CKD

SM-10214-A

INSTRUCTION MANUAL

UNIT CYLINDER

UCA2 (Metal Type)
UCA2-B (Bearing Type)

- Please read this instruction manual carefully before using this product, particularly the section describing safety.
- Retain this instruction manual with the product for further consultation whenever necessary.

CKD Corporation

For Safety Use

To use this product safely, basic knowledge of pneumatic equipment, including materials, piping, electrical system and mechanism, is required (to the level pursuant to JIS B 8370 Pneumatic System Rules).

We do not bear any responsibility for accidents caused by any person without such knowledge or arising from improper operation.

Our customers use this product for a very wide range of applications, and we cannot keep track of all of them. Depending on operating conditions, the product may fail to operate to maximum performance, or cause an accident. Thus, before placing an order, examine whether the product meets your application, requirements, and how to use it.

This product incorporates many functions and mechanisms to ensure safety. However, improper operation could result in an accident. To prevent such accidents, read this instruction manual carefully for proper operation.

Observe the cautions on handling described in this manual, as well as the following instructions:

⚠ Precautions

- Before performing an overhaul inspection on the actuator, deactivate residual pressure completely.
- While the actuator is operating, do not step into or place hands in the driving mechanism.
- To prevent an electric shock, do not touch the electric wiring connections (exposed live parts) of the actuator equipped with a solenoid valve or switch.
  Perform an overhaul inspection with the power off. Also, do not touch these live parts with wet hands.

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Unit Cylinder
Manual No. SM 10214-A

NOTE : Letters & figures enclosed within Gothic style bracket (examples such as [C2-4PP07] · [V2-503-B] etc.) are editorial symbols being unrelated with contents of the book.

Jun.7.1993
Revision : Jul.3.2000

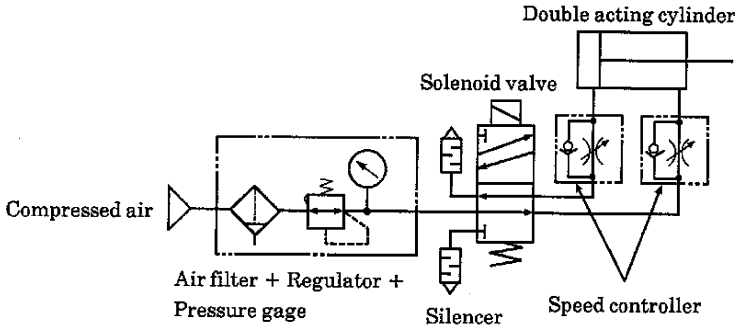
1. PRODUCT

1.1 Specification

Model No.	Metal Type	UCA2-10	UCA2-16	UCA2-25	UCA2-32
	Bearing Type	UCA2-B-10	UCA2-B-16	UCA2-B-25	UCA2-B-32
Item					
Tube bore mm		ϕ10	ϕ16	ϕ25	ϕ32
Port size		M5×0.8		Rc1/8	
Standard stroke mm		25, 50, 75, 100	25, 50, 75, 100, 125, 150, 175, 200		
Media		Compressed Air			
Lubrication		Not Required (Use Turbine Oil, Grade 1, ISO VG32 if lubrication is required)			
Working pressure range MPa		0.15 to 1.0		0.1 to 1.0	
Proof Pressure MPa		1.5			
Ambient temperature range ℃		−10 to 60 (Not to be frozen)			
Working piston speed mm/s		30 to 300			
Cushioning		Built-in Shock Killer			
Adjustable range of stroke mm		Standard Stroke−10 (One end−5), Optional−25			
Maximum Load N at 0.5MPa	Body mounting type (X)	6.9	19.6	34.3	49
	Plate mounting type(Y)	14.7	39.2	68.6	98
Non turning accuracy (at stroke 0mm) °	Metal type	±0.10	±0.05	±0.05	±0.02
	Bearing type	±0.04	±0.03	±0.01	±0.01

1.2 Fundamental circuit diagram

Fundamental circuit diagram for rodless cylinder is generally as per illustrated below. (Pre-lubricated)

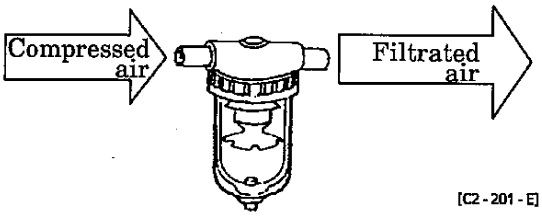


2
CAUTION

2. CAUTION

2.1 Fluid

1) Use the compressed air, filtrated and dehumidified. Carefully select a filter of an adequate filtration rate (5μm or lower preferred), flow rate and its mounting location (as closest to directional control valve as possible).

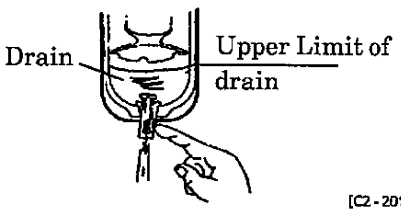


[C2-201-E]

2) Be sure to drain out the accumulation in filter periodically.

3) Note that the intrusion of carbide of compressor oil (such as carbon or tarry substance) into the circuit causes malfunction of solenoid valve and cylinder. Be sure to carry out thorough inspection and maintenance of compressor.

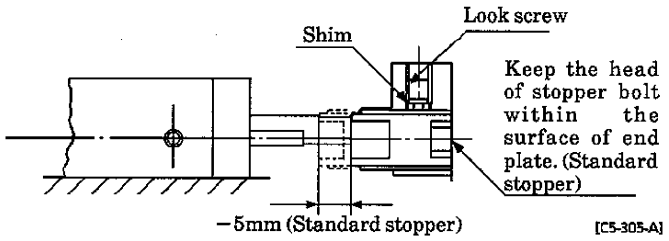
4) This valve does not require lubrication. It is recommended, however, to use Turbine oil Grade 1, ISO VG32 if lubrication is



[C2-201-F]

3. OPERATION

3.1 Adjustment of Stopper



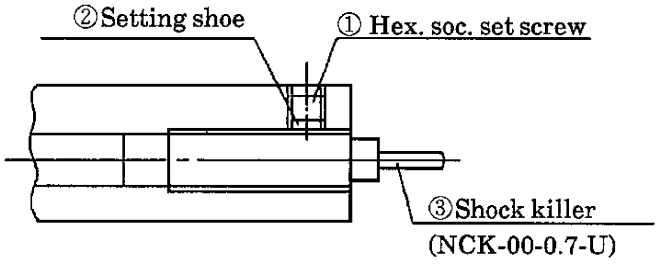
Adjust the location of stopper bolt by turning it after loosening the lock screw. Be sure to tighten it back again after adjustment is accomplished. Keep the head of stopper bolt within the sur face of end plate. Maximum adjustable stroke per end is −5mm.

3.2 Shock Killer

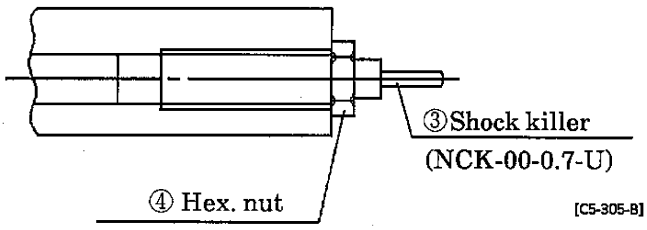
The absorbing volume of kinetic energy by the shock killer built in the cylinder of this type is fixed making it unable to readjust the volume. Avoid intending to remove the shock killer. Comply with the following precedure, if and when disassemblying the cushion is required by some reasons.

1) In case of it is ϕ10
   (1) Remove socket head bolt ①. Be sure not to misplace set screw② in this event.
   (2) Imscrew the shock killer③ by its neck with fingers. Apply hand tool such as a spanner when it is too hard to turn it by fingers.
   In this case, the service life of shock killer is approx, 3million actions.
2) In case of it is ϕ16 to ϕ32
   A. When shipping it as a total product
      a. Remove socket head bolt④. (It comes out as a consolidated unit together with shock killer.)
   B. When repair kit part is mounted.
      a. Remove hexagonal nut④.
      b. Use spanner to remove shock killer③ applying the tool at parallel sided for spanner at the tip of threaded portion.
      In this case, the service life of shock killer is approx, 3million actions.

ϕ10



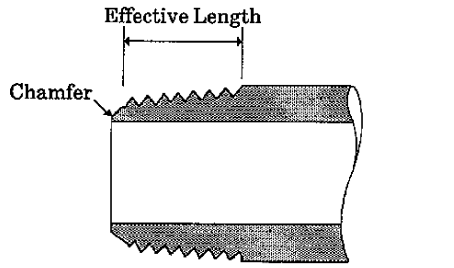
ϕ16 to ϕ32



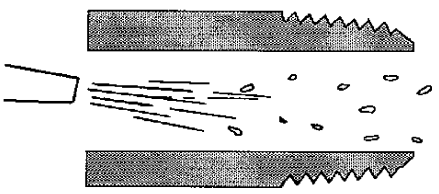
4. INSTALLATION

4.1 Piping

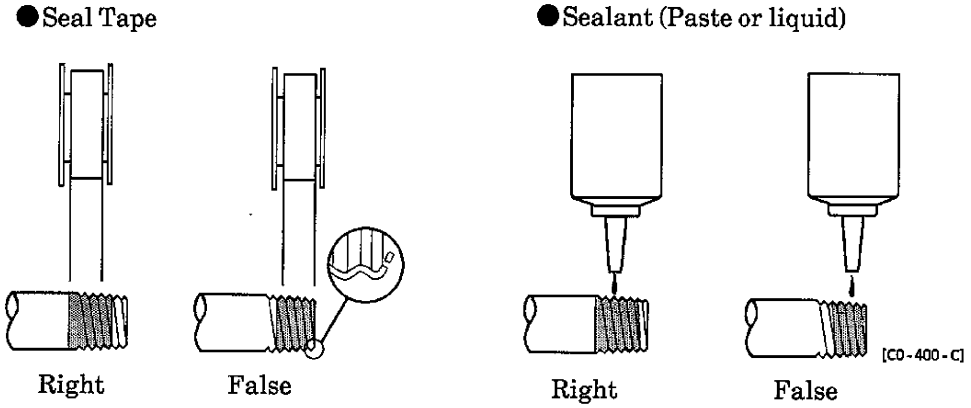
1) For piping beyond the filter, use pipes that hardly get corroded such as galvanized pipes, nylon tubes, rubber tubes, etc.
2) See to it that the pipe connecting cylinder and solenoid valve has effective sectional area needed for the cylinder to drive at specified speed. (Refer to Selection Guide Table for Related Equipment.)
3) Install filter preferably adjacent upper-stream to solenoid valve for eliminating rust, foreign substance and drain in the pipe.
4) Strictly observe the effective thread length of gas pipe and give a chamfer of approx. 1/2 pitch from the threaded end.
5) Flush air into the pipe to blow out foreign substances and chips before piping.



[C0-400-A]


[C0-400-B]

6) Refrain applying sealant or sealing tape approx. two pitches of thread off the tip of pipe to avoid residual substances from falling into piping system.



[C0-400-C]

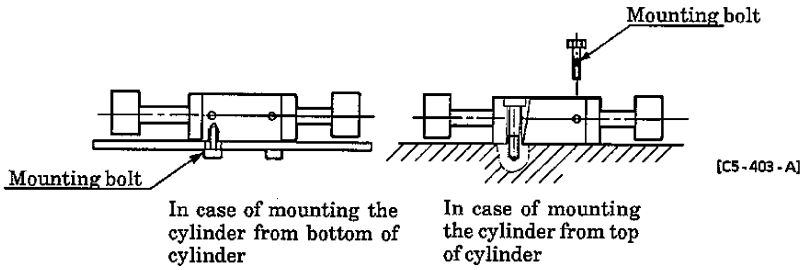
7) Inspect against any external leakage at each threaded joint, Upon completion of plumbing, by applying soapy water over it.

4.2 Installation

1) In case of Body mounting (Model UCA2-(B)-X)
There are two types of mounting as follows.

Use socket headed bolts to mount the cylinder using bolts from top surface of cylinder downward. Refer the table right to select appropriate size of bolts.

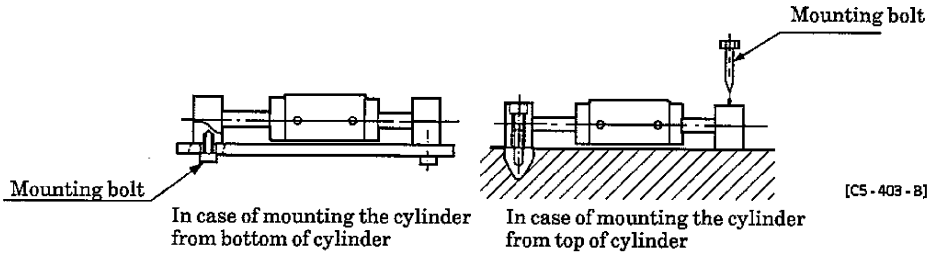
Item / Tube bore dia. (mm)	Sizes of Socket headed bolts	Quantity
ϕ10	M3×22ℓ	4
ϕ16	M4×30ℓ	4
ϕ25	M5×35ℓ	4
ϕ32	M6×40ℓ	4



2) In case of Plate mounting (Model UCA2-(B)-Y)
There are two types of mounting as follows.

Use socket headed bolts to mount the cylinder using bolts from top surface of cylinder downward. Refer the table right to select appropriate size of bolts.

Item / Tube bore dia. (mm)	Sizes of Socket headed bolts	Quantity
ϕ10	M3×22ℓ	4
ϕ16	M4×30ℓ	4
ϕ25	M5×35ℓ	4
ϕ32	M6×40ℓ	4

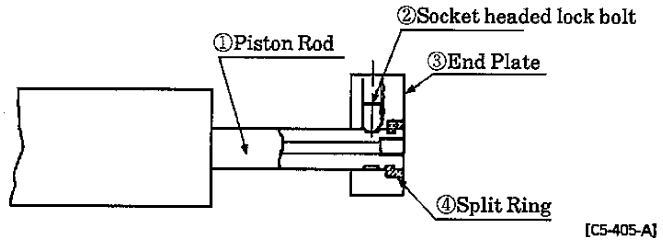


4.3 Removing the End Plate

1) Loosen Socket headed lock screw②.
Refer to the table at right as for the size of bolts.

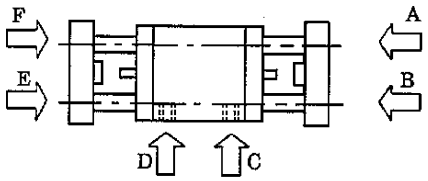
Tube bore dia. (mm)	Sizes of Socket headed bolts	Quantity
ϕ10	M4×4ℓ	4
ϕ16	M4×4ℓ	4
ϕ25	M5×5ℓ	4
ϕ32	M5×5ℓ	4

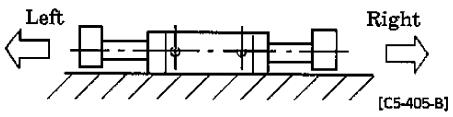
2) Take split ring④ by sliding the end plate for approx. 10mm toward cylinder body then take the end plate③ off the piston rod.



4.4 Peculiar piping to Unit Cylinder

1) Body mounting type (Model Code : UCA2-(B)-X)

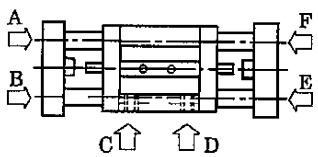


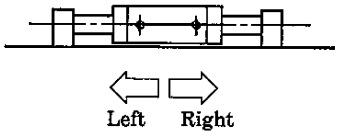


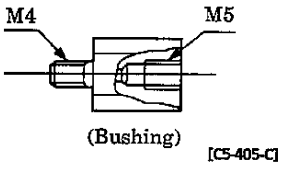
Relative directions of pressure port and piston rod movement is as per illustrated below. Apply blind plugs to what ever ports unused.

Pressure port	A	B	C	D	E	F
Direction of piston motion	Flat	Flat	Left	Right	Flat	Flat

2) End Plate mounting type (Model Code : UCA2-(B)-Y)







Relative directions of pressure port and piston rod movement is as per illustrated below. Apply blind plugs to whatever ports unused. Use the bushings supplied together with cylinder, in case of mounting the model UCA2-(B)-Y-10.

Pressure port	A	B	C	D	E	F
Direction of body motion	Left	Right	Flat	Flat	Right	Left

4.5 Miscellaneous caution of handling cylinder

1) Carefully avoid giving scratch marks or striking dents on the sliding surface or piston rod. It may cause damage to packing or air leaking.
2) Carefully avoid giving scratch marks or striking dents on the mounting flat of body or plate on both sides to become harmful of flatness.
3) Carefully keep machining chips or foreign particles from falling into the spot facing of the stopper. It may cause damage to shock killer.
4) Carefully avoid of giving twisting or warping to the piston rod during mounting work. It may cause increased sliding resistance, shorter wear and tear of bearing resulting inaccuracy of positioning or air leakage.
5) Design to make gravity center of load and center of unit cylinder as close as possible.

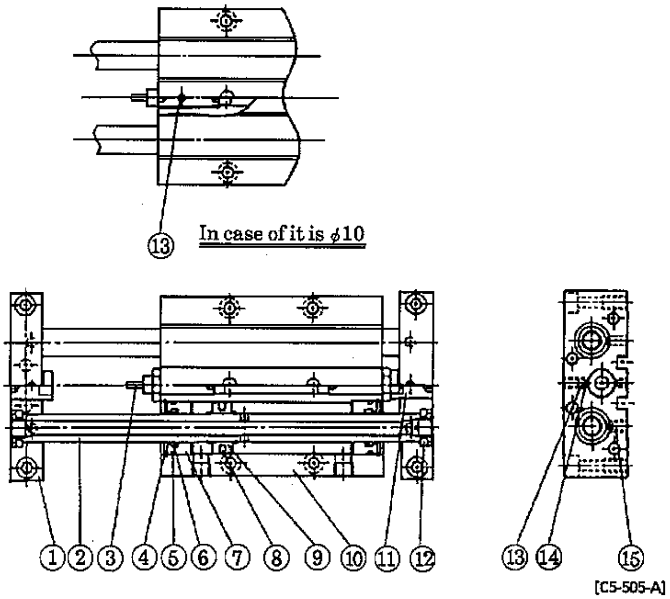
5. MAINTENANCE

5.1 Disassembling

1) This cylinder is able to be disassembled.
Replace component parts by disassembling cylinder referring to internal structure drawing when air leakage is ever occurred.

2) Internal structure drawing and parts list

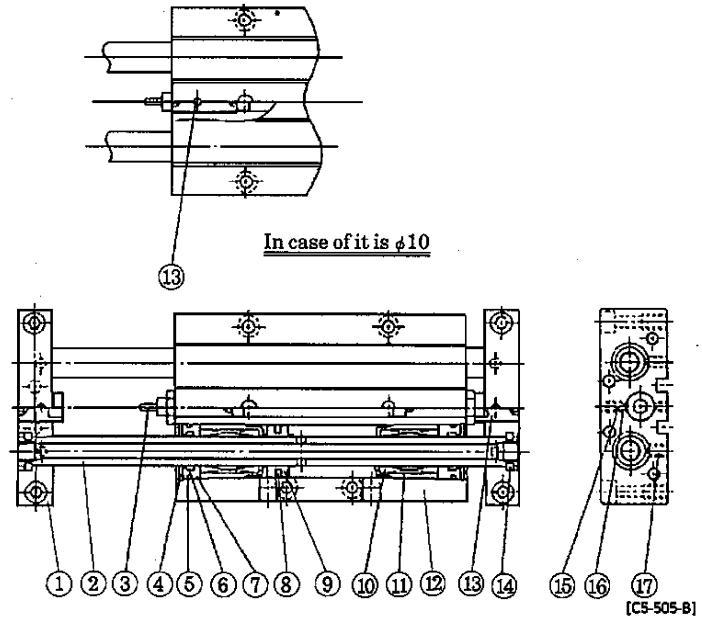
(1) Metal type



[C5-505-A]

Item No.	Parts name	Material	Remarks
①	End plate	Alluminum alloy	Colored alumite finish (Black)
②	Piston rod	Steel	Industrial chrome plate
③	Shock killer		NCK-00-0.7-U
④	Snap ring, large	Steel	Black oxide finish
⑤	Rod matal gasket	Nitril rubber	Packing standard AS568
⑥	Rod packing	Nitril rubber	Packing standard PDU
⑦	Rod metal	Special alluminum	Hard ened alumite finish
⑧	Piston packing	Nitril rubber	ϕ10, ϕ16Packing standard DYP ϕ25, ϕ32Packing standard PSD
⑨	Piston	Alluminum alloy	
⑩	Cylinder body	Alluminum alloy	Hardened alumite finish
⑪	Stopper	Steel	Zinmc-chromate
⑫	Split ring	Steel	Black oxide finish
⑬	Socket head scre	Steel	Black oxide finish
⑭	Set shoe	Alluminum alloy	
⑮	Sockt head scre	Steel	Black oxide finish, w/dry lock glue

2) Bearing type



Item No.	Parts name	Material	Remarks
①	End plate	Alluminum alloy	Colored alumite finish (Black)
②	Piston rod	Stell	Industrial chrome plate
③	Shock killer		NCK-00-0.7-U
④	Snap ring, Large	Stell	Black oxide finish
⑤	Rod metal gasket	Nitril rubber	Packing standard AS568
⑥	Rod packing	Nitril rubber	Packing standard PDU
⑦	Rod metal	Special alluminum	Hard ened alumite finish
⑧	Piston packing	Nitril rubber	ϕ10, ϕ16Packing standard DYP ϕ25, ϕ32Packing satndard PSD
⑨	Piston	Alluminum alloy	
⑩	Ball bushing		ϕ10 : LM6 ϕ16 : LM10 ϕ25 : KH14 ϕ32 : KH16
⑪	Housing	Alluminum alloy	
⑫	Cylinder body	Alluminum alloy	Hardened alumite finish
⑬	Stopper	Steel	Zinmc-chromate
⑭	Split ring	Steel	Black oxide finish
⑮	Socket head scre	Steel	Black oxide finish
⑯	Set shoe	Alluminum alloy	
⑰	Socket head scre	Steel	Black oxide finish, w/dry lock glue

Expendable Parts List

Item No. / Parts name / Tube bore(mm) / Kit No.	⑥	⑤	⑧	⑮
	Rod packing	Rod matal gasket	Piston packing	Socket head scre
ϕ10	UCA2-10-K	PDU-6	AS568-012	DYP-10	F4-206231
ϕ16	UCA2-16-K	PDU-10	AS568-016	DYP-16	F4-206231
ϕ25	UCA2-25-K	PDU-14	AS568-020	PSD-25	F4-206232
ϕ32	UCA2-32-K	PDU-16	AS568-026	PSD-32	F4-206233

Note : Expendable components corelate between bearing type and that of metal type.

6. HOW TO ORDER

Specify the model code complying with the following coding specification.

6.1 Without Switch

MODEL — a — b — c — d

Model		ⓐ Mounting type		ⓑ Tube bore	
UCA2	Sliding shaft bearing (Metal type)	X	Body mounting	10	ϕ10
UCA2-B	Rolling shaft bearing (Bearing type)	Y	Plate mounting	16	ϕ16
				25	ϕ25
				32	ϕ32

ⓒ Stroke (mm)			ⓓ Accessories, Options		
Tube bore ϕ10	Tube bore ϕ16, ϕ25, ϕ32		P1A	One end adjusting stopper	Plate A side
25	25	125	P1B		Plate B side
50	50	150	P2	Both ends adjusting stopper	
75	75	175			
100	100	200			

6.2 With Switch

MODEL — a — b — c — d — e — f

Model		ⓐ Mounting type		ⓑ Tube bore	
UCA2-L	Sliding shaft bearing (Metal type)	X	Body mounting	10	ϕ10
UCA2-BL	Rolling shaft bearing (Bearing type)	Y	Plate mounting	16	ϕ16
				25	ϕ25
				32	ϕ32

ⓒ Stroke (mm)			ⓓ Switch Model No.			
Tube bore ϕ10	Tube bore ϕ16, ϕ25, ϕ32		Reed switch type	S0※	Relay for PC	2-wire
25	25	125		S5※	Relay for PC, IC circuit, series connection	
50	50	150	Solid state type	S2※	For PC	
75	75	175		S3※	For Relay, PC, IC circuit, for small solenoid valve	3-wire
100	100	200				

ⓔ Number of switch			ⓕ Accessories, Options		
PA	with	Plate A side	P1A	One end adjustin	Plate A side
RB	one	Plate B side	P1B		Plate B side
D	with two		P2	Both sides adjusting stopper	
T	with three				

※ Length of lead wire	
No code	1m (Stndard)
3	3m (Option)
5	5m (Option)

Note : Minimum stroke required for one switch = 10 mm
Minimum stroke required for two switches = 20 mm
Minimum stroke required for three switches = 75 mm