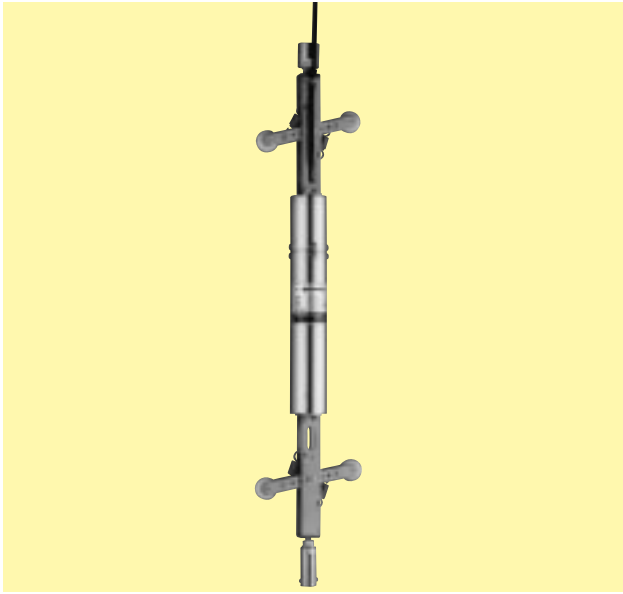
Specifications

Type	NKB-5LC	NKB-10LC	NKB-5MC	NKB-10MC
No. of measuring axis	1		2	
Capacity	$\pm 5^\circ$	$\pm 10^\circ$	$\pm 5^\circ$	$\pm 10^\circ$
Rated indication	Approx. 2000 digit			
Non-linearity	0.5%RO			
Cross sensitivity	—		3%RO	
Temperature range	$-20 \sim +60^\circ\text{C}$			
Channel set	Factory default (000~999)			
Weight	2kg		3kg	

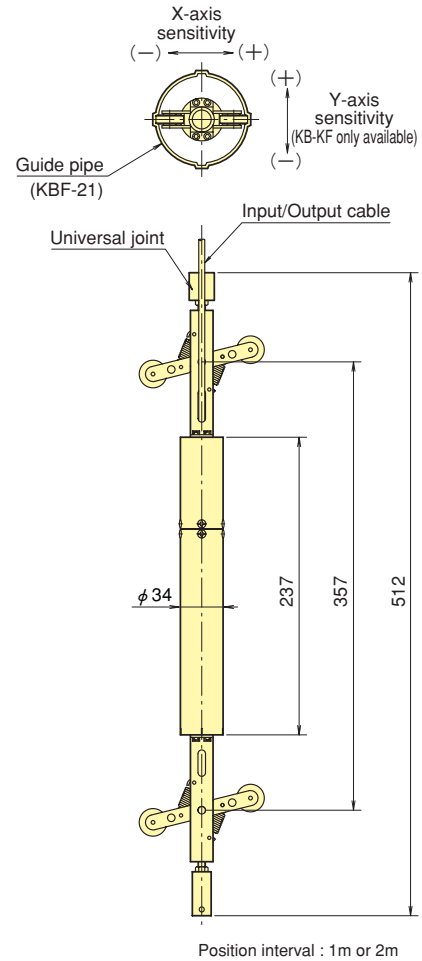
Input/output cable : $\phi 6\text{mm}$ 0.5mm^2 2-core shielded vinyl cable with special waterproofing connector, 2m
Shield wire is connected to body.

(For combination use with instruments, refer to page 64.)

KB-JF/KB-KF Inclinometer



KB-JF and KB-KF Inclinometer are multi-layer inclinometers similar to the KB-JE and KB-KE respectively. These models are used to measure landslide and displacement of retaining wall. The large inner diameter of the special guide pipe enable measurement up to 31 levels. Automatical measurement is available with our Data Logger. Graphical slope monitoring is also available with Data Logger TDS-602. The KB-KF is a bi-axial model. Arrester-integrated model is available. Protection ratings : IP 68 equivalent



Specifications

Type	KB-5JF	KB-10JF	KB-5KF	KB-10KF
No. of measuring axis	1		2	
Capacity	$\pm 5^\circ$	$\pm 10^\circ$	$\pm 5^\circ$	$\pm 10^\circ$
Rated Output	1mV/V (2000×10^{-6} strain)			
Non-linearity	0.5%RO			
Cross sensitivity	—		3%RO	
Temperature range	$-20 \sim +60^\circ\text{C}$			
Input/output resistance	350 Ω		Input 175 Ω / Output 350 Ω	
Recommended exciting voltage	Less than 2V			
Allowable exciting voltage	5V			
Weight	1.5kg		1.5kg	

Input/output cable
 KB-JF : $\phi 4.6\text{mm}$ 0.14mm² 4-core shielded vinyl cable 2m
 KB-KF : $\phi 4.6\text{mm}$ 0.08mm² 6-core shielded vinyl cable 2m

(For details, refer to pages 41~44.)

KB-GC/KB-HC Inclinometer

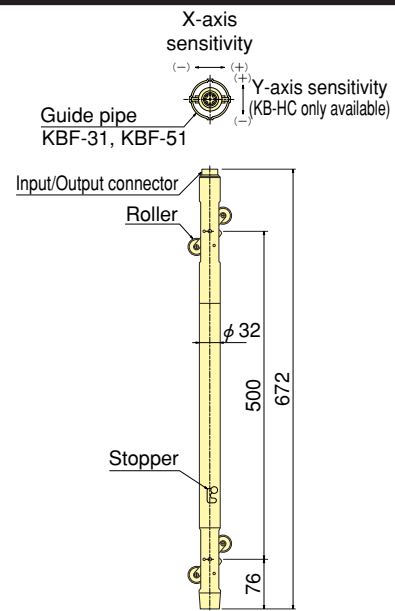


The KB-GC and KB-HC inclinometers are used to measure the inclination of ground or structures. Before installation, special guide pipes are first set in ground or structures vertically and then the inclinometers are inserted into these special guide pipes to measure inclination. The KB-HC can measure inclination in both X and Y directions simultaneously.

Protection ratings : IP 68 equivalent

Specifications

Type	KB-5GC	KB-10GC	KB-5HC	KB-10HC
No. of measuring axis	1		2	
Capacity	$\pm 5^\circ$	$\pm 10^\circ$	$\pm 5^\circ$	$\pm 10^\circ$
Rated Output	1mV/V (2000 $\times 10^{-8}$ strain)			
Non-linearity	0.5%RO			
Cross sensitivity	—		3%RO	
Temperature range	-20~+60°C			
Input/output resistance	360 Ω			
Recommended exciting voltage	Less than 2V			
Allowable exciting voltage	5V			
Unit weight	2.5kg			
Cable weight	5.5kg			



Supplied cable

KB-GC : CT9-4UM50/SWP-SNP

$\phi 9\text{mm}$ 0.5mm²

4-core shielded vinyl cable with scale, 50m

KB-HC : CT9-8UM50/SWP-SNP $\times 2$

$\phi 9\text{mm}$ 0.3mm²

8-core shielded vinyl cable with scale, 50m

Accessory

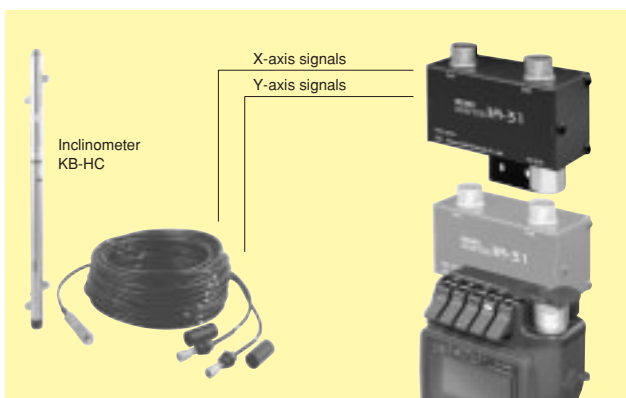
Carrying Case KBF-60

The Aluminium steel make Carrying Case contains main body of the inclinometer.

Size : 720(W) \times 100(D) \times 100(H)

Weight : 4.7 kg.

IA-31 Inclinoadapter



The Inclinoadapter is designed to measure bi-axial inclination with our Handy Digital Strainmeter TC-31K. With setting of Inclino mode on the TC-31K, inclination in both X and Y directions can be measured simultaneously. Moreover, Data memory function of the TC-31K turns ON, separated data on X and Y is saved.

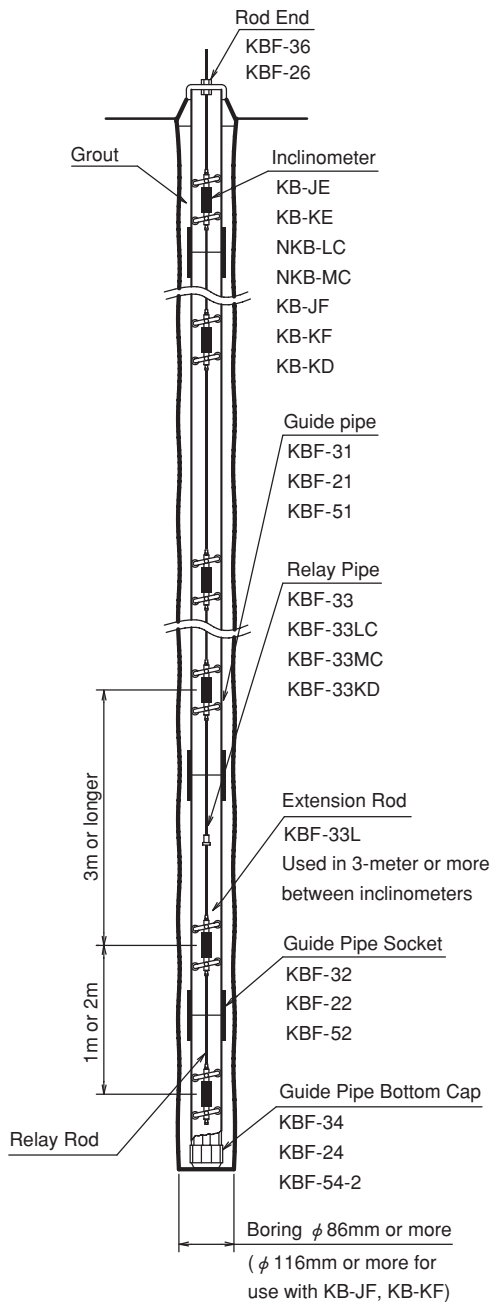
Specifications

Applicable instruments	TC-31K ^(TYPE S238C) (Ver.4.1A or later)
No. of measuring points	2
Carrier	350 Ω Constant current system 5.7mA DC drive
Extension of sensor cable	Maximum total cable resistance 150 Ω
Accuracy	Subject to TC-31K
Power requirement	Powered by TC-31K 5Vdc 100mA or less
Environment	-10~+50°C
	80%RH or less (no condensation)
Dimensions	95(W) \times 42(H) \times 85(D)
Weight	300g.

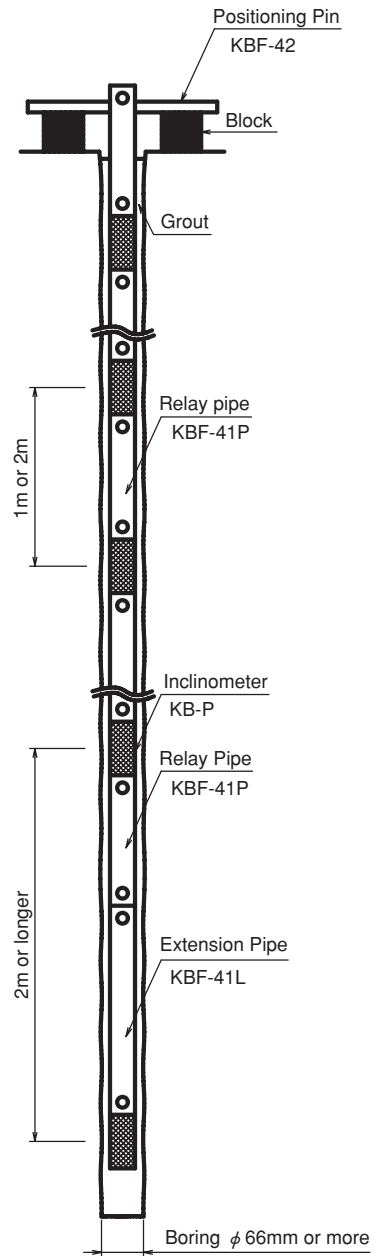
Inclinometer accessories

Installation of Inclinometer and its accessories

Inclinometer KB-JE, KB-KE, KB-JF, KB-KF, KB-KD
 NKB-LC, NKB-MC



Installation of KB-P model and its accessories



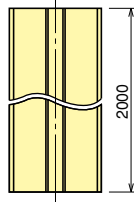
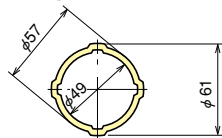
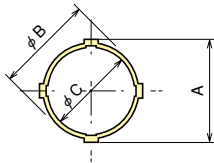
Inclinometer accessories

GUIDE PIPE KBF-31/KBF21/KBF-51

These pipes are used to hold inclinometers for insertion in the ground.

Aluminium Pipe
 KBF-31-1 : 1m
 KBF-31-2 : 2m
 KBF-31-3 : 3m
 KBF-21-3 : 3m

ABS Pipe
 KBF-51-2 : 2m



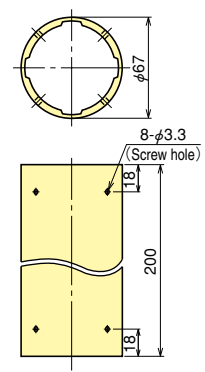
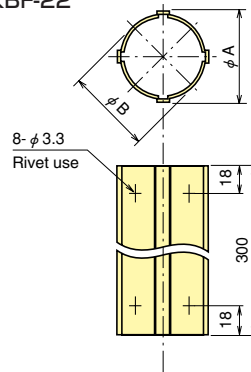
Type	A	B	C
KBF-31	56	52	49
KBF-21	78	74	69

GUIDE PIPE SOCKET KBF-32/KBF-22/KBF-52

These Pipe Sockets are used to connect guide pipes.

Aluminium Pipe
 KBF-32
 KBF-22

ABS Pipe
 KBF-52



Type	A	B
KBF-32	59.5	55.5
KBF-22	83.5	79.5

ALUMINIUM GUIDE PIPE CAP

These caps are used to prevent muddy water from entering the Aluminium guide pipes. (Cap available for both top and bottom.)

KBF-34
 KBF-24



ABS GUIDE PIPE CAP

These caps are used to prevent muddy water from entering the ABS guide pipes.

Top cap
 KBF-54-1

Bottom cap
 KBF-54-2



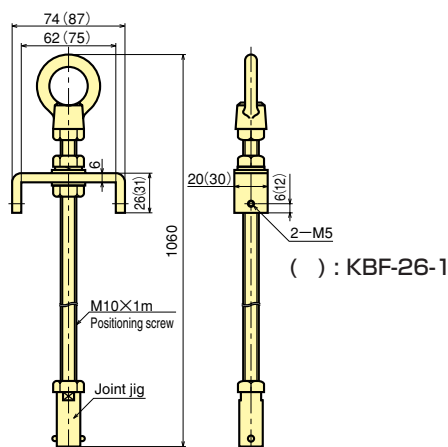
ROD END

KBF-36-1

This End is used to secure the top of KB-JE, KB-KE and KB-KD Multi-layer inclinometers.

KBF-26-1

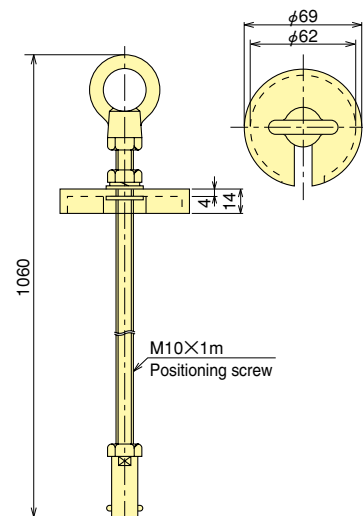
This End is used to secure the top of KB-JF and KB-KF Multi-layer inclinometers.



ROD END

KBF-36-3

This End is used to secure the top of NKB-LC and NKB-MC Multi-layer inclinometers.



CABLE HOLDER KBF-37

This Holder is used to hold cables at the measuring point when taking measurements with KB-GC and KB-HC inclinometers.



RIVET

KBF-38

This Rivet is used to secure the KBF-32 Guide Socket to the KBF-31 Guide Pipe.

KBF-28

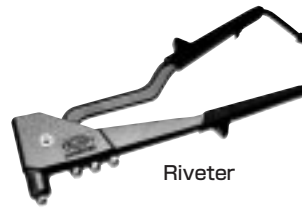
This Rivet is used to secure the KBF-22 Guide Socket to the KBF-21 Guide Pipe.

RIVETER KBF-39

This Riveter is a pair of pliers used to mount KBF-38 and KBF-28 Rivets.

SUSPENSION JIG KBF-39-2

This Jig is used to secure multi-layer inclinometers.



Riveter



Rivet

CARRYING CASE KBF-60

This Case is for KB-GC or KB-HC inclinometer.



REMOVAL PLIER KBF-39-1

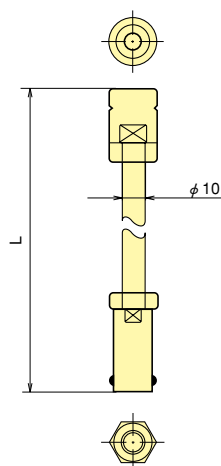
This Pliers are used to remove Relay Rods and Extension Rods from inclinometers.



RELAY ROD

This rods are used to connect Multi-layer inclinometers on multiple levels.

	Type	L (mm)
1m use	KBF-33-1	512
	-33LC-1	372
	-33KD-1	355
2m use	KBF-33-2	1512
	-33LC-2	1372
	-33MC-2	1225
	-33KD-2	1355



EXTENSION ROD KBF-33L

The KBF-33L Rods are used to extend Relay Rods.

Type	L
KBF-33L-1	1012
KBF-33L-2	2012

TAPPING SCREWS KBF-58

This screw is used to secure ABS Guide Pipe KBF-51 to Guide Socket KBF-52.

Inclinometer accessories

Specifications

Name	Type	KB-GC	KB-HC	KB-JE	KB-KE	NKB-LC	NKB-MC	KB-JF	KB-KF	KB-KD
Guide pipe	KBF-31-1 (1m use)	●	●	●	●	●	●			●
	KBF-31-2 (2m use)	●	●	●	●	●	●			●
	KBF-31-3 (3m use)	●	●	●	●	●	●			●
	KBF-21-3 (3m use)							●	●	
	KBF-51-2 (2m use)	●	●	●	●	●	●			●
Guide pipe socket	KBF-32	●	●	●	●	●	●			●
	KBF-22							●	●	
	KBF-52	●	●	●	●	●	●			●
Relay rod	KBF-33-1 (1m use)			●	●			●	●	
	KBF-33-2 (2m use)			●	●			●	●	
	KBF-33LC-1 (1m use)					●				
	KBF-33LC-2 (2m use)									
	KBF-33MC-2 (2m use)						●			
	KBF-33KD-1 (1m use) KBF-33KD-2 (2m use)									
Extension rod	KBF-33L-1 (1m use) KBF-33L-2 (2m use)			▲	▲	▲	▲	▲	▲	▲
Guide pipe cap	KBF-34	●	●	△	△	△	△			△
	KBF-24							△	△	
	KBF-54-1	●	●	△	△	△	△			△
Guide pipe cap	KBF-34	●	●	●	●	●	●			●
	KBF-24							●	●	
	KBF-54-2	●	●	●	●	●	●			●
Rod end	KBF-36-1			●	●					●
	KBF-36-3					●	●			
	KBF-26-1							●	●	
Rivet	KBF-38	●	●	●	●	●	●			●
	KBF-28							●	●	
Riveter	KBF-39	●	●	●	●	●	●	●	●	●
Guide pipe positioning jig	KBF-35	○	○	○	○	○	○			○
Cable holder	KBF-37	○	○							
Removal plier	KBF-39-1			●	●	●	●	●	●	●
Suspension jig	KBF-39-2			●	●	●	●	●	●	●
Tapping screws	KBF-58	●	●	●	●	●	●			●

●Related products required for measurement

▲Used when the distance between inclinometers is longer than 3m

○Use improves workability

△Use according to environment