



認證取得業體



인사말씀

그 동안 성원해 주신 소비자 제위께 진심으로 감사드립니다.

저희 용성전기(주)는 소비자 제위의 신뢰를 바탕으로 급속도로 변화해 가는 산업기기 발전에 발 맞추어 국제적으로 인정되는 품질보증체제 구축으로 품질향상과 신제품 개발에 박차를 가하고 꾸준한 연구개발과 기술 축적으로 원자력 발전소용 전기기기 뿐만 아니라 산업용 자동제어기기 및 전자제품에 이르기까지 다양한 제품을 생산 하므로써 명실공히 인정받는 종합메이커로써 계속 성장해 나갈 것입니다.

이를 위해 당사는 원자력 발전소용 전기기기 품질보증을 위해 원자력 품질보증 인증 기관인 대한전기협회로부터 원자력품질보증(KEPIC-EN)인증을 취득하였으며 산업용 자동제어기기 품질보증을 위해서는 미국의 RAB로부터 ISO-9001 품질보증 시스템 인증을 취득하여 제품 생산시 적용하고 있으며 제품 경쟁력 확보 및 수출을 위해 미국의 UL사로부터  인증 및 중국의  인증을 취득함으로써  및  MARK 인 증등과 병행하여 소비자 제위께 신뢰성을 드리기 위한 노력을 계속 해나가고 있으며 이를 인정받아 중소기업청으로부터 1999년 4분기 기술혁신상을 수상한 바 있습니다.

또한 저희 용성전기(주)는 원자력 발전소의 Mild Environmental Condition에 사용되는 CLASS IE 안정성관련 전기기기를 제작하여 공급하기 위하여 국내 과학기술부 인증 기 기검증 회사인 (주)새한검증에 기기검증(Equipment Qualification : EQ) 시험을 의뢰하 여 (주)새한검증 주관하에 미국의 NRC인증 기기검증 회사인 NLI사와 공동으로 기기 점증을 수행하여 1998년 4월 인증 완료하여 원자력 발전소용 안정성관련 CLASS IE 전기기기를 제작하여 공급하고 있으며 Harsh & Mild Environmental Condition 용 Limit Switch 및 Terminal Block과 Mild Environmental Condition용 Control Switch Modules(CLASS IE)을 또한 개발 완료 하였습니다.

따라서 저희 용성전기(주)는 철저한 품질보증 시스템에 따라 산업용 전기기기 및 전자제품과 원자력급 전기기기(CLASS IE)를 제작 공급해 드릴 것을 약속 드리오며 보다 신뢰성 있는 제품을 개발해 나아 가도록 노력하겠습니다.

많은 지원과 관심을 기울여 주시기를 부탁드립니다.



Greeting Dear Customer

Thank all the customer sincerely for encouragement all the while. Our company, YongSung Electric Co., Ltd (Here-in-after called by YongSung) is now accelerating to the quality improvement and new product development based international quality assurance certification on the foundation of all the customers reliability keeping pace with development of industrial equipment which is changing rapidly.

YongSung will grow as a general maker receiving customers recognition without interruption by manufacturing products from Automatic Control Parts to industrial electronic products as well as an electrical products for nuclear power plant through continuing R&D and technology accumulation.

YongSung was received **KEPIC-EN** Certificate which is issued by Korea Electric Association which is Nuclear Quality Assurance Authorization Organization for Quality Assurance System of nuclear grade items. And received **ISO-9001** Certificate which is issued by RAB in U.S.A for industrial automatic control part.

Also with the export competition of items, We are always make an effort to know trust to our customer through acquiring  Certificates from Underwrite Lab. in U.S.A and  Certificates from China to be with  and  marks.

As a results, We are awarded to technology innovation reward for our effort from Small & Medium Business Administration in 4th 1999.

Also YongSung was qualified by SaeHan Engineering & Qualification Co., Ltd which is Equipment Qualification(E.Q) Company approved by Ministry of Science & Technology and NLI which is Equipment Qualification Company approved by NRC of U.S.A in order to supply safety related electrical equipment(CLASS 1E item) applied in Mild Environmental Condition of nuclear power plant on April, 1998.

Now we are preparing to supply Limit Switch, Terminal Block(CLASS 1E) to be used in Harsh Environmental Condition and Control Switch Moduels to be used in Mild Environmental Condition.

All of us are able to make a promise to you with supply our industrial electric & electronic equipment, and electrical equipment for nuclear power plant(CLASS 1E) according to Quaality Assurance System from beginning to end. Also we are always make every effort to develop a more trust products. We wish that you give us much advice without hesitation and concern.

S.J. CHOI
PRESIDENT

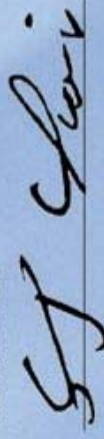
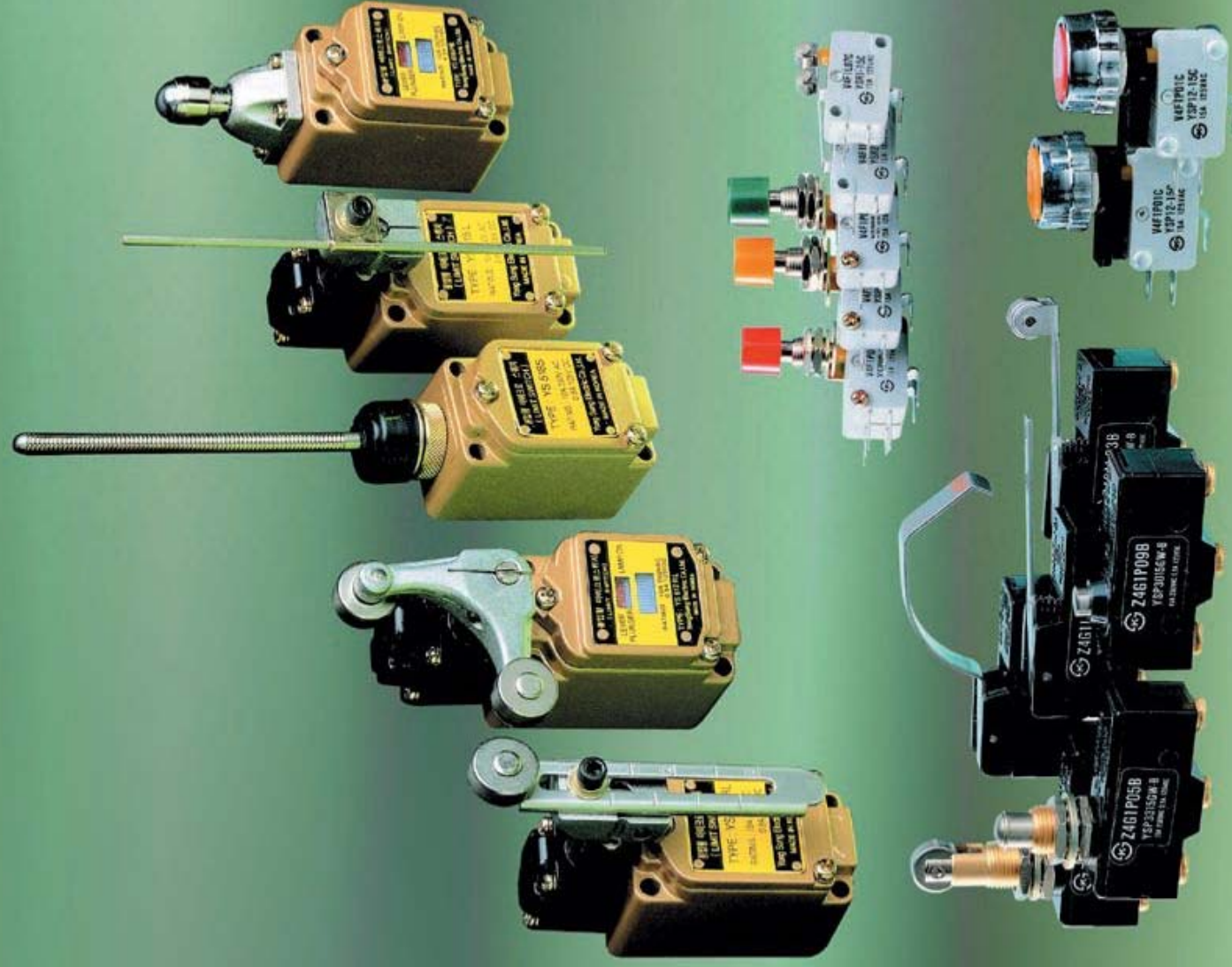


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LIMIT SWITCHES

- 1-1 Alternating Current Micro Switch (Z Type)
- 1-2 Direct Current Micro Switch (Z Type)
- 1-3 Mini Micro Switch (V Type)
- 1-4 Limit Switch

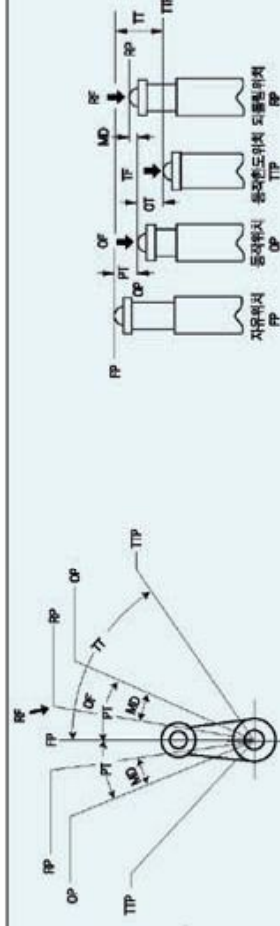
1 리미트 스위치류 LIMIT SWITCHES

1-1	交流用 마이크로 스위치	1-1	Alternating Current Micro Switch
1-2	直流用 마이크로 스위치	1-2	Direct Current Micro Switch
1-3	小形 마이크로 스위치	1-3	Mini Micro Switch
1-4	리미트 스위치	1-4	Limit Switch

• 動作特性에 關한 用語 - Terms for operating characteristics

- 自由位置(F.P) : 外部에서 힘이加해져 있지 않았을 때의 액추에이터의 위치
- 動作位置(O.P) : 액추에이터에 外力이 가해져 可動接點이 自由位置 상태에서, 곧 反轉할 때의 액추에이터 位置
- 動作에 必要한 힘(O.F) : 自由位置로부터 動作位置까지 움직이게 하는데 必要한 액추에이터에 가해지는 힘
- 動作까지의 움직임(P.T) : 액추에이터의 自由位置로부터 動作位置까지의 이동거리 또는 이동각도
- 動作限度位置(T.T.P) : 액추에이터가 액추에이터 멈춤에 도달하였을 때의 액추에이터의 위치
- 動作後의 움직임(O.T) : 액추에이터의 動作位置로부터 動作限度位置까지의 이동거리 또는 이동각도
- 되돌림 位置(R.P) : 액추에이터의 外力을 감소시켜, 可動接點이 動作位置의 상태로부터 自由位置의 상태로 反轉할 때의 액추에이터의 位置
- 應差의 움직임(M.D) : 액추에이터의 動作位置에서부터 되돌림 位置까지의 이동거리 또는 이동각도
- 全體의 움직임(T.T) : 액추에이터 自由位置에서 動作限度位置까지의 이동거리 또는 이동각도
- 되돌림의 힘(R.F) : 동작한도 위치로부터 되돌림 위치까지 움직이는데 필요한 액추에이터에 가해진 힘
- Free Position (F.P) : Actuator's position when no external force is given.
- Operating position (O.P) : Actuator's position when the operating contact turns over soon by giving outer force to actuator in position state.
- Operating force (O.F) : Given force to actuator required to move from free position to operating one.
- Pretravel (P.T) : Moving distance or moving angle from actuator's free position to operating one.
- Total Travel Position (T.T.P) : Actuator's position when actuator reaches at actuator stop position.
- Over Travel (O.T) : Moving distance or moving angle from actuator's operation position to operating limit.
- Release Position (R.P) : Actuator's position when operating contact turns over from operating position to free with reducing actuator's outer force.
- Movement Differential (M.D) : Moving distance or angle from actuator's operating position to release one.
- Total Travel (T.T) : Moving distance or angle from actuator's free position to T.T.P (operating limited one).
- Release Force (R.F) : Given force to actuator required to move it from T.T.P to R.P.

• 動作 特性圖 - Operating characteristic diagram



1-1

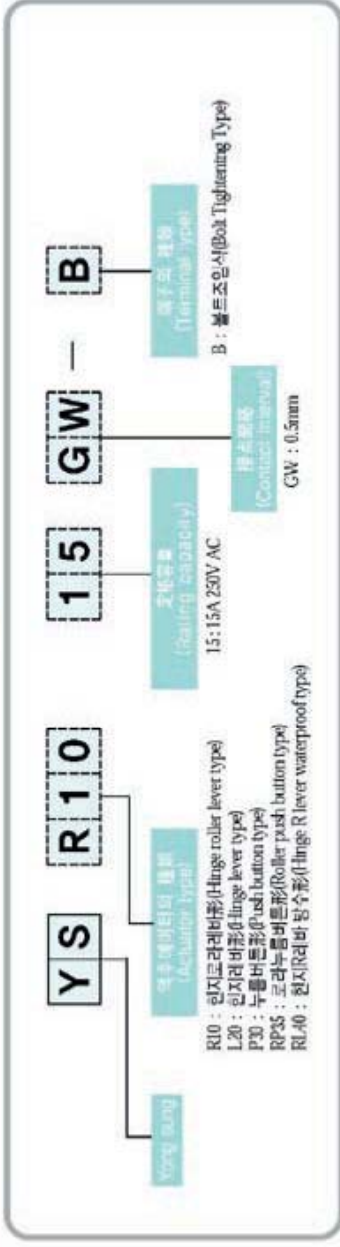
교류용 마이크로 스위치 (Z형)

Alternating Current Micro Switch (Z Type)

KSC 4508
제 6942 호

리미트 스위치

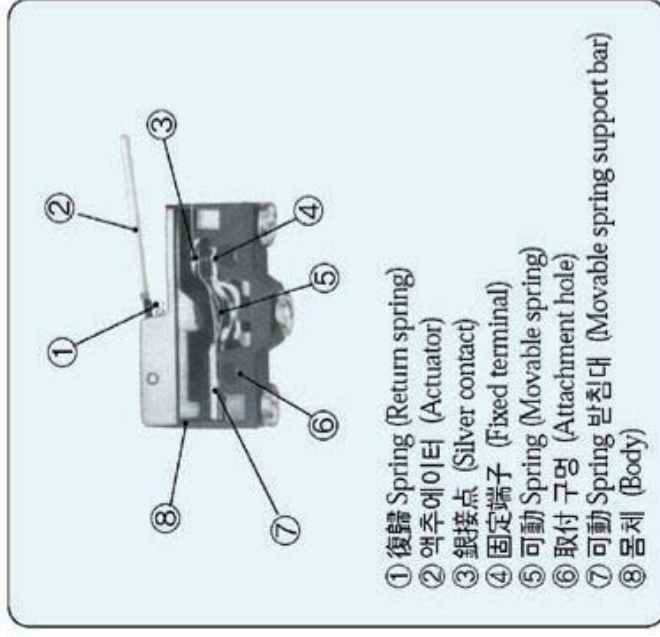
• 形式 區分圖 - Type Classification diagram



• 特徵 - Features

- 高 신뢰성 마이크로 스위치
- 15A의 開閉容量
- 高性能으로 適合
- 액추에이터에는 누름버튼형과 힙지레올라버형 등의 다양한 種類가 있습니다.
- 耐熱, 耐燃 및 耐아크성이 양호하므로 전기절연이 優秀합니다.
- High reliability micro switch
- 15A switching capacity
- Suitable for high performance
- Various kinds of actuator such as push button type, hinge lever type etc.
- Excellent electric insulation due to good tendency of heat-resistant, smoke-resistant and arc-resistant.

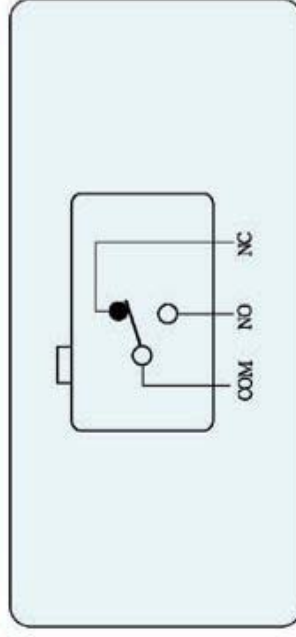
• 内部 構造圖 - Inside structure diagram



• 用途 - Application

- 各種産業機械, 壓力, 溫度, 液面, 重量, 時間 등의 制御用 및 自動制御機器에 使用됩니다.
- For Control of various kinds of industrial machines, pressure, temperature, liquid face, weight, speed, time etc., and for automatic control devices.

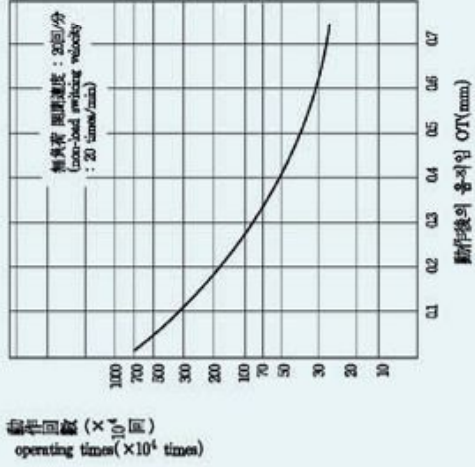
• 接点 構成圖 - Contact form diagram



●壽命曲線 - Lifetime curve

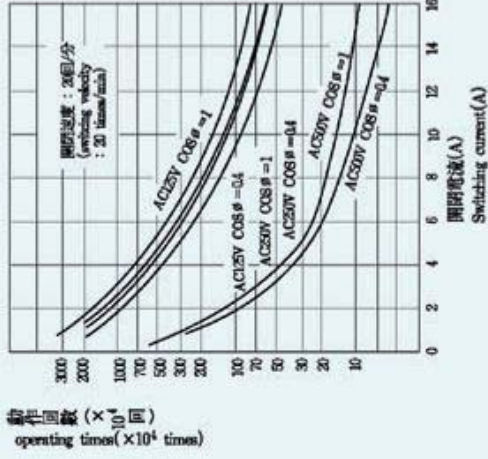
●機械的壽命曲線

(Mechanical lifetime curve)



●電氣的壽命曲線

(Electrical lifetime curve)



●액추에이터의 種類 - Actuator type

分類名 Classified type	形狀 Shape	特性 및 適用 Characteristics & Application	形名 Designation
短누름버튼形 Short push button		버튼길이가 짧고 직경이 넓어 작동이 편함 Easy operating by short button and wide dia.	YSP 3015GW-B YSP 3010GW-B
長누름버튼形 Long push button		低速CAM과 함께 사용 가능 (OT, 最大) Possible using with low speed CAM (OT, Max.)	YSP 3315GW-B YSP 3310GW-B
로라누름버튼形 Roller push button		長누름버튼形에 로라부착 (OT, 大) Roller Attachment to long push button type (OT, large)	YSRP 3615GW-B YSRP 3610GW-B
가로로 누름버튼形 Horizontal roller push button		로라누름버튼形과 特性은 같으나 로라방향만 틀림 Same characteristic as Roller push button except roller direction	YSRP 3515GW-B YSRP 3510GW-B
힌지短레바形 Hinge short lever		레바길이 最小 Lever length Min.	YSL 2015GW-B YSL 2010GW-B
힌지中레바形 Hinge medium lever		動作力, 壽命 正負도 를 고려한 선택가능 Choice possible	YSL 2115GW-B YSL 2110GW-B
힌지長레바形 Hinge long lever		considering operating force, life accuracy	YSL 2215GW-B YSL 2210GW-B
힌지特長레바形 Hinge super long lever		레바길이 最大 Lever length Max	YSL 2315GW-B YSL 2310GW-B
힌지로라短레바形 Hinge roller short lever		高速回轉, 短直線 운동에 적합 Suitable for high speed revolution & short linear movement	YSR 1015GW-B YSR 1010GW-B
힌지로라中레바形 Hinge roller medium lever		高速CAM에 적합 Suitable for high speed CAM	YSR 1115GW-B YSR 1110GW-B
힌지로라長레바形 Hinge roller long lever		레바길이 最大 Lever length Max.	YSR 1215GW-B YSR 1210GW-B

• 定格 - Rating

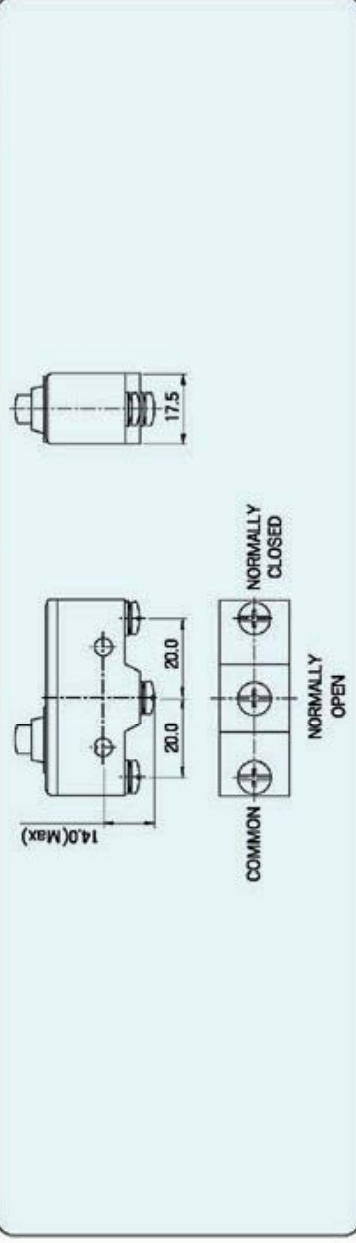
定格電壓(V) Rating voltage(V)	無誘導負荷(A) Non-inductive load(A)				誘導負荷(A) Inductive load(A)			
	抵抗負荷(resistance load)(cos ϕ =1)		램프負荷(lamp load)		誘導負荷(inductive load)(cos ϕ =0.4, L/R=7ms)		電動機負荷(motor load)	
	常時閉路 normally closed	常時開路 normally open	常時閉路 normally closed	常時開路 normally open	常時閉路 normally closed	常時開路 normally open	常時閉路 normally closed	常時開路 normally open
AC 125	15		2	1		7	2.5	2
250	15		1	0.5		5	1.5	1
DC 8	15		2	1		7	3	1.5
14	15		2	1		7	3	1.5
30	2		2	1		1	1	0.5
125	0.4		0.4	0.4	0.03		0.03	0.03
250	0.2		0.2	0.2	0.02		0.02	0.02

• 端子의 種類 - Terminal types

表示名(Marking)	英文 (English)	名稱 (Designation)
COM	Common	共通端子 (Common terminal)
N.O	Normally Open	常時開路 (Normally open circuit)
N.C	Normally Closed	常時閉路 (Normally closed circuit)

• 볼트조임식 端子 - Bolt tightening type terminal

(unit : mm)



• 性能 概要 - Performance summary

定格容量 (Rating capacity)	15A 250V AC, 0.4A 125V DC(저항부하)
開閉頻度 (Switching frequency)	機械的 (mechanical)
	電氣的 (electrical)
絕緣抵抗 (Insulation resistance)	above 100M Ω (DC 500V, Meg)
接觸抵抗 (Contact resistance)	below 15m Ω (initial value)
耐震動 (Withstand vibration)	double amplitude 1.5 mm (10 ~ 55Hz)
耐衝擊 (Withstand impact)	300 ㉾ (about 30G)
耐電壓 (Withstand voltage)	AC1,500V/min (50~60Hz)
壽命 (Lifetime)	機械的 (mechanical)
	電氣的 (electrical)
使用周圍溫度 (Ambient temperature)	-25℃ ~ +55℃
相對濕度 (Relative humidity)	45 ~ 85%

• 形別 部品材質 - Part material per type

形名(Type) 부품(Part)	YSR 힌지롤러레바형 Hinge roller lever type	YSL 힌지레바형 Hinge lever type	YSP 누름버튼형 Push button type	YSRP 로라누름버튼형 Roller push button type
몸 체 Body	열경화성 페놀 수지 Thermosetting Phenol resin			
액추에이터 Actuator	스테인레스강 Stainless steel			탄소강 Carbon steel
端子 Terminal		黃銅 Brass		
可動 spring Movable spring		베릴륨동 Beryllium copper		
接点 Contact		은점점 Silver		
부싱 Bushing	-			黃銅 Brass

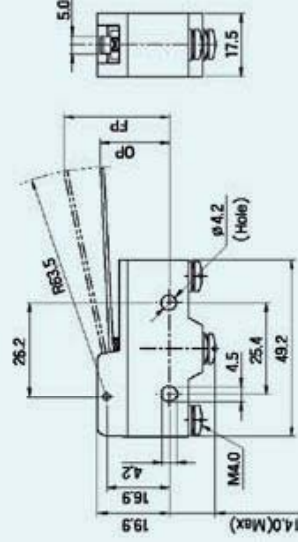
• 材質 特性 - Material features

- 열경화성 페놀수지 : 내열성, 내충격성, 내절연성, 내식성 양호
- Stainless 鋼 : 내식성, 활강도, 내마모성, 내열성 양호
- 黃銅 : 전도성 양호
- 베릴륨동 : 전도성, 내식성, 복귀능력 양호
- 은점점 : 산화방지, 내마모성, 내아크성, 낮은 접촉저항, 낮은 온도 상승, 긴 수명
- Thermosetting phenol resin : good of heat resistance, impact resistance insulation corrosion resistance
- Stainless steel : good of corrosion resistance, wear resistance, heat resistance and bending strength
- Brass : good of conductivity
- Beryllium copper : good of conductivity, corrosion resistance and return capability
- Silver : anti-oxidation, wear resistance, arc resistance, low contact resistance, low temperature increase, long life-time

● 外形/値數圖 - Shape/Dimension Drawing

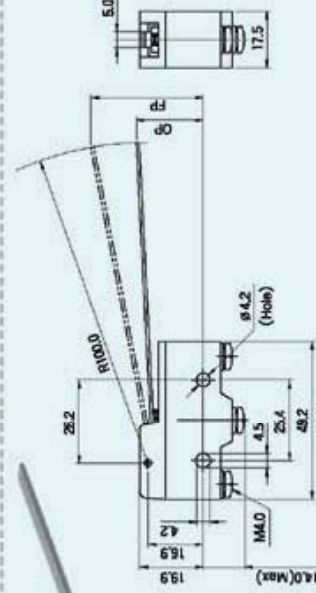
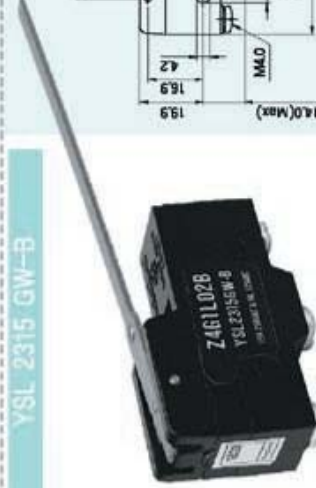
(unit : mm)

YSL 2215 GW-B



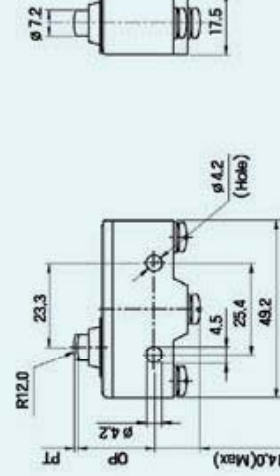
OF	최대(max.)	85gf
RF	최소(min.)	25gf
OT	최소(min.)	6mm
MD	최대(max.)	2.4mm
FP	최대(max.)	29.1mm
OP		19.1 ^{±0.1}

YSL 2315 GW-B



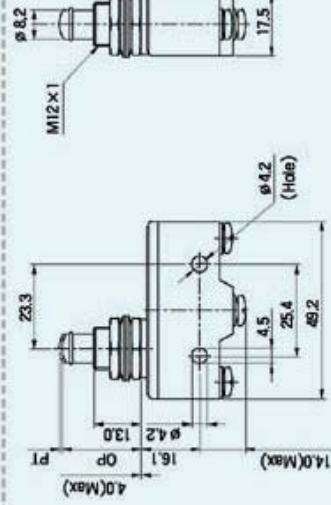
OF	최대(max.)	80gf
RF	최소(min.)	14gf
OT	최소(min.)	13mm
MD	최대(max.)	5mm
FP	최대(max.)	34.9mm
OP		20.9 ^{±0.1}

YSP 3015 GW-B



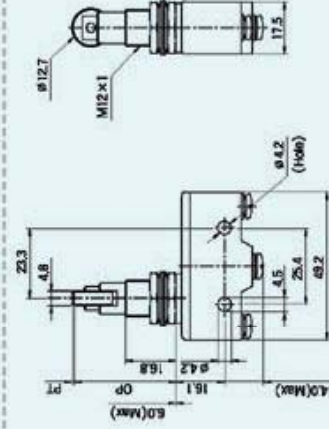
OF	최대(max.)	380gf
RF	최소(min.)	114gf
OT	최소(min.)	15mm
MD	최대(max.)	0.13mm
PT	최대(max.)	0.9mm
OP		21.2 ^{±0.1}

YSP 3315 GW-B



OF	최대(max.)	380gf
RF	최소(min.)	114gf
OT	최소(min.)	5.5mm
MD	최대(max.)	0.13mm
PT	최대(max.)	0.7mm
OP		21.8 ^{±0.1}

YSPP 3515 GW-B

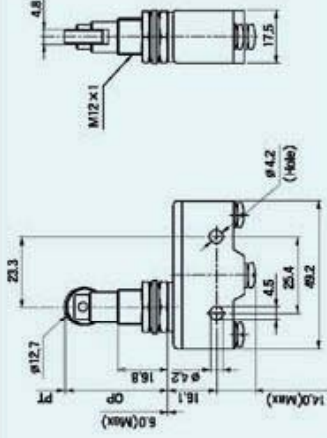


OF	최대(max.)	380gf
RF	최소(min.)	114gf
OT	최소(min.)	4.5mm
MD	최대(max.)	0.13mm
PT	최대(max.)	0.7mm
OP		33.4 ^{±1.2}

•外形/値數圖 - Shape/Dimension Drawing

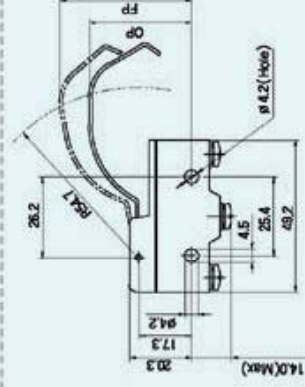
(unit : mm)

YSRP 3515 GW-B



OF	최대(max)	380gf
RF	최소(min.)	114gf
OT	최소(min.)	4.5mm
MD	최대(max)	0.13mm
PT	최대(max)	0.7mm
OP		33.4 ^{+1.2}

YSRL 4015 GW-B



OF	최대(max)	70gf
RF	최소(min.)	14gf
OT	최소(min.)	7mm
MD	최대(max)	1.8mm
FP	최대(max)	45.2mm
OP		36 ^{+1.0}

방수용 마이크로 스위치(주문생상품입니다.)
Waterproof micro switch(ordered product)

YSMS-C

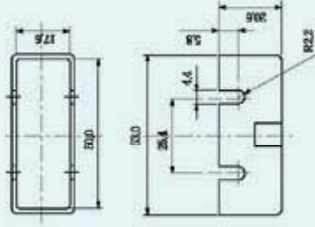


● 端子間 保護カバー

- 本體 및 단자 접속선 保護役割
- 단자간의 短絡, 接地, 短線 등과 접촉불량 및 감전사고 방지

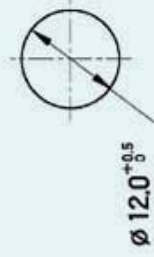
● Protection cover between terminals

- Protection role of body and terminal contact wire
- Protection against short circuit between terminals grounding, short wire etc., and bad contact and electric shock

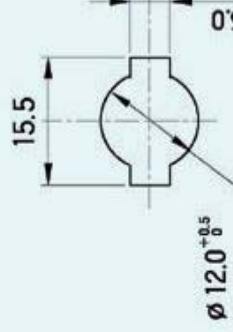


•판넬 取付值數 - Panel attachment dimension

(unit : mm)



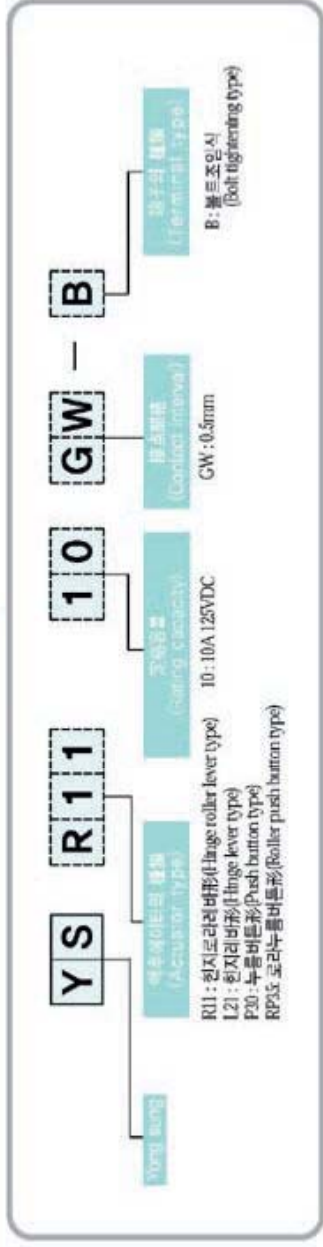
P3315

RP3515
RP3615

1-2

直流用 마이크로 스위치 (Z형) Direct Current Micro Switch (Z TYPE)

• 形式 區分圖 - Type classification diagram



• 特徵 - Features

- 形態 및 一般의 特性은 交流用마이크로 스위치와 同一합니다.
- 直流電流 開閉用으로서 接點器具에 아크(arc)를 끌여주기 위해 永久磁石을 내장하였습니다..
- The shape and general characteristics are identical to alternating current micro switch.
- As a direct current switching, permanent magnet is built-in contact device in order to cut arc.

• 用途 - Application

- 直流電流用
- 種類가 다양하므로 각종 産業用機械, 自動制御機器 등 넓은 用途에 使用할 수 있습니다.
- For direct current
- Various types can be widely used for various kinds of industrial machines, automatic control devices etc.

• 內部 構造圖 - Inside structure diagram



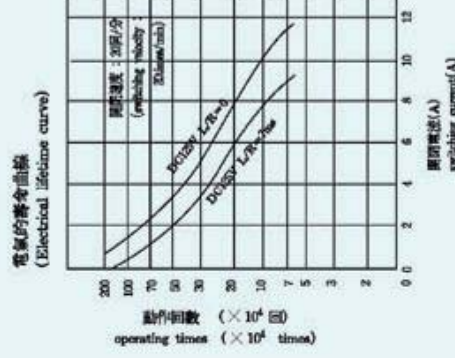
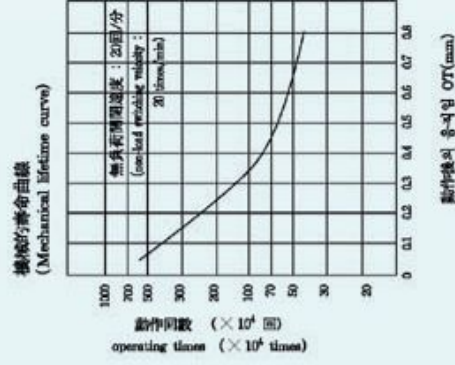
• 定格 – Rating

定格電壓(V) Rating voltage(V)	無誘導負荷(A) Non-inductive load(A)		誘導負荷(A) Inductive load(A)			
	抵抗負荷(resistance load)(cos ϕ =1)		燈泡負荷(lamp load)		誘導負荷(Inductive load)(L/R=7ms)	
	常時閉路 normally closed	常時開路 normally open	常時閉路 normally closed	常時開路 normally open	常時閉路 normally closed	常時開路 normally open
DC 8	15	3	3	3	15	10
14	15	3	3	3	15	10
30	15	3	3	3	10	6
125	10	3	3	1.5	6	4
250	3	1.5	0.75	0.75	2	1

• 性能 概要 – Performance summary

許容操作速度 (Allowable operating speed)	0.1mm~1m/s	
開閉頻度 (Switching frequency)	機械的 (mechanical)	20 times/min
	電氣的 (electrical)	20 times/min
絕緣抵抗 (Insulation resistance)	above 100MQ (DC 500V, Meg)	
接觸抵抗 (Contact resistance)	below 15mQ (initial value)	
耐電壓 (Withstand voltage)	AC1,500V/min (50~60Hz)	
耐震動 (Withstand vibration)	誤動作 (Malfunction) double amplitude 1.5 mm (10~55Hz)	
耐衝擊 (Withstand impact)	耐久 (Endurance)	1,000 % (about 100G)
	誤動作 (Malfunction)	300 % (about 30G)
壽命 (Lifetime)	機械的 (mechanical)	above 1,000,000 times/min
	電氣的 (electrical)	above 100,000 times/min
使用周圍溫度 (Ambient temperature)	-25℃ ~ +55℃	
相對濕度 (Relative humidity)	45 ~ 85%	

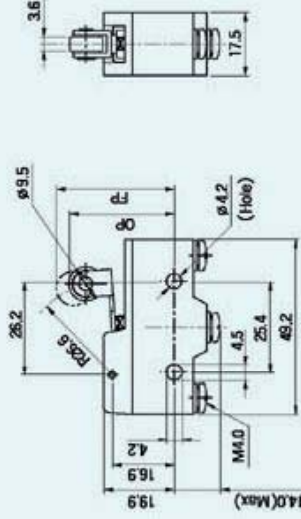
• 壽命曲線 – Lifetime curve



- 外形/值數圖 – Shape/Dimension Drawing

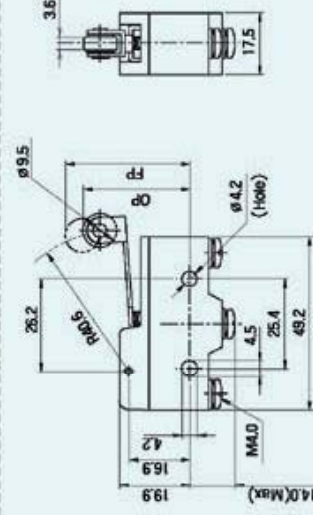
(unit: mm)

B-MS 0101 BSA



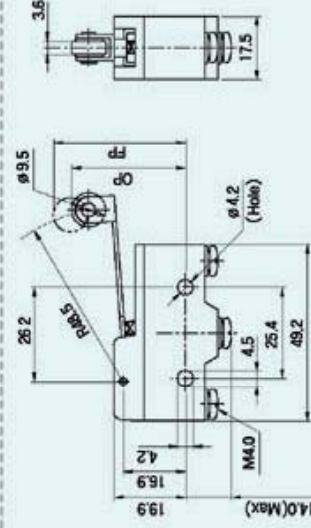
OF	최대(max.)	160g
RF	최소(min.)	80g
OT	최소(min.)	3mm
MD	최대(max.)	1.2mm
FP	최대(max.)	32.9mm
OP	최대(max.)	29.4 ^{±0.6}

YSR 1110 GW-B



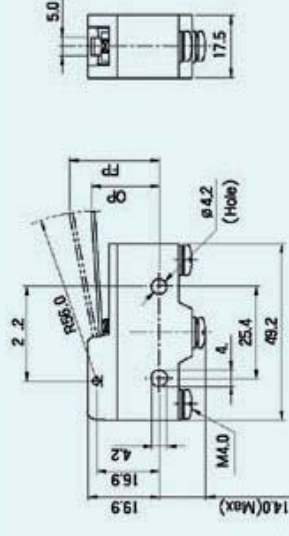
OF	최대(max.)	120gf
RF	최소(min.)	50gf
OT	최소(min.)	6mm
MD	최대(max.)	2mm
FP	최대(max.)	35.0mm
OP	최대(max.)	30.0 ^{±0.5}

YSR 1210 GW-B



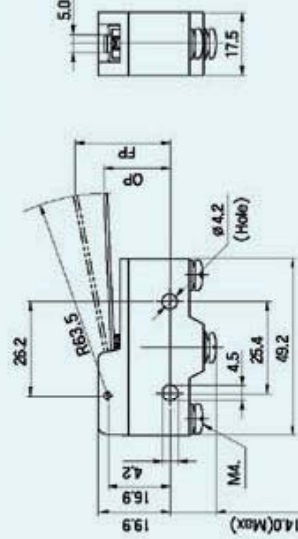
OF	최대(max.)	90gf
RF	최소(min.)	40gf
OT	최소(min.)	6mm
MD	최대(max.)	2.4mm
FP	최대(max.)	36.5mm
OP	최대(max.)	31.5 ^{±0.8}

YSL 2110·GW-B



OF	최대(max.)	90gf
RF	최소(min.)	40gf
OT	최소(min.)	8mm
MD	최대(max.)	3mm
FP	최대(max.)	26.4mm
OP		18.4 ^{±3.5}

YSL 2210 GW-R

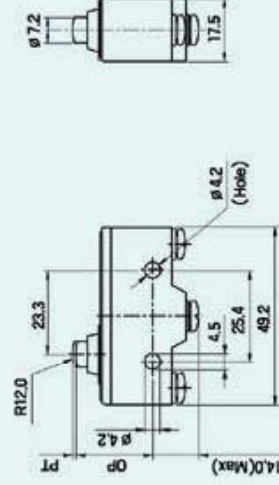


OF	최대(max.)	85gf
RF	최소(min.)	25gf
OT	최소(min.)	6mm
MD	최대(max.)	2.4mm
FP	최대(max.)	29.1mm
OP	최대(max.)	19.1 ^{0.02}

●外形/値數圖 - Shape/Dimension Drawing

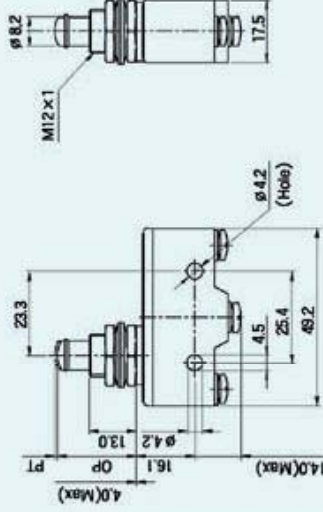
(unit : mm)

YSP 3010 GW-B



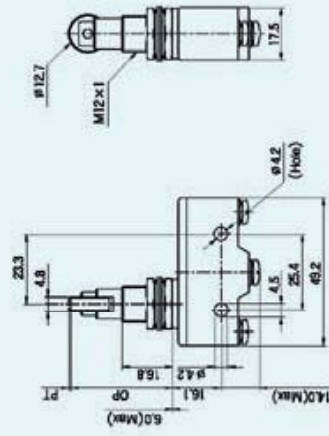
OF	최대(max)	380gf
RF	최소(min)	114gf
OT	최소(min)	1.6mm
MD	최대(max)	0.13mm
PT	최대(max)	0.9mm
OP		21.2 ^{+1.5}

YSP 3310 GW-B



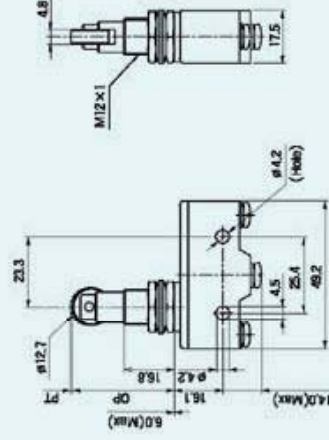
OF	최대(max)	380gf
RF	최소(min)	114gf
OT	최소(min)	5.5mm
MD	최대(max)	0.13mm
PT	최대(max)	0.7mm
OP		21.8 ^{+1.3}

YSRP 3510 GW-B



OF	최대(max)	380gf
RF	최소(min)	114gf
OT	최소(min)	4.5mm
MD	최대(max)	0.13mm
PT	최대(max)	0.7mm
OP		33.4 ^{+1.2}

YSRP 3610 GW-B



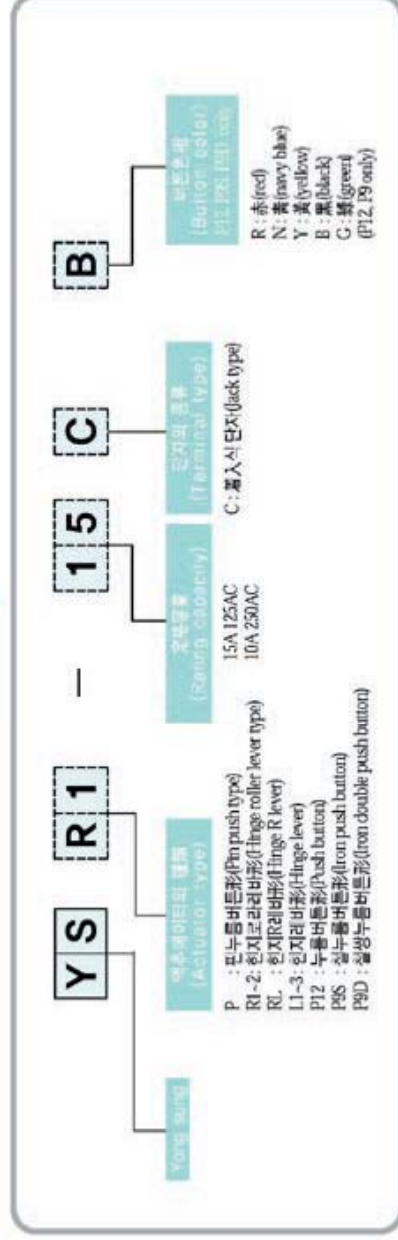
OF	최대(max)	380gf
RF	최소(min)	114gf
OT	최소(min)	4.5mm
MD	최대(max)	0.13mm
PT	최대(max)	0.7mm
OP		33.4 ^{+1.2}

1-3

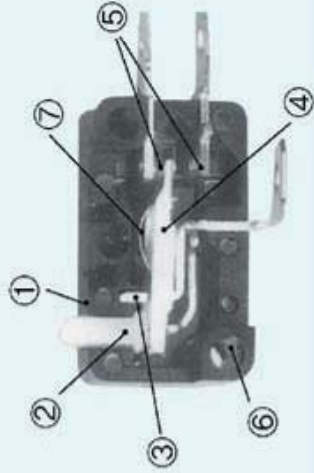
小型マイクスイッチ (V 形)
Mini Micro Switch (V Type)

KG
KSC 4508
제 6942 호

● 形式區分圖 - Type classification diagram



● 內部構造圖 - Inside structure diagram

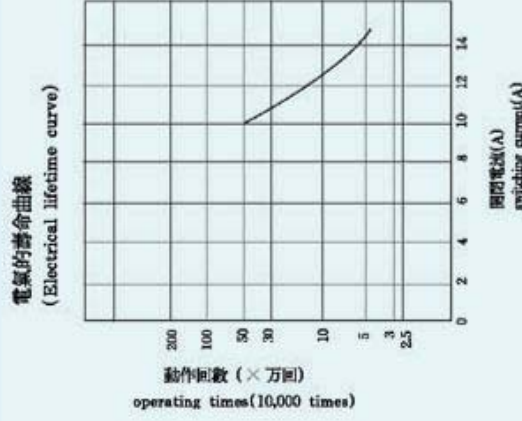
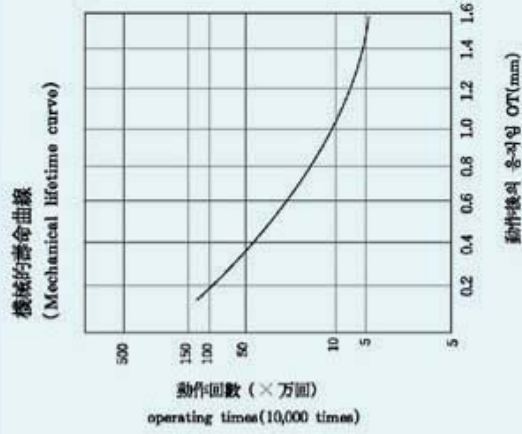


- ① 몸체 (Body)
- ② 액추에이터 (Actuator)
- ③ 공통端子 (Common terminal)
- ④ 이동端子 (Movable terminal)
- ⑤ 접점 (Contact)
- ⑥ 취부 구멍 (Attachment hole)
- ⑦復帰 스프링 (Return spring)

● 性能概要 - Performance summary

許容操作速度 (Allowable operating speed)	0.1mm - 1m/s	
開閉頻度 (Switching frequency)	機械的 (mechanical)	20 times/min
	電氣的 (electrical)	20 times/min
絶緣抵抗 (Insulation resistance)	above 100MΩ (DC 500V, Meg)	
接觸抵抗 (Contact resistance)	below 15mΩ (initial value)	
耐電壓 (Withstand voltage)	AC1,500V/min (50~60Hz)	
耐震動 (Withstand vibration)	double amplitude 1.5 mm (10~55Hz)	
耐衝擊 (Withstand impact)	300 ٪ (about 30G)	
壽命 (Lifetime)	機械的 (mechanical)	above 1,000,000 times
	電氣的 (electrical)	above 100,000 times
使用周圍溫度 (Ambient temperature)	-25℃ ~ +55℃	
相對濕度 (Relative humidity)	45 ~ 85%	

● 壽命曲線 - Lifetime curve



• 定格 - Rating

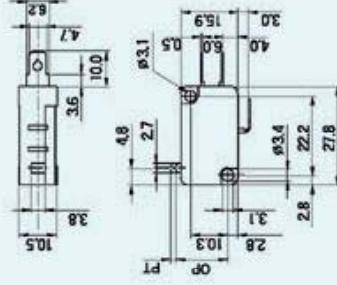
定格電壓(V) Rating voltage(V)	無誘導負荷(A) Non-inductive load(A)				誘導負荷(A) Inductive load(A)			
	抵抗負荷(resistance load)(cosθ=1)		ランプ負荷 (lamp load)		誘導負荷(Inductive load) (cosθ=0.4, L/R=7ms)		電動機負荷 (motor load)	
	常時閉路 normally closed	常時開路 normally open	常時閉路 normally closed	常時開路 normally open	常時閉路 normally closed	常時開路 normally open	常時閉路 normally closed	常時開路 normally open
AC 125	15		2		10		2	
250	10		1.5		6		2	
DC 8	10		3		6		3	
14	10		3		6		3	
30	6		3		4		3	
125	0.6		0.1		0.6		0.1	
250	0.3		0.05		0.3		0.05	

※接点間隔 1.0mm, 接点間隔에 따라 定格負荷가 變更될 수도 있습니다.

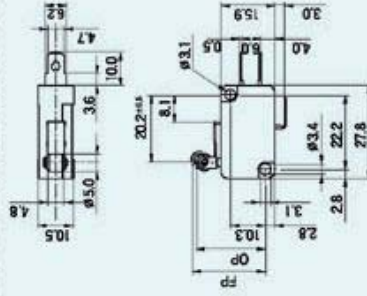
Contact interval 1.0mm, rating load is subject to contact interval.

• 部品 材質特性 - Part materials characteristics

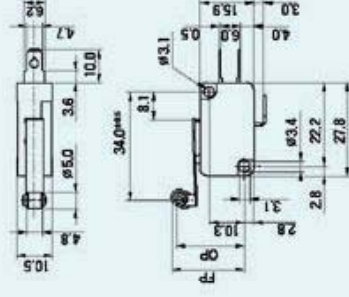
部 品 (Part)	材 質 (Materials)	特 性 (Characteristics)
몸 체 Body	PBT Resin	난연성, 내충격성, 내열연성, 내식성 양호 Good of heat resistance, impact resistance insulation and corrosion resistance
액추에이터 Actuator	Stainless 鋼 Stainless steel	내식성, 기계적 수명이 길다. Corrosion resistance and long mechanical life time
端 子 Terminal	黃 銅 Brass	전도성 양호 Good conductivity
可動 端子 Movable terminal	베릴륨동 Beryllium copper	내식성, 복귀능력, 전도성 양호 Good of corrosion resistance, return capability, conductivity
接 点 Contacts	은 Silver	산화방지, 낮은 접촉저항, 내마모성, 내아크성 양호 Good of anti-oxidation, low contact resistance, wear resistance & arc resistance



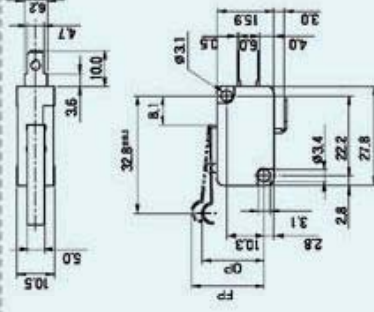
OF	최대(max.)	300gf
RE	최소(min.)	50gf
PT	최대(max.)	1.6mm
OT	최소(min.)	1mm
MD	최대(max.)	0.5mm
OP		14.7 ^{±0.7}



OF	최대(max.)	300gf
RF	최소(min.)	50gf
FP	최대(max.)	22.2mm
OT	최소(min.)	1mm
MD	최대(max.)	0.5mm
OP		20.6 ^{±1.0}



OF	최대(max.)	120gf
RF	최소(min.)	15gf
FP	최대(max.)	23.8mm
OT	최소(min.)	2mm
MD	최대(max.)	1.5mm
OP		20.6 ^{±0.5}

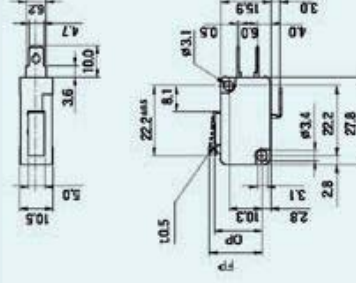


OF	최대(max.)	120gf
RF	최소(min.)	15gf
FP	최대(max.)	21.7mm
OT	최소(min.)	2mm
MD	최대(max.)	1.5mm
OP		18.5 ^{±1.5}

●外形/値數圖 - Shape/Dimension Drawing

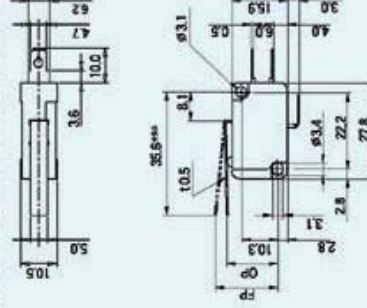
(unit : mm)

YS L1-15C



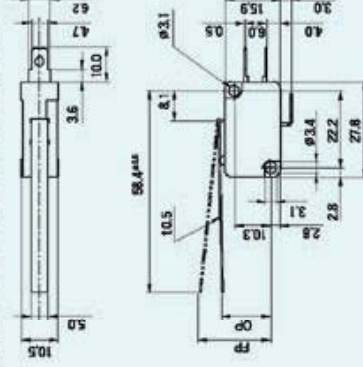
OF	최대(max.)	300gf
RF	최소(min.)	50gf
FP	최대(max.)	16.9mm
OT	최소(min.)	1mm
MD	최대(max.)	0.5mm
OP		15.3 ^{±0.5}

YS L2-15C



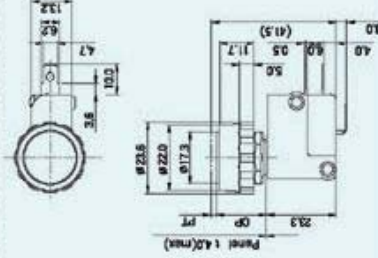
OF	최대(max.)	120gf
RF	최소(min.)	15gf
FP	최대(max.)	18.5mm
OT	최소(min.)	2mm
MD	최대(max.)	1.5mm
OP		15.3 ^{±0.5}

YS L3-15C



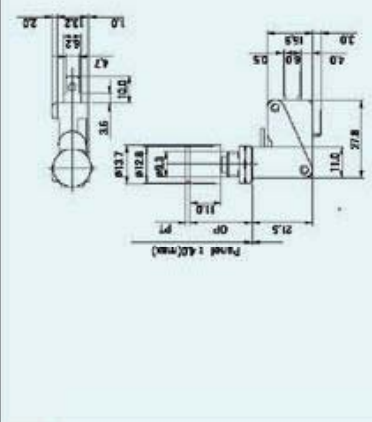
OF	최대(max.)	55gf
RF	최소(min.)	12gf
FP	최대(max.)	21.7mm
OT	최소(min.)	1mm
MD	최대(max.)	3mm
OP		15.3 ^{±0.5}

YS P12-15C

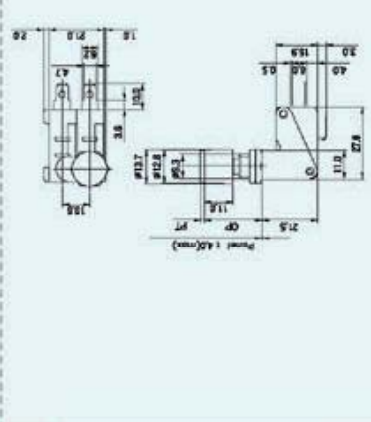


OF	최대(max.)	300gf
RF	최소(min.)	50gf
PT	최대(max.)	1.6mm
OT	최소(min.)	1mm
MD	최대(max.)	0.5mm
OP		16.5 ^{±0.7}

● 外形/值數圖 – Shape/Dimension Drawing

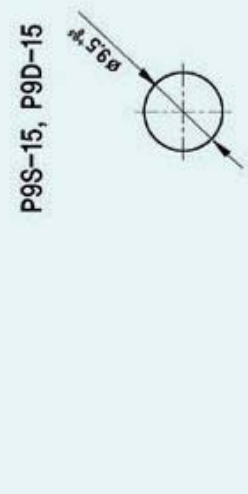
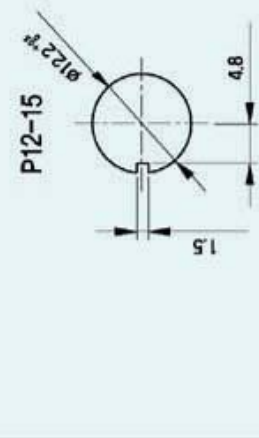


OF	최대(max.)	300gf
RF	최소(min.)	50gf
PT	최대(max.)	1.5mm
OT	최소(min.)	1mm
MD	최대(max.)	0.5mm
OP		22.0 ^{±0.5}



OF	최대(max.)	600gf
RF	최소(min.)	50gf
PT	최대(max.)	1.6mm
OT	최소(min.)	1mm
MD	최대(max.)	0.5mm
OP		22.0 ^{±1}

판넬 取付値數 - Panel attachment dimension



단결 부착 치수 - Panel attachment dimension (unit : mm)

▶ 한국전기연구원개발시험합격 D940518 (N611 TYPE)
Certified by KERI's R & D Test D940518 (N611 TYPE)

● 特徴 - Features

- 다이캐스팅 케이스에 2回路雙斷 스위치를 內藏시킨 리미트 스위치입니다.
- 機械的 強度가 크고 耐熱, 耐油, 防塵, 防水 구조로서 매우 견고하게 설계되어 있습니다.
- TYPE은 로리形, 레버形, 롯데레버形, 푸쉬形 등으로 다양하며, 動作을 確認할 수 있는 램프形은 보수가 용이합니다.
- IP : 56
- The limit switch built-in 2 circuit both edge basic switch in diecasting case.
- Very solid design with high mechanical strength, heat resistance, oil resistance, vibration-resistance and water-resistance.
- Various types of roller, lever, lot lever, push types etc., and easy maintenance of operation verifiable lamp type.
- IP : 56

● Spatter type

- 아크용접 등의 용접 Line에서 용접, 용단시에 비산되는 슬래그 및 금속입자로부터 보호하는 구조입니다.
- Lamp Cover는 내열성수지를 사용한 내열형입니다.
- Head와 Lever간에 보호 CAP을 사용하여 분진 및 이물질 침투로 인한 동작불량을 최대한 감소시키는 구조로 되어 있습니다.
- Lever는 고강도 알루미늄 다이캐스팅 재료를 사용하여 내구성을 강화하였습니다.
- Protective structure against slag and metal piece dispersed from welding/ melting in welding line of arc welding etc.
- Lamp cover of heat resistant resin.
- Minimized bad operating due to penetration of power and other particles by use of protection CAP between head and lever.
- Strengthened lever endurance by use of high strength aluminum diecasting material.

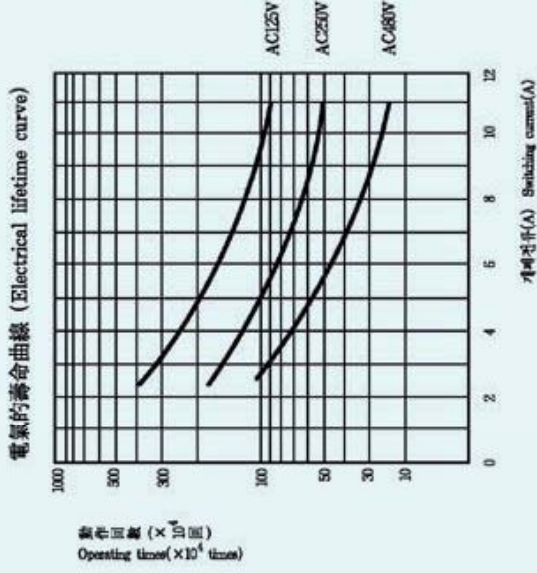
● 用途 - Application

- 각종 工作機械, 自動制御機器 등 用途가 다양함.
- For various fields such as many kinds of machine tools, automatic controller etc.

● 内部 構造圖 - Inside structure diagram



壽命曲線 - Lifetime curve



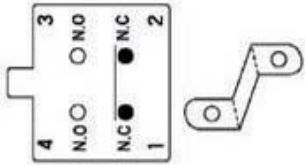
性能概要 - Performance summary

項目 (Item)	性能 (Performance)
絕緣抵抗 (Insulation resistance)	above 100MΩ (DC 500V, Meg)
接觸抵抗 (Contact resistance)	below 20mΩ (initial value)
耐電壓 (Withstand voltage)	AC 1,500V/min (50 ~ 60Hz)
耐振動 (Withstand vibration)	10~55Hz, double amplitude 1.5mm
耐衝擊 (Withstand impact)	about 30G (300 %)
壽命 (Lifetime)	機械的 (mechanical) 電氣的 (electrical)
使用周圍溫度 (Ambient temperature)	100萬回以上 (20回/分) above 1 million times (switching freq : 20times/min.) 10萬回以上 (20回/分) above 100,000 times (switching freq : 20times/min.)
相對濕度 (Relative humidity)	-25℃~ +55℃ 45 ~ 85%

種類別 形式區分 - Type classification

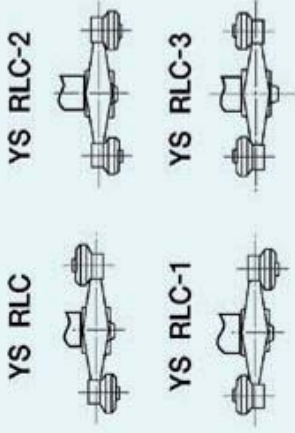
分類名 (Classified Type)	形狀 (Shape)	區分 (Designation)	最大 LEVER 動作角度 (Max. lever operating angle)
로라레바 形 (Roller lever type)		YS511RL	左右 (left/right) 90°, 45°
양레바걸림 形 (Both lever suspending type)		YS512RL	左右 (left/right) 90°
로리조절레바 形 (Roller adjusting lever type)		YS513RL	左右 (left/right) 90°, 45°
롯데스프링레바 形 (Lot spring lever type)		YS513SL	左右 (left/right) 90°, 45°
롯데조절레바 形 (Lot adjusting lever type)		YS515L	左右 (left/right) 90°, 45°
푸시플런저 形 (Push plunger type)		YS516P	上下 (top, bottom)
톱 볼 形 (Top ball type)		YS516PB	上下 (top, bottom)
로라플런저 形 (Roller plunger type)		YS517RP	上下 (top, bottom)
코일스프링 形 (Coil spring type)		YS518S	無指向性 (non-directional)
대로라레바 形 (Large roller lever type)		YS519RL	左右 (left/right) 90°

• 接点 構成圖/內藏스위치 (T형) – Contact form diagram/Built-in switch (T type)



Common 단자1번, 4번
(Common terminal No.1, No.4)

YS512(612) RL形 로라부착종류
YS512(612) RL type roller attachment type



※기본형 YS RLC TYPE

• 部品 材質 – Part materials

部 品 (Part)		材 質 (Materials)
몸 체 (Body)		알루미늄합금다이캐스팅 (Aluminum alloy diecasting)
액추에이터 (Actuator)	로 라 (Roller)	Stainless 강 (Stainless steel)
	레 바 (Lever)	알루미늄합금 다이캐스팅 (Aluminum alloy diecasting)
CAM		SUM 24L
플러저 (Plunger)		SUM 24L
내장스위치몸체 (Built-in switch body)		열경화성페놀수지 (Thermosetting phenol resin)
端 子 (Terminal)		황 동 (Brass)
接 点 (Contact)		銀酸化 Cadmium 合金 (Silver cadmium oxide alloy)

• 定格 – Rating

定格電壓(V) Rating voltage(V)	無誘導負荷(A) Non-inductive load(A)				誘導負荷(A) Inductive load(A)			
	抵抗負荷(resistance load)(cosφ=1)		램프負荷 (lamp load)		誘導負荷(Inductive load) (cosφ=0.4, L/R=7ms)		電動機負荷 (motor load)	
	常時閉路 normally closed	常時開路 normally open	常時閉路 normally closed	常時開路 normally open	常時閉路 normally closed	常時開路 normally open	常時閉路 normally closed	常時開路 normally open
AC 125	10	10	3	1.5	10	5	2.5	
250	10	10	2	1	10	3	1.5	
500	10	10	1.5	0.8	3	1.5	0.8	
DC 8		10	6	3	10	6		
14		10	6	3	10	6		
30		6	4	3	6	4		
125		0.8	0.2	0.2	0.8	0.2		
250		0.4	0.1	0.1	0.4	0.1		

- (주) 1. 상기 치수는 정상전류를 표시합니다.
2. 유도부하는 역률 0.4 이상(교류), 시정수 7ms이하(직류)입니다.
3. 램프 부하에는 10배의 돌입 전류를 유발합니다.
4. 전동기 부하에는 6배의 돌입전류를 유발합니다.

- (Note) 1. Above values indicate normal current.
2. Inductive load is above 0.4 of induction ratio(AC), and below 7ms of time constant(DC).
3. Rush current of 10 times occurs in lamp load.
4. Rush current of 6 times occurs in motor load.

● 外形/値數圖 - Shape/Dimension Drawing

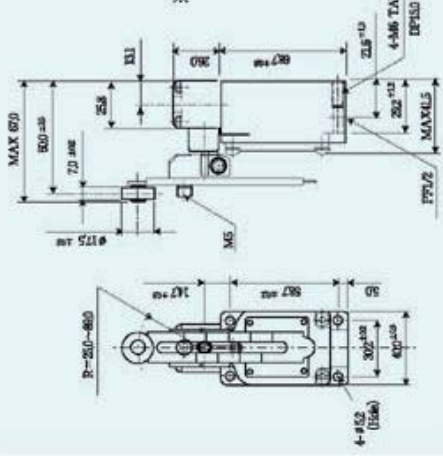
일반형(General type)

램프형(Lamp type)

(unit : mm)

YS 513 RL

YS 613 RL

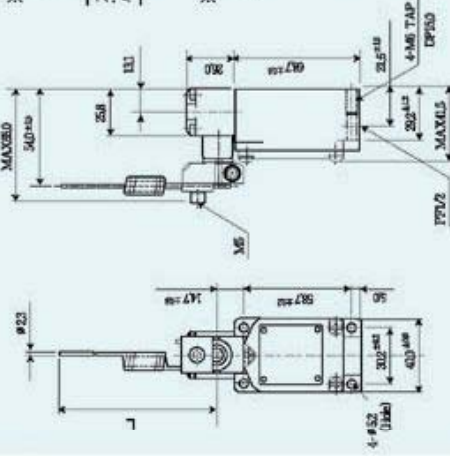


※ 레바의 길이가 38mm일 경우
(When lever length is 38mm)

	OF	최대(max)	140gf
RF	최소(min)	220gf	
PT	최대(max)	15 ^{±0.5}	
OT	최소(min)	30°	
MD	최대(max)	12°	

YS 513 SL

YS 613 SL



※ L의 장장치수 구분
(Classification of total length
dimension L)

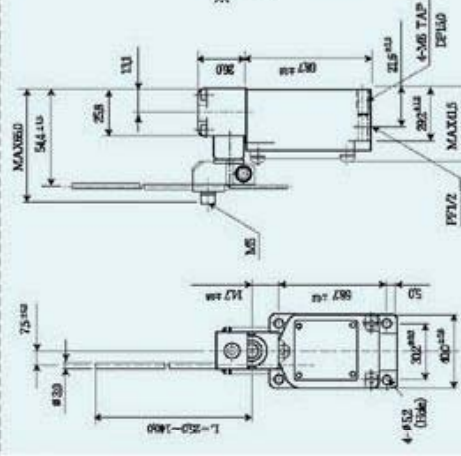
大(large)	330 ^{mm}	중음품(ordered product)
小(small)	126.5 ^{mm}	기본품(basic product)

※ 루드의 길이가 126.5mm일 경우
(When lot length is 126.5mm)

OF	최대(max)	50gf
RF	최소(min)	35gf
PT	최대(max)	20°
OT	최소(min)	30°
MD	최대(max)	12°

YS 515L

YS 615L



※ 루드의 길이가 140mm일 경우
(When lot length is 140mm)

OF	최대(max)	50gf
RF	최소(min)	25gf
PT	최대(max)	15 ^{±0.5}
OT	최소(min)	30°
MD	최대(max)	12°

外形/値數圖 - Shape/Dimension Drawing

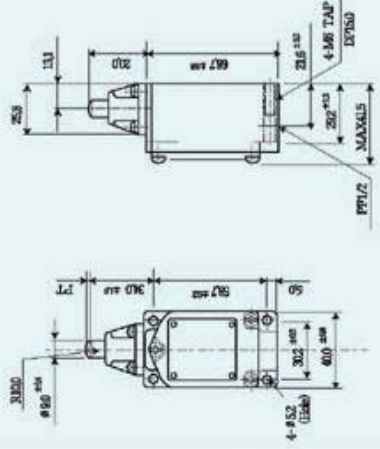
일반형(General type)

램프형(Lamp type)

(unit : mm)

YS 516 P

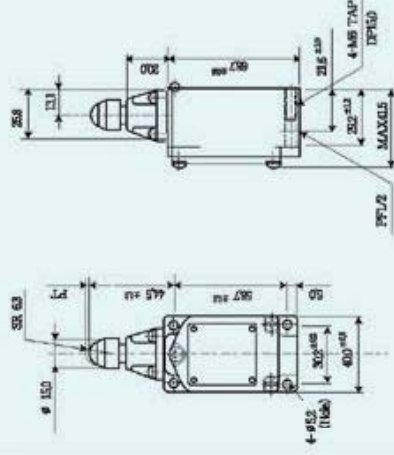
YS 516 P



OF	최대(max)	2800gf
RF	최소(min)	900gf
PT	최대(max)	2.0mm
OT	최소(min)	6.4mm
MD	최대(max)	1.0mm

YS 516 PB

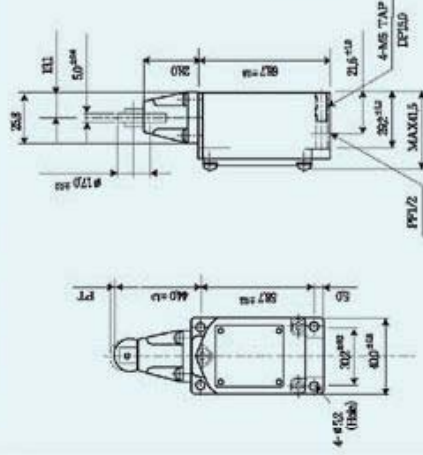
YS 516 PB



OF	최대(max)	2700gf
RF	최소(min)	910gf
PT	최대(max)	1.65mm
OT	최소(min)	6.4mm
MD	최대(max)	1.0mm

YS 517 RP

YS 517 RP



OF	최대(max)	2800gf
RF	최소(min)	900gf
PT	최대(max)	2.0mm
OT	최소(min)	5.6mm
MD	최대(max)	1.0mm

● 外形/値數圖 - Shape/Dimension Drawing

일반형(General type)

램프형(Lamp type)

YS 518 S

YS 618 S

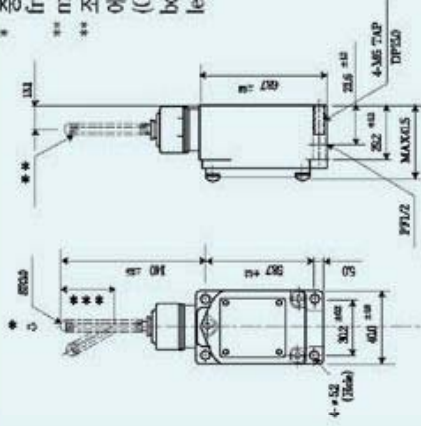


(unit : mm)

* 중심에서 동작까지의 거리(Distance from center to operation)

** material : SIS 304

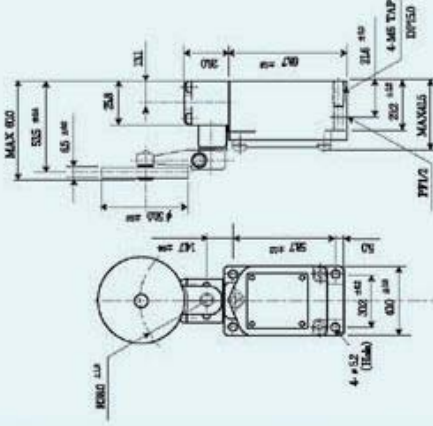
** 조작체의 최적사용범위는 S/P선단에서 S/P전장의 1/3以内일 것
(Optimum using scope of operating body is within 1/3 of S/P full length at S/P end)



OF	최대(max.)	80gf
RF	최소(min.)	-
PT	최대(max.)	20mm
OT	최소(min.)	-
MD	최대(max.)	-

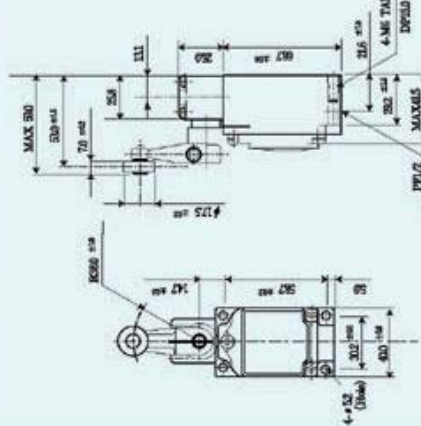
YS 519 RL

YS 619 RL



OF	최대(max.)	980gf
RF	최소(min.)	120gf
PT	최대(max.)	20°
OT	최소(min.)	70°
MD	최대(max.)	10°

YSN 611 RL(SPATTER TYPE)



OF	최대(max.)	1400gf
RF	최소(min.)	220gf
PT	최대(max.)	15°
OT	최소(min.)	30°
MD	최대(max.)	12°



CAM SWITCHES

- 2-1 Cam Switch (AC250V, 10A, 30A, DC125V, 20A)
- 2-2 Illuminated Cam Switch
- 2-3 Key Cam Switch
- 2-4 Lockout Relay
- 2-5 Discrepancy Cam Switch (AC250V 5A)
- 2-6 Discrepancy Cam Switch (AC250V 10A)
- 2-7 Cam Switch (AC250V 5A)
- 2-8 43PDA Motor Cam Switch

2 캠 스위치류 CAM SWITCHES



- ▶ 한국전기연구원개발시험협력
DE5260, 5261, 5263, 5325, 5326
(Certified by KERI's R & D Test
DE5260, 5261, 5263, 5325, 5326)
- ▶ IP56 : EX 99 IP 535

SEL 80125-EL001

2-1	캠 스위치(10A)(20, 30A)	2-1	Cam Switch(10A)(20, 30A)
2-2	조광형 캠 스위치	2-2	Illuminated Cam Switch
2-3	키 캠 스위치	2-3	Key Cam Switch
2-4	로코아웃 릴레이	2-4	Lockout Relay
2-5	모자이크용 캠스위치(5A)	2-5	Discrepancy Cam Switch(5A)
2-6	모자이크용 캠스위치(10A)	2-6	Discrepancy Cam Switch(10A)
2-7	캠스위치(AC250V 5A)	2-7	Cam Switch(AC250V 5A)
2-8	모터 캠스위치	2-8	43PDA Motor Cam Switch

2-1 캠 스위치 (AC250V, 10A, 30A, DC125V, 20A)

Cam Switch (AC250V, 10A, 30A, DC125V, 20A)

• 特徴 - Features

- 機器의 폭넓은動作이 可能하도록 다양한 規格으로 研究開發하였습니다.
- 캠 스위치의 生命인 회로구성의 다양성으로 모든 機器에 완벽하게 사용할 수 있습니다. (별도의 回路集 참조)
- 엄격한 實驗을 통해 標準化 回路에 따라 均일하게 生産 品質을 향상시켰습니다.
- 캠 스위치는 85년 11월 한국전기연구원개발시험에 합격하여 그 품질의 우수성을 인정받아 한국전력에 많은 납품실적을 올리게 되었습니다.
- Researched & Developed with various standard for wide operating of device.
- With various circuit formation which is Cam Switch's key part, can be perfectly applied to all kinds of devices.
(refer to separate circuit collection.)
- Improved production quality according to standardization circuit through strict testing.
- Approved the quality by passing the KERI's R & D Test in 1985/11, Cam Switch has recorded many delivery results in Korea Electric Power Corporation.

• 接点의 動作記號 說明 - Explanation of contact's operating marks

- 閉路위치를 나타낸다. (ON)
- + 開路위치를 나타낸다. (OFF)
- ▬ 閉路위치의 구간을 나타낸다.
- ⌋ 잔류 接点을 나타낸다.
- ⚡ DC 20A Magnet삽입표시를 나타낸다.

- closed position (ON)
- + open position (OFF)
- ▬ interval of closed position
- ⌋ residual contact
- ⚡ mark of DC 20A magnet inserting contact

예) YSC-3201A의 標準接續圖

핸들 段數: 3段

연결블럭數: 2連

接点構成번호: 01

핸들동작: A(자동복귀방식)

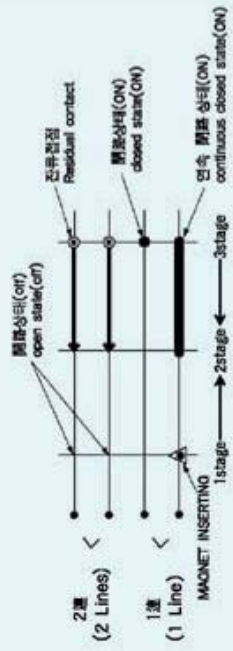
ex) Standard connection diagram of YSC-3201A

number of handle stage: 3stages

number of connection block: 2lines

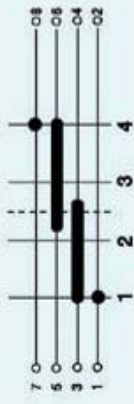
contact composition No.: 01

handle operating: A(automatic return type)



• 切換時 중첩되는 回路 (Circuit superimposed when transfer)

핸들 전환시 단과 단 사이의 중심부에서 개로측 점점과 폐로측 점점이 일정구간 중첩되었다 단락되는 회로
EX) AS

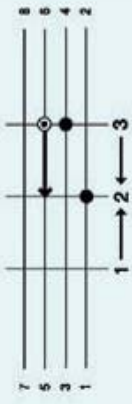


Circuit which open/closed side contacts are superimposed and shorted for a certain distance in the central part between stages when handle transfer.

• 잔류 接点回路 (Residual contact circuit)

핸들이 1단 開路(OFF) 상태로 동작했다가 자동 복귀했을 때 開路(OFF) 상태를 유지하고, 3단 閉路(ON) 상태로 동작했다가 자동복귀했을 때는 계속 閉路(ON) 상태로 유지하는 接点回路.

Contact circuit which keeps open state(OFF) when auto-returning after handle Operates at 1 stage open state(OFF), while maintaining closed(ON) state when auto-returning after operating at 3 stage closed(ON) state.



• 接点 構成時 注意事項 - Remark on contact form

- 캠스위치 안에 내장되어 있는 2점점(4단자)은 캠에 대하여 대조적으로 배치되어 있어서 핸들의 각도가 180° 회전되면 2점점 모두 폐로 또는 개로상태가 되니 임의개조하지 마십시오.
- Please note 2 contacts all will be close or open state if handle angle turns 180° as 2 contacts(4terminals) built-in Cam Switch are arranged in contrast to cam.

예 Example	90° 전환 3단일 때 90° transfer 3 stages	60° 전환 4단일 때 60° transfer 4 stages	45° 전환 5단일 때 45° transfer 5 stages	30° 전환 7단일 때 30° transfer 7 stages
회로전개도 Circuit Diagram				

- 내장된 캠과 점점, 핸들위치(90° 3단의 예)
- Built-in cam and contact, handle position(example of 90°, 3stages)

핸들위치 Handle Position				
점점과 캠 Contact & Cam				

● 部品材質 - Part materials

部 品 (Part)	材 質 (Materials)
몸 체 (Body)	ABS내열 (Heat resistance ABS) Resin
C A M	Acetal Resin
接 点 (Contact)	銀酸化 Cadmium 合金 (Silver-cadmium oxide alloy)
端 子 (Terminal)	黃 銅 (Brass)
볼 트 (Bolt)	MSWR-3 (Zn plating)
스프링 (Spring)	Stainless 鋼 (Stainless steel)
손잡이 (Handle)	66Nylon Resin (R · E형), Phenol (O · C형), ABS Resin (P · G형)

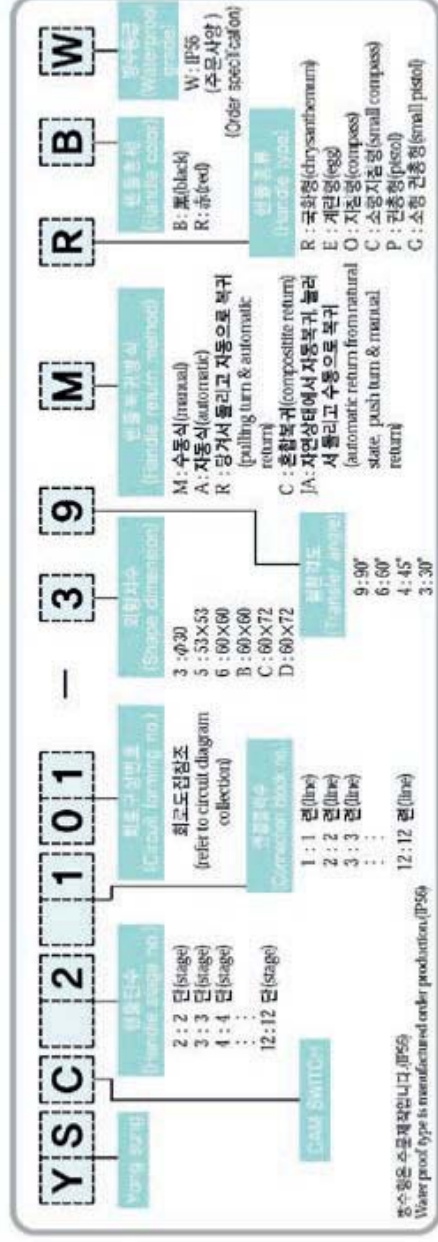
● 性能 概要 - Performance summary

項 目 (Item)	性 能 (Performance)
壽 命 (Lifetime)	機械的 (mechanical) above 500,000 times (switching freq : 20times/min.)
絶緣抵抗 (Insulation resistance)	電氣的 (electrical) above 100,000 times (switching freq : 20times/min.)
接觸抵抗 (Contact resistance)	above 100MQ (DC 500V, Meg)
耐電壓 (Withstand voltage)	below 20mQ (initial value) AC 2,500V/min (50~60Hz)
耐振動 (Withstand vibration)	내 구 10~55Hz, 복진폭 1.5mm 오동작 10~15Hz, 복진폭 1.0mm
耐衝擊 (Withstand impact)	내 구 약30g (300 ٪) 오동작 약10g (100 ٪)
작動에 필요한 힘 (Operating force)	560g
使用周圍溫度 (Ambient temperature)	-25℃ ~ +40℃
相對濕度 (Relative humidity)	45 ~ 85%

● 接点定格 - Contact Rating ... 10A

接点部の仕様 Contact part spec.	交流 (AC)	定格電壓 (rating voltage)	125V	250V	440V
		定格電流 (rating current)	15A	10A	3A
		遮斷電流 (breaking current)	폐로차단전류=정격전류 X 2.2 (Closed breaking=rating current X 2.2)		
	直流 (DC)	定格電壓 (rating voltage)	24V	110V	220V
		抵抗(resistance)	10A	2.5A	1.2A
		遮斷電流 (breaking current)	폐로차단전류=정격전류 X 1.1 (Closed breaking=rating current X 1.1)		
		定格電流 (rating current)	5A	1A	0.45A
		誘導(induction)	폐로차단전류=정격전류 X 1.1 (Closed breaking=rating current X 1.1)		
		定格通電電流 (rating conductive current)	20A		

● 形式區分圖 - Type classification diagram ... 10A Type



- **핸들위치 표준 표본도 - Handle position standard diagram**

각 단 핸들위치 표본(Each handle position sample)												
복귀방법 Return method	정환각도 Transfer angle	2단 (stage)	3단 (stage)	4단 (stage)	5단 (stage)	6단 (stage)	7단 (stage)	8단 (stage)	9단 (stage)	10단 (stage)	11단 (stage)	12단 (stage)
수동복귀식 기호(M) manual return mark(M)	90°											
	60° 10A ONLY											
	45°											
	30° 10A ONLY											
자동복귀식 기호(A) automatic return mark(A)	45°											
	30° 10A ONLY											
	45°											
	30°											
핸들걸림식 기호(R) handle suspending mark(R)	45°											
	30° 10A ONLY											
	45°											
	30°											
혼합복귀식 기호(C) composite return mark(C)	45° 10A ONLY											
	45°											
	30°											
	45°											
핸들걸림식 기호(Q) handle suspending mark(Q)	45° 20/20A ONLY											
	45°											
	30°											
	45°											

• 제작 가능련수 - Possible manufacturing number of connection block

	10A	20A, 30A
수동 복귀식 (Manual Return Type)	12련 (12 Block)	15련 (15 Block)
자동 복귀식 (Automatic Return Type)	5련 (5 Block)	5련 (5 Block)
핸들 걸림식 (Handle suspending Type)		
혼합 복귀식 (Composite Return Type)	5련 (5 Block)	-

• 하부 및 연결단자 - Contact block & connection terminal

부품명(Parts Name) 정격(Rating)	하 부 (Contact Block)	연 결 단 자 (Connection Terminal)	
		가로용 (Horizontal Type)	세로용 (Vertical Type)
AC 5A			
AC 10A			
DC 20A			
AC 30A			

● 핸들 - Handle

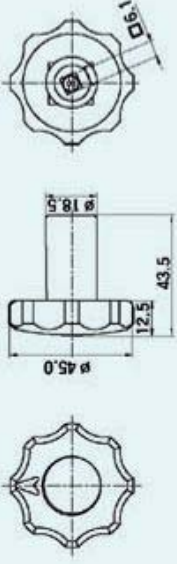
- 스위치에 부착하는 핸들은 절화용, 조정용, 조작용 등 용도에 따라 선택합니다.
- 핸들의 색상은 흑색, 적색 2종류이며, 흑색을 표준으로 합니다.
- Handle for switch attachment is chosen depending on applications for transfer, adjusting, operating etc.
- Handle colors are 2 types of black and red, and black is standard.

(unit : mm)

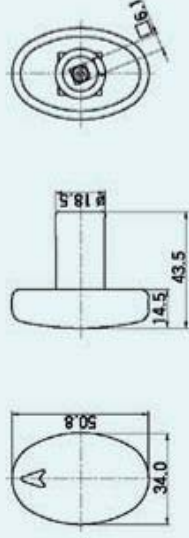
핸들종류 (Handle Type)

외형치수 (Shape Dimension)

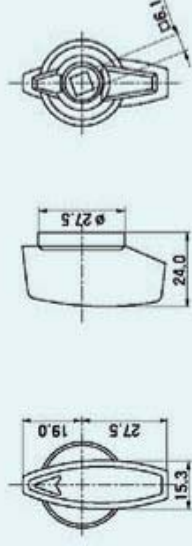
- R형 : 국화형
- R type : Chrysanthemum



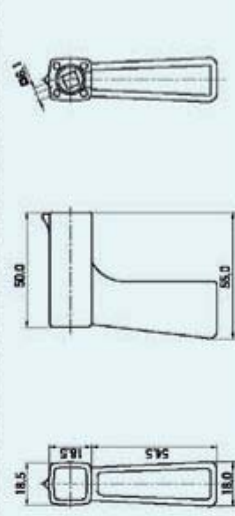
- E형 : 계란형
- E type : Egg



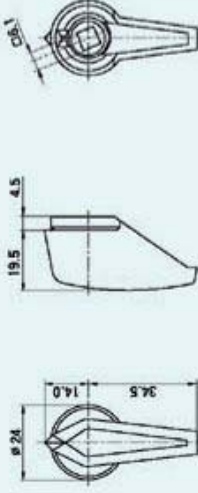
- O형 : 지침형
- O type : Compass



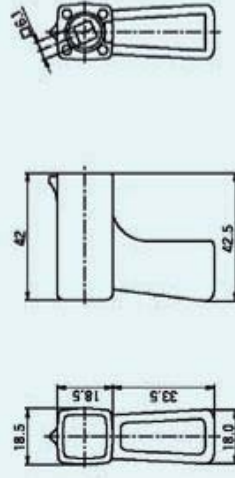
- P형 : 권총형
- P type : Pistol



- C형 : 소형 지침형
- C type : Small Compass



- G형 : 소형 권총형
- G type : Small Pistol



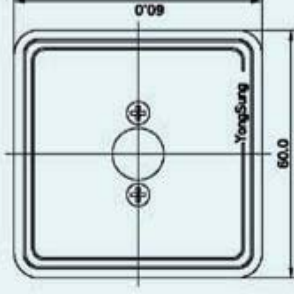
표준 전면판 - Standard Front Section

(unit : mm)

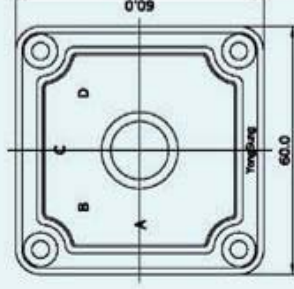
전면판 종류 (Front section)

외형 치수 (Shape Dimension)

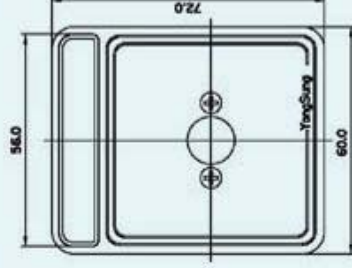
60 TYPE



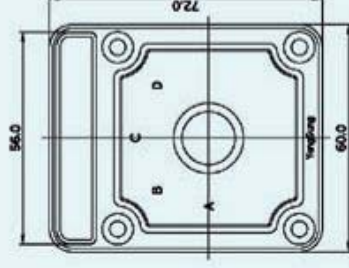
B TYPE



C TYPE



D TYPE



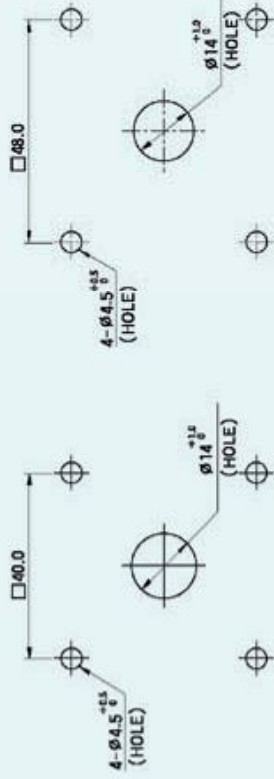
● PANEL 取付値數 - Panel attachment dimension

(unit : mm)

(53×53)

(60×60) (60×72)

(30Φ)



● 外形/値數圖 - Shape/Dimension Drawing

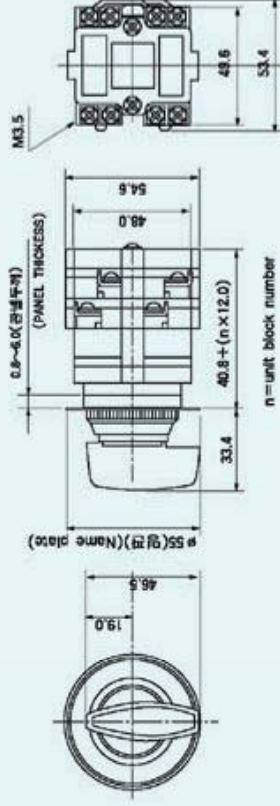
(unit : mm)

Ø30(Ø30 Type)

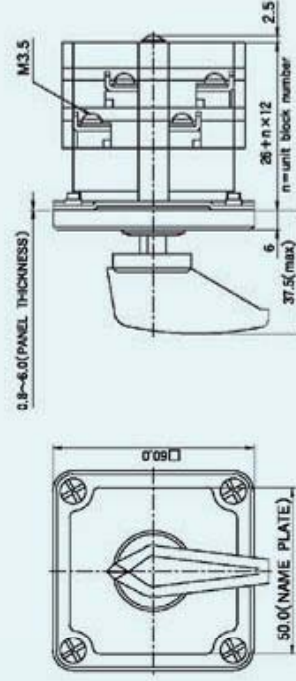


PAJ US

수동복귀(B Type)



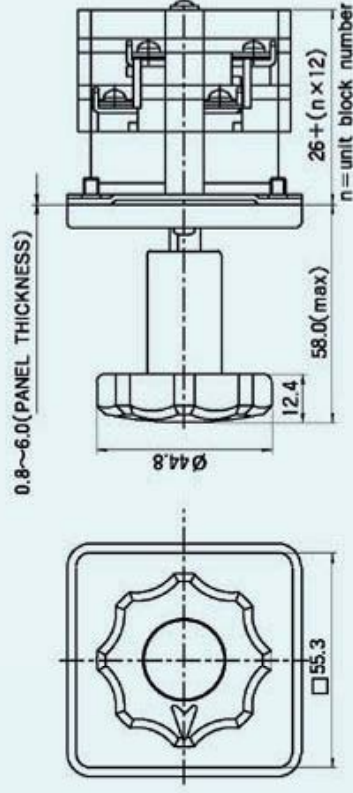
PAJ US



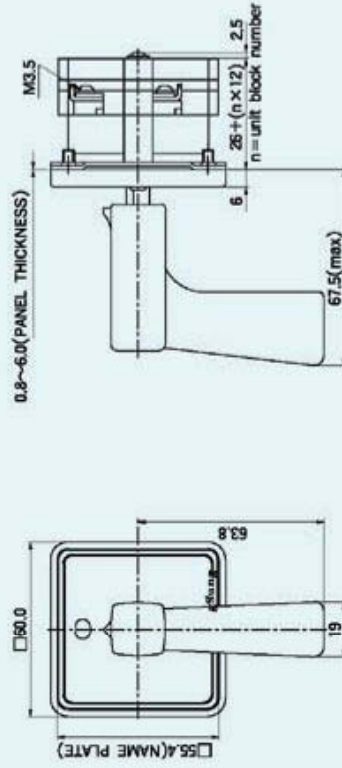
● 外形/値數圖 - Shape/Dimension Drawing

(unit : mm)

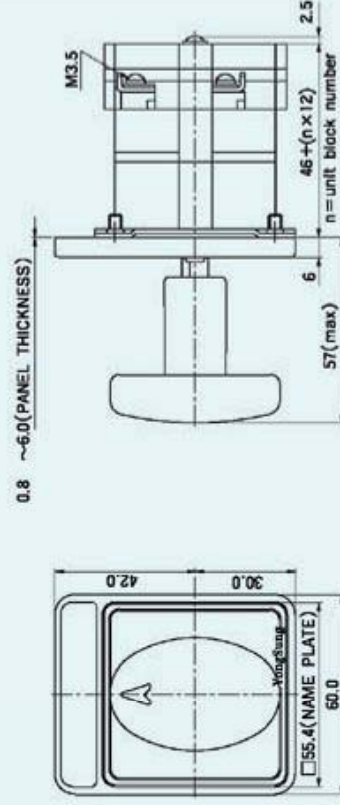
수동복귀 (60x60Type)



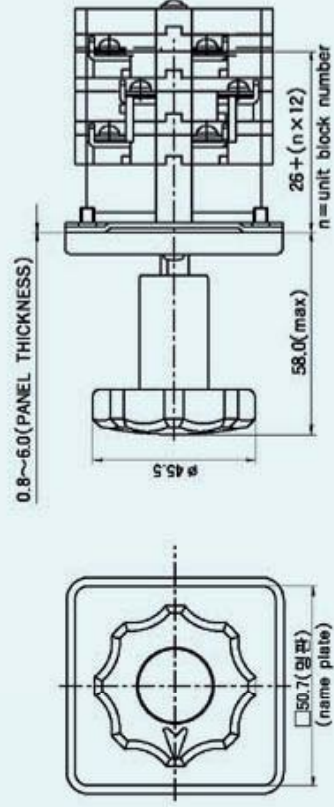
자동복귀 (60x60Type)



원동걸림 (C Type)



수동복귀 (53x53 Type)

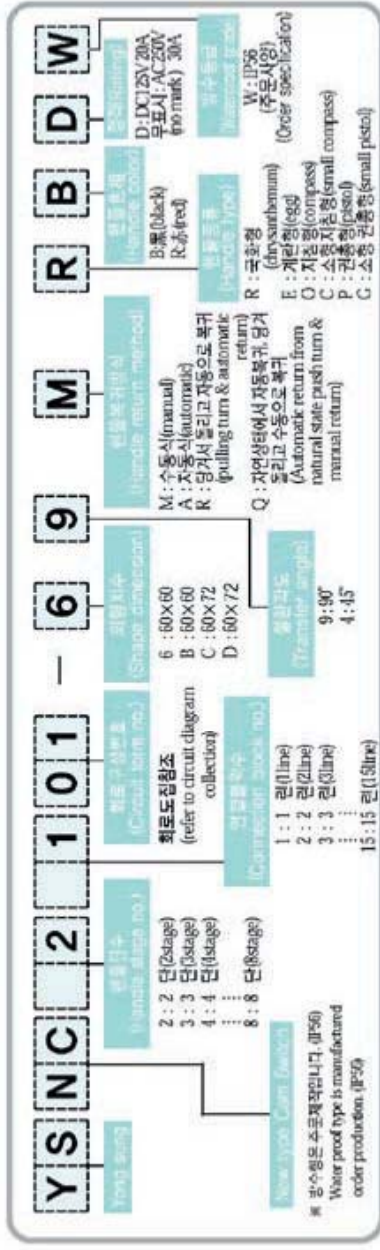


- ▶ 의장등록 제127346호
- ▶ 실용신안 제78890호(20A)
- ▶ Registration of design No. 127346
- ▶ Korea Utility Model No. 78890 (20A)

- ▶ 한국전기연구원 개발 시험합격
AC30A : DE8678, 8679, 8680
DC20A : DE91659

- ▲ Certified by KERI'S R&D test
 AC30A : DE8678, 8679, 8680
 DC20A : DE91659

● 形式区分图 - Type classification diagram ... 20A, 30A Type



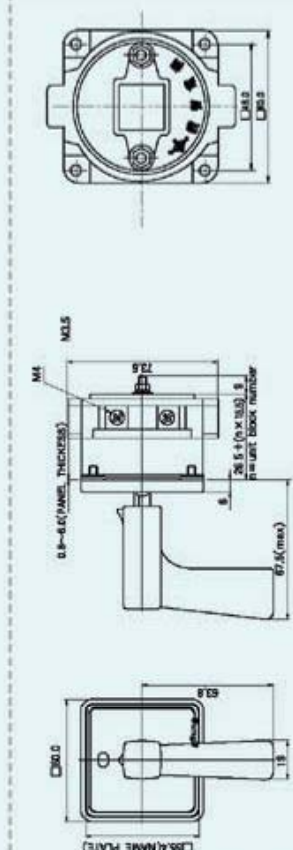
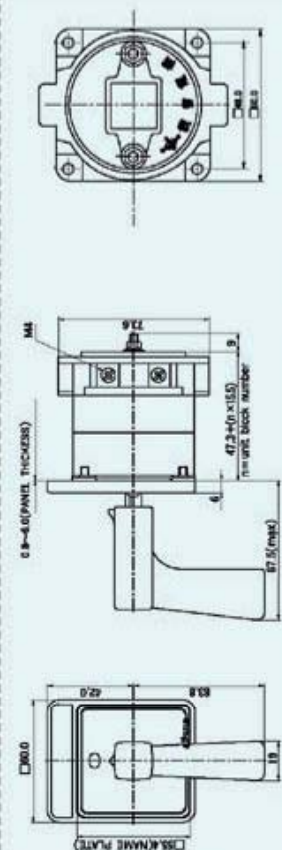
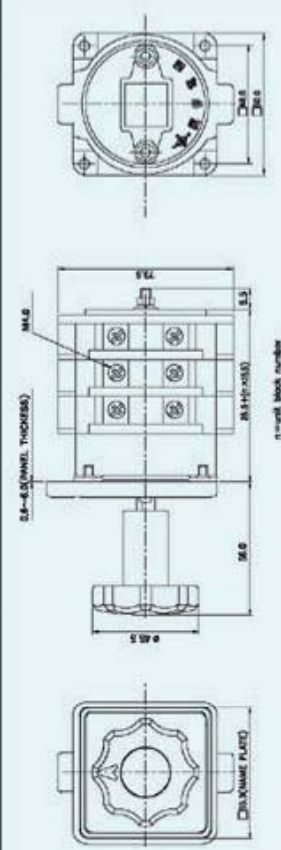
- 定格 - Rating

接点部 Contact part	交流 (AC)	定格電壓 (Rating voltage)	250V	600V
		定格電流 (Rating current)	30A	20A
	直流 (DC)	定格電壓 (Rating voltage)	125V	220V
		定格電流 (Rating current)	20A	10A
	定格通電電流 (Rating conductive current)		30A	

※ 직류 20A용은 영구자석이 부착되어 있습니다.(For DC 20A, permanent magnet is attached.)

- 外形/值數圖 – Shape/Dimension Drawing

(unit : mm)



性能概要 - Performance summary

絶縁抵抗 (Insulation resistance)	100MΩ 以上 (Above 100MΩ (DC500V, Meg))
耐電壓 (Withstand voltage)	AC 2,000V/min
使用周囲温度 (Ambient temperature)	-25℃ ~ + 40℃
相對濕度 (Relative humidity)	45 ~ 85%

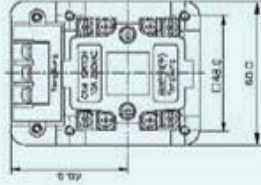
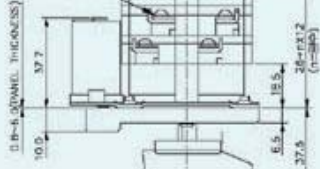
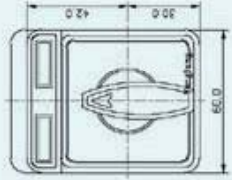
Lamp 接續圖 - Lamp connection diagram



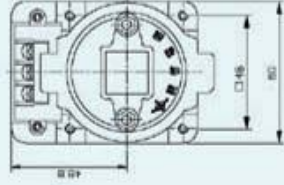
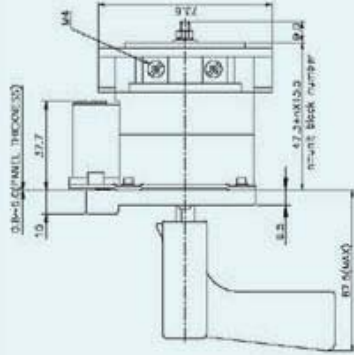
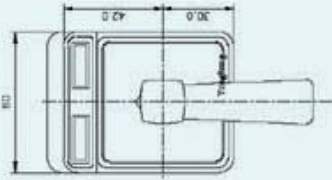
外形/値数圖 - Shape/Dimension Drawing

(unit : mm)

10A

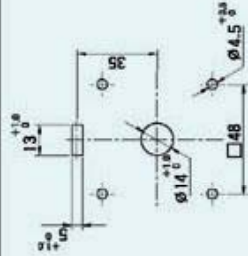


20A/30A



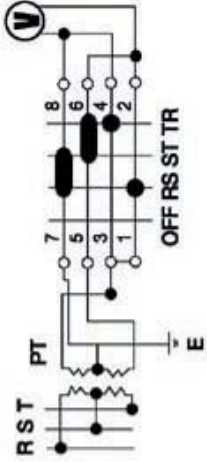
PANEL 取付値数 - Panel attachment dimension

(unit : mm)

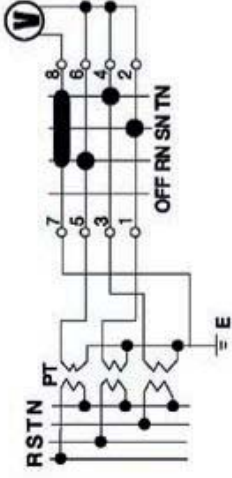


● 기본 회로에(전압계 · 전류계 회로) - example of basic circuit (voltmeter, amperemeter circuit)

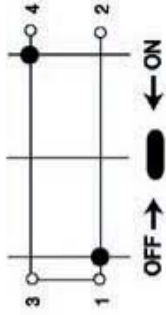
C4210 (voltmeter, 3Ø 2PT circuit)



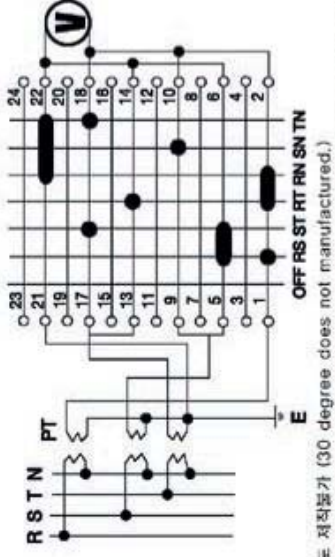
C4211 (voltmeter, 3Ø 3PT circuit)



C3102A

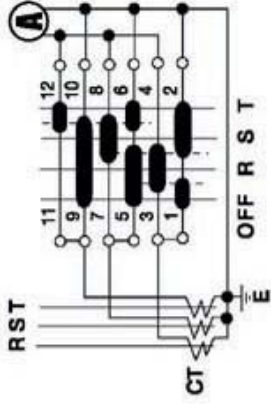


C7602(voltmeter, 3Ø 3PT) 복합형(composite type)

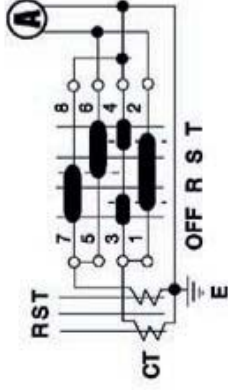


*30도 저각도가 (30 degree does not manufactured.)

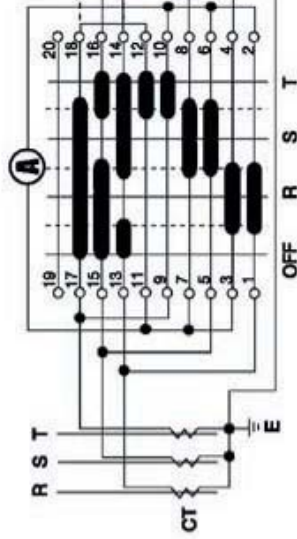
C4307 (amperemeter, 3Ø 3CT circuit)



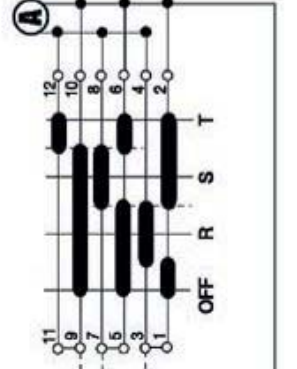
C4213 (amperemeter, 3Ø 2CT circuit)



C4502(관통형,AS) (penetrating type, AS 3Ø 3CT circuit)



C4307

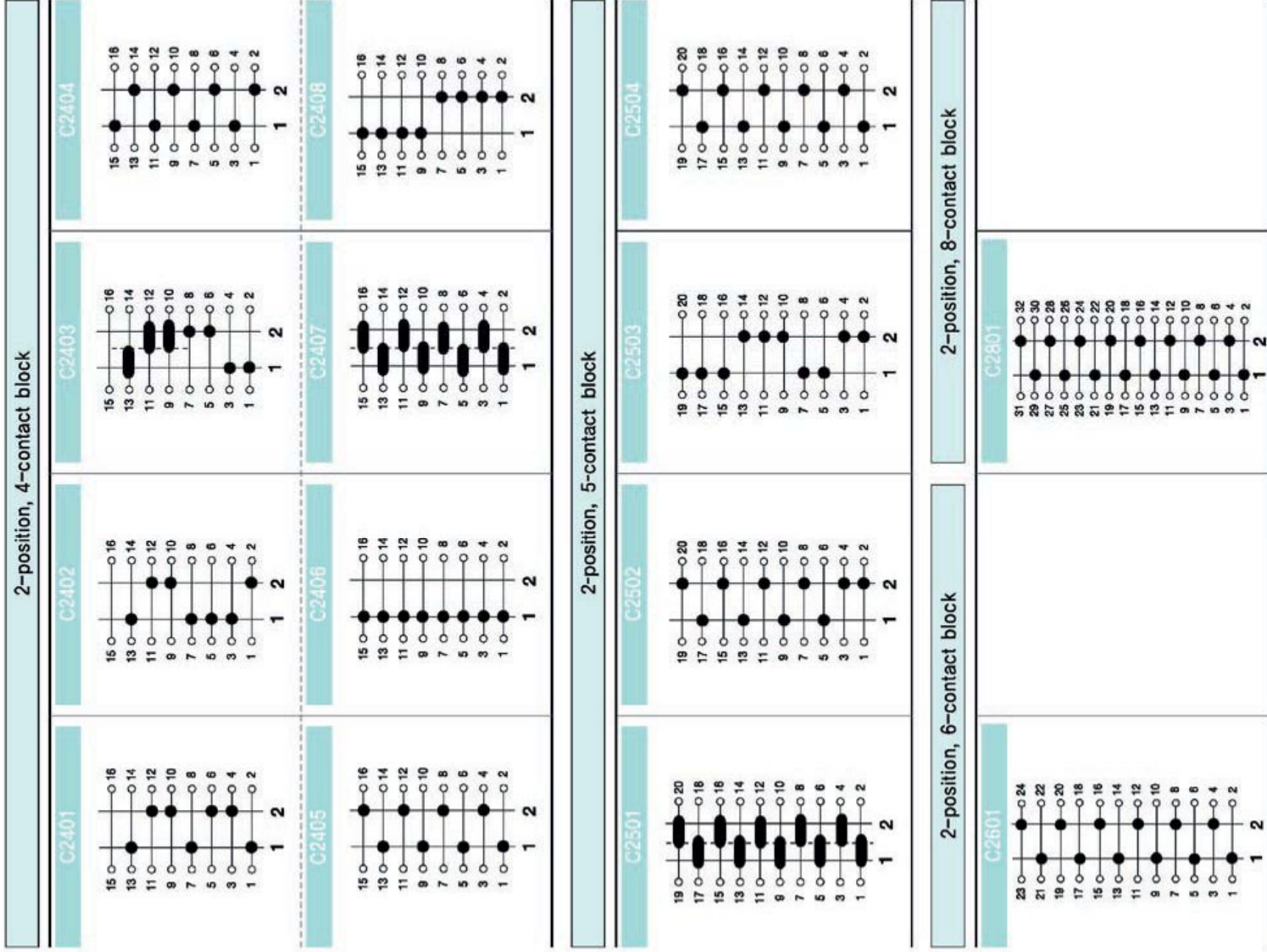


표준 회로집 - example of standard circuit

주) Position의 표준 절환각도 위배시 contact block 추가됨. (Note) When standard transfer angle of position violates, contact block is added.

2-position, 1-contact block			
C2101		C2102	
C2105		C2106	
C2103		C2104	
C2107		C2108	
2-position, 2-contact block			
C2201		C2202	
C2205		C2206	
C2203		C2204	
C2207		C2208	
2-position, 3-contact block			
C2301		C2302	
C2305		C2306	
C2303		C2304	
C2307		C2308	

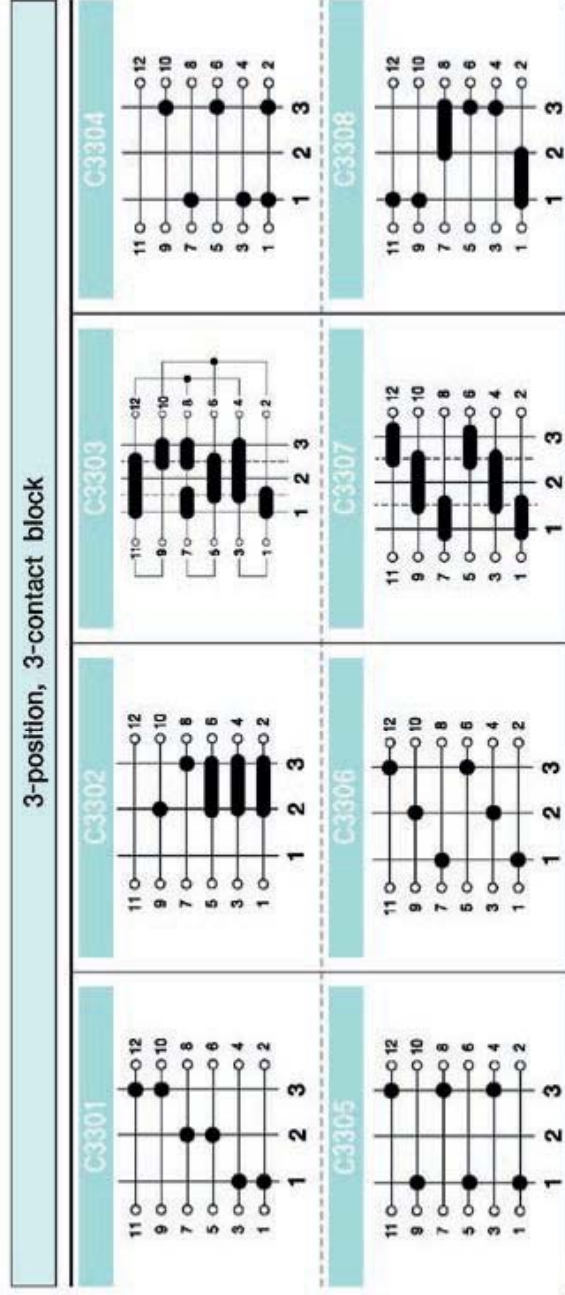
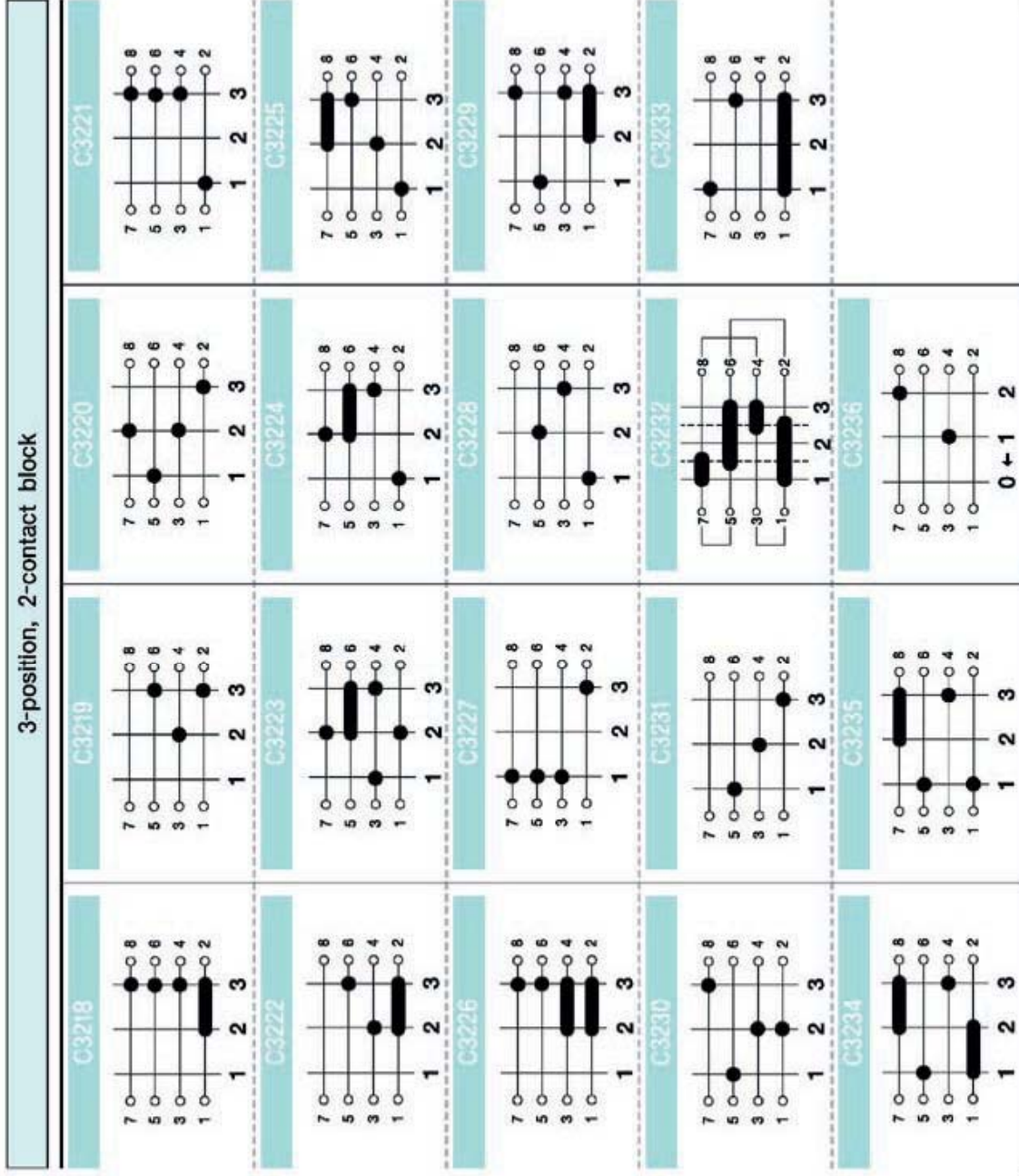
표준 회로집 - example of standard circuit



표준 회로집 - example of standard circuit

3-position, 1-contact block							
C3102		C3103		C3104A		C3105	
C3106		C3107		C3108		C3109	
C3110							
3-position, 2-contact block							
C3201A		C3202		C3203		C3204	
C3205		C3206		C3207		C3208	
C3210		C3211		C3212		C3213A	
C3214		C3215		C3216		C3217	

표준 회로집 - example of standard circuit



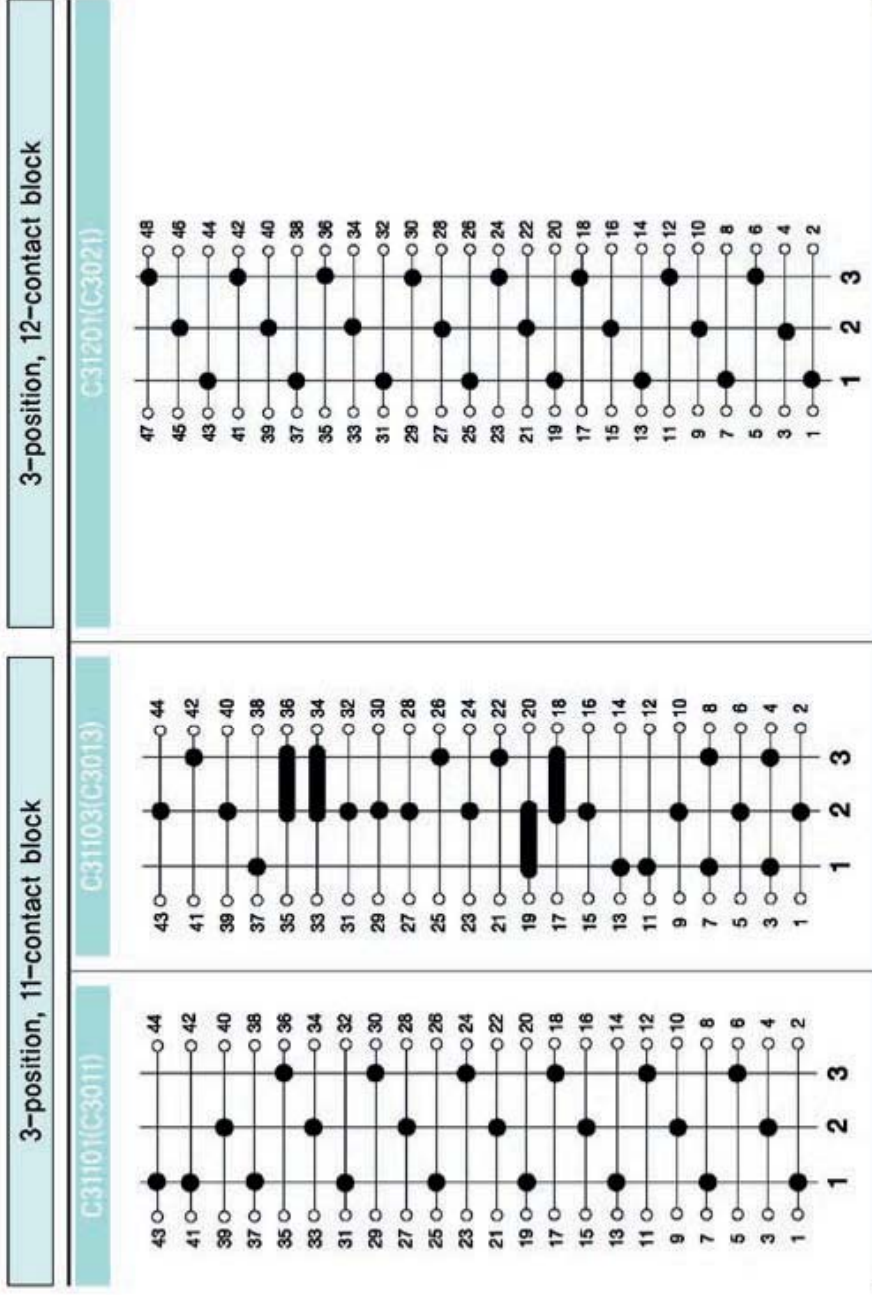
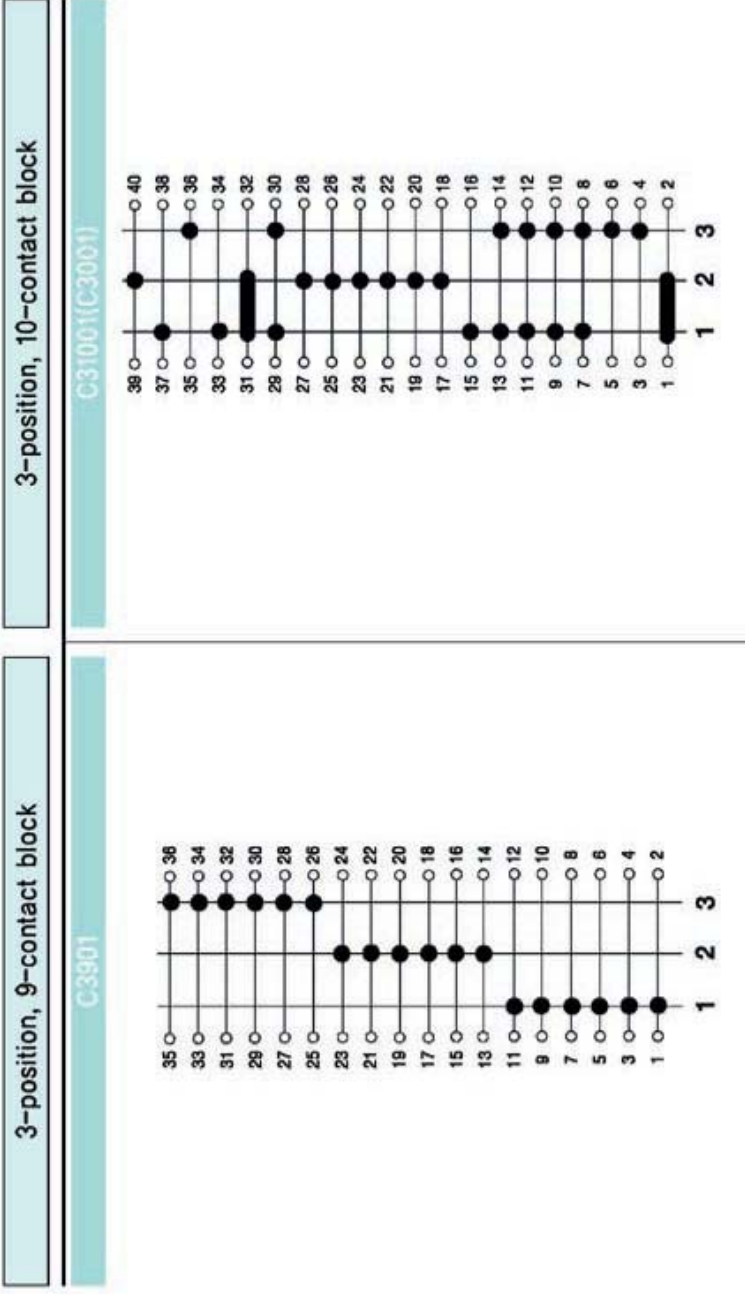
표준 회로집 - example of standard circuit

3-position, 3-contact block			
C3309	C3310	C3311	C3312
C3313	C3314	C3315	C3316
C3317A	C3318A		
3-position, 4-contact block			
C3401	C3402	C3403	C3404

표준 회로집 - example of standard circuit

3-position, 5-contact block				
C3501	C3502	C3503	C3504	
19 17 15 13 11 9 7 5 3 1 20 18 16 14 12 10 8 6 4 2 1 2 3	19 17 15 13 11 9 7 5 3 1 20 18 16 14 12 10 8 6 4 2 1 2 3	19 17 15 13 11 9 7 5 3 1 20 18 16 14 12 10 8 6 4 2 1 2 3	19 17 15 13 11 9 7 5 3 1 20 18 16 14 12 10 8 6 4 2 1 2 3	
C3505				
19 17 15 13 11 9 7 5 3 1 20 18 16 14 12 10 8 6 4 2 1 2 3				
3-position, 6-contact block				
C3601	C3602	C3603		
23 21 19 17 15 13 11 9 7 5 3 1 24 22 20 18 16 14 12 10 8 6 4 2 1 2 3	23 21 19 17 15 13 11 9 7 5 3 1 24 22 20 18 16 14 12 10 8 6 4 2 1 2 3	23 21 19 17 15 13 11 9 7 5 3 1 24 22 20 18 16 14 12 10 8 6 4 2 1 2 3		

표준 회로집 - example of standard circuit



표준 회로집 - example of standard circuit

4-position, 2-contact block			
C4201	C4202	C4203	C4204
C4205	C4206	C4207	C4208
C4209	C4212	C4214	C4215
C4216	C4217	C4220	C4229
C4230	C4231	C4241	

4-position, 3-contact block		
C4303	C4304	C4305
		C4306

표준 회로집 - example of standard circuit

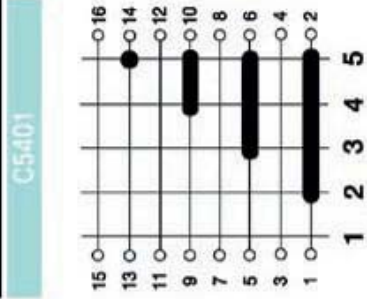
4-position, 4-contact block			
C4403	C4404	C4405	
4-position, 5-contact block	4-position, 6-contact block	4-position, 11-contact block	
C4501	C4602	C4110(C4111)	
5-position, 2-contact block			
C5201	C5202	C5203	C5204
C5205	C5206	C5207	C5208

표준 회로집 - example of standard circuit

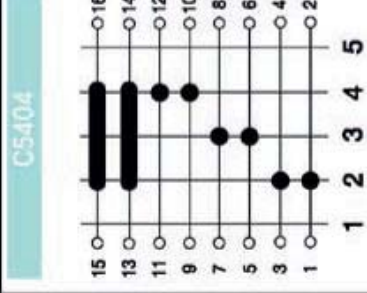
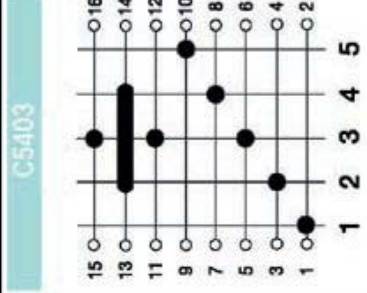
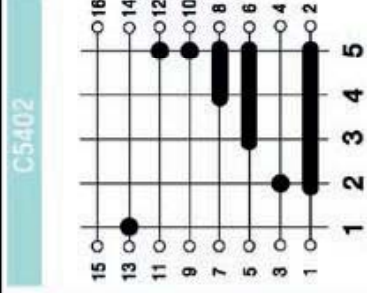
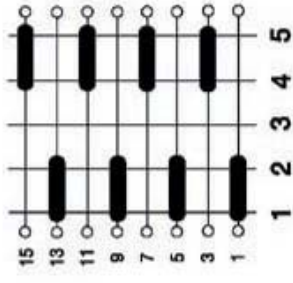
5-position, 2-contact block		
C5209	C5210A	
5-position, 3-contact block		
C5301	C5302	C5303
C5305	C5306	C5309
C5311	C5312	C5313
C5315	C5316	C5317
C5304	C5310	C5314
C5318		

표준 회로집 - example of standard circuit

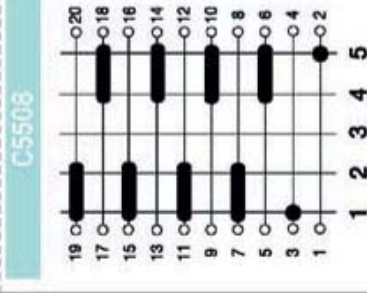
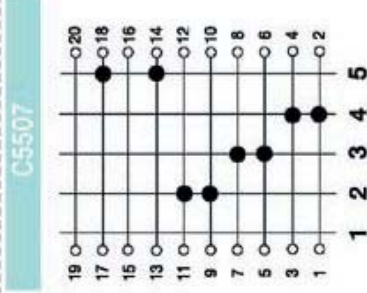
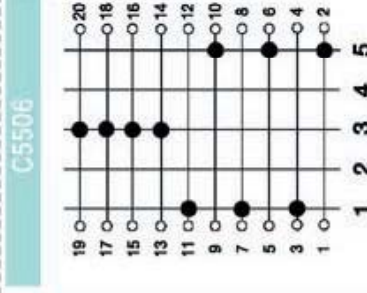
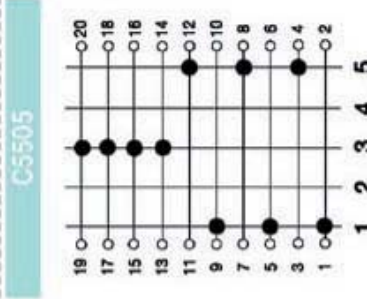
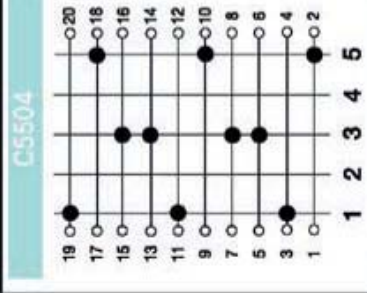
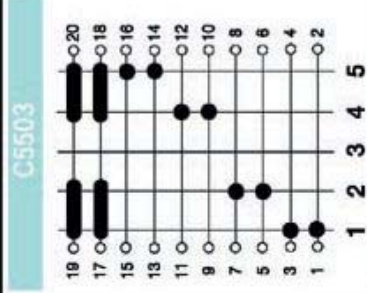
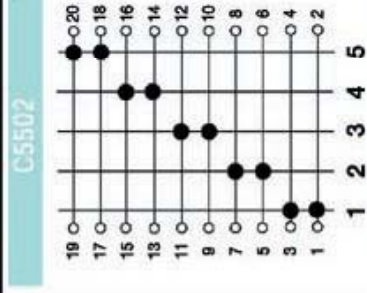
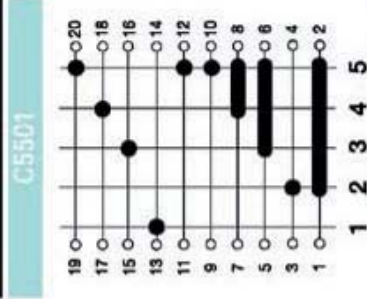
5-position, 4-contact block



C5405



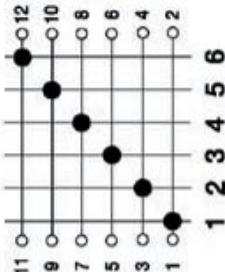
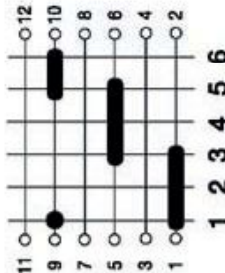
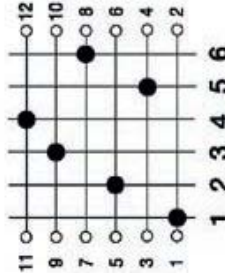
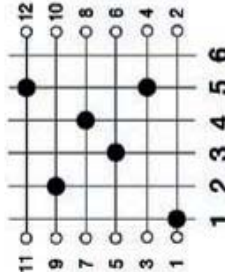
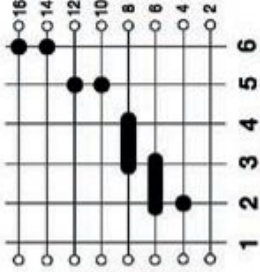
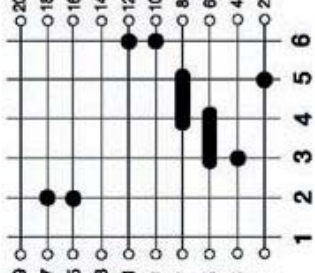
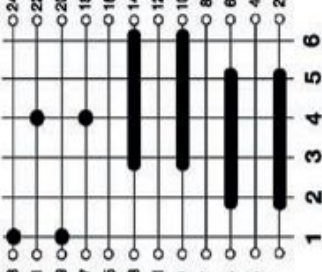
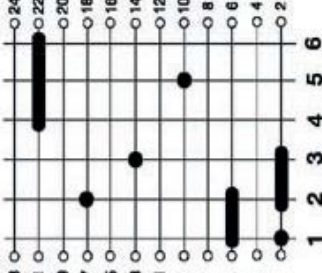
5-position, 5-contact block



표준 회로집 - example of standard circuit

5-position, 5-contact block	
C5509	C5510
5-position, 6-contact block	5-position, 7-contact block
C5601	C5701
5-position, 8-contact block	5-position, 10-contact block
C5801	C51001(C5001)

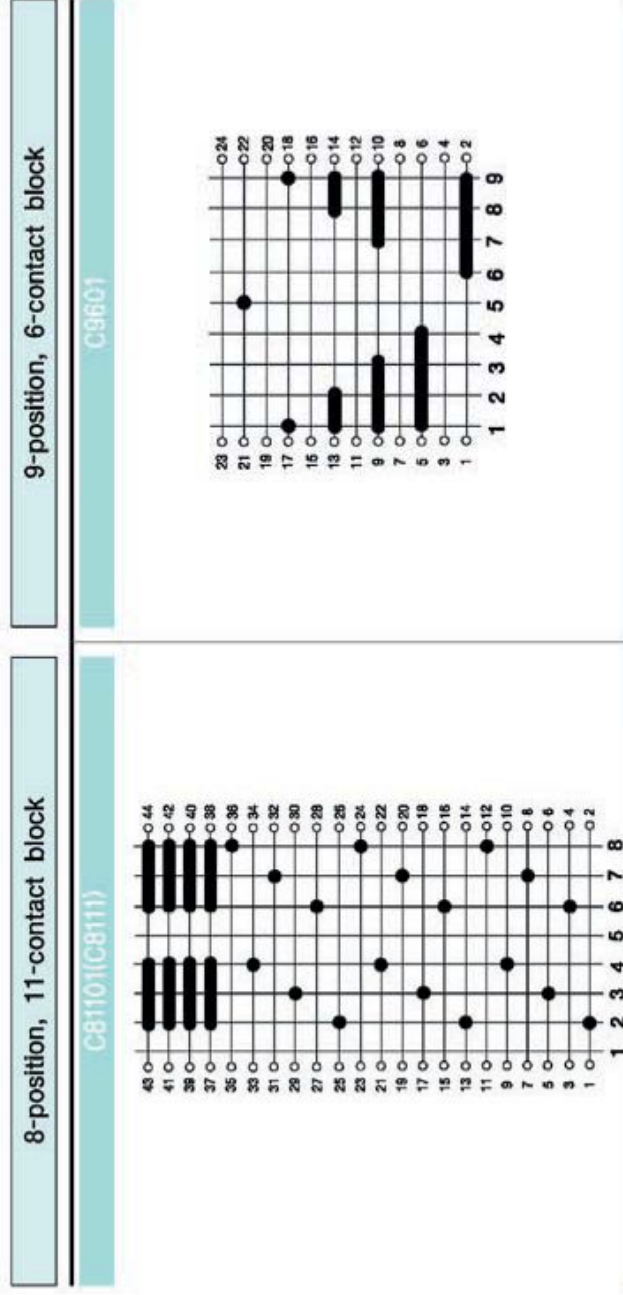
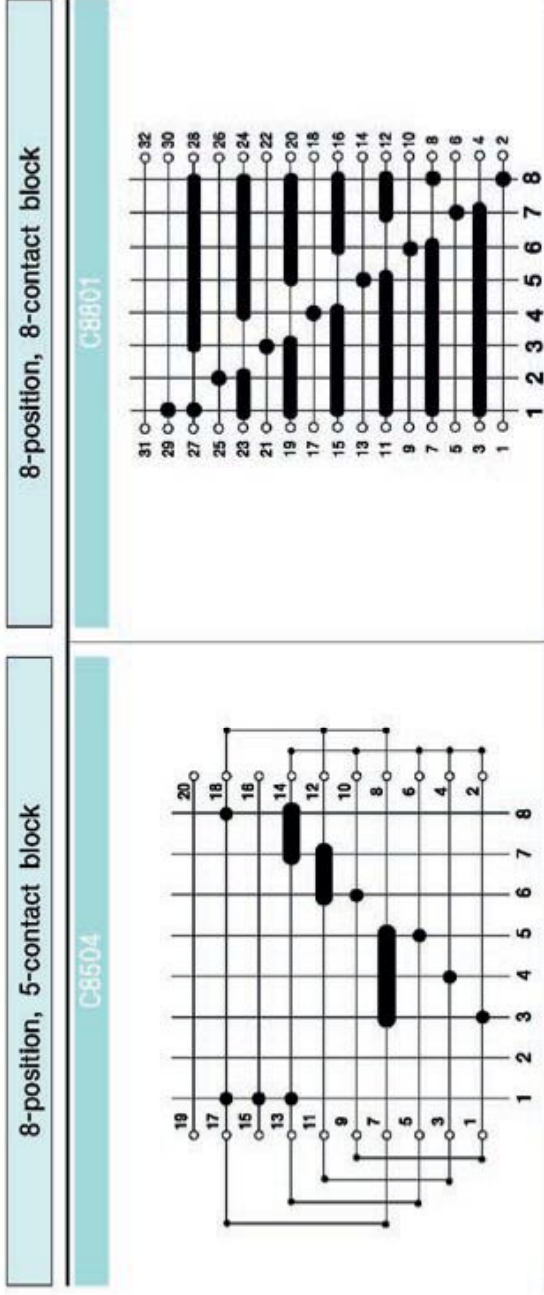
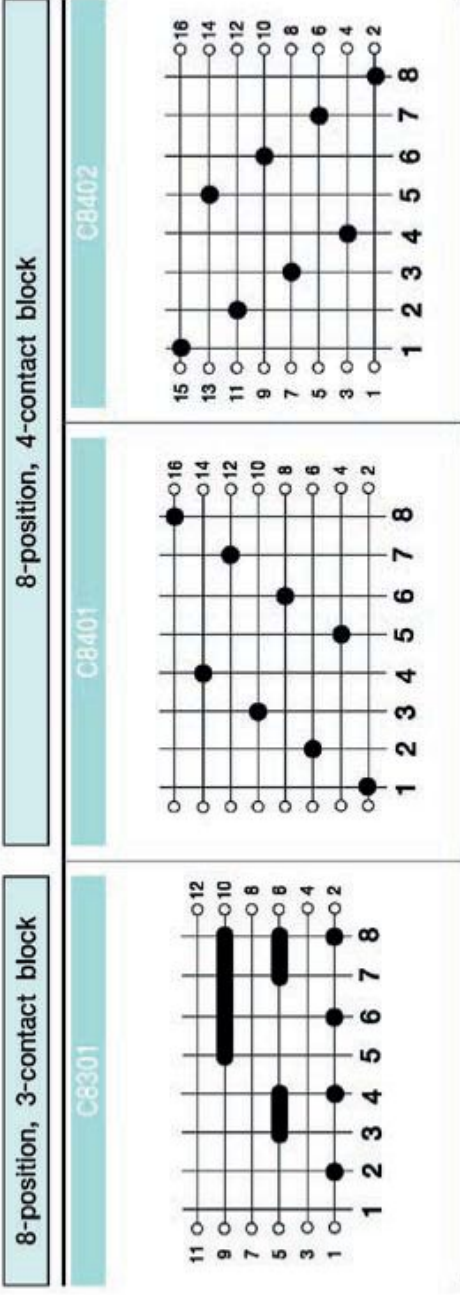
표준 회로집 - example of standard circuit

6-position, 3-contact block			
C6301	C6302	C6303	C6304
			
6-position, 4-contact block			
C6402	6-position, 5-contact block		
			
6-position, 6-contact block			
C6601	C6602		
			

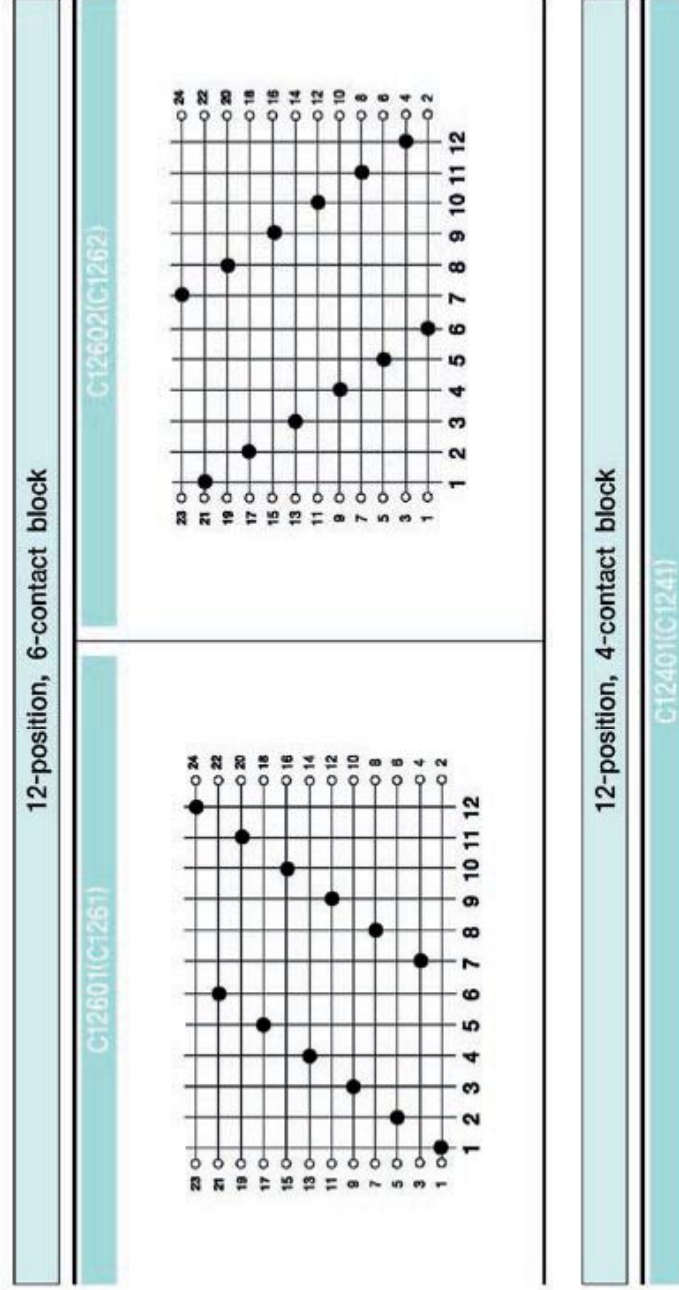
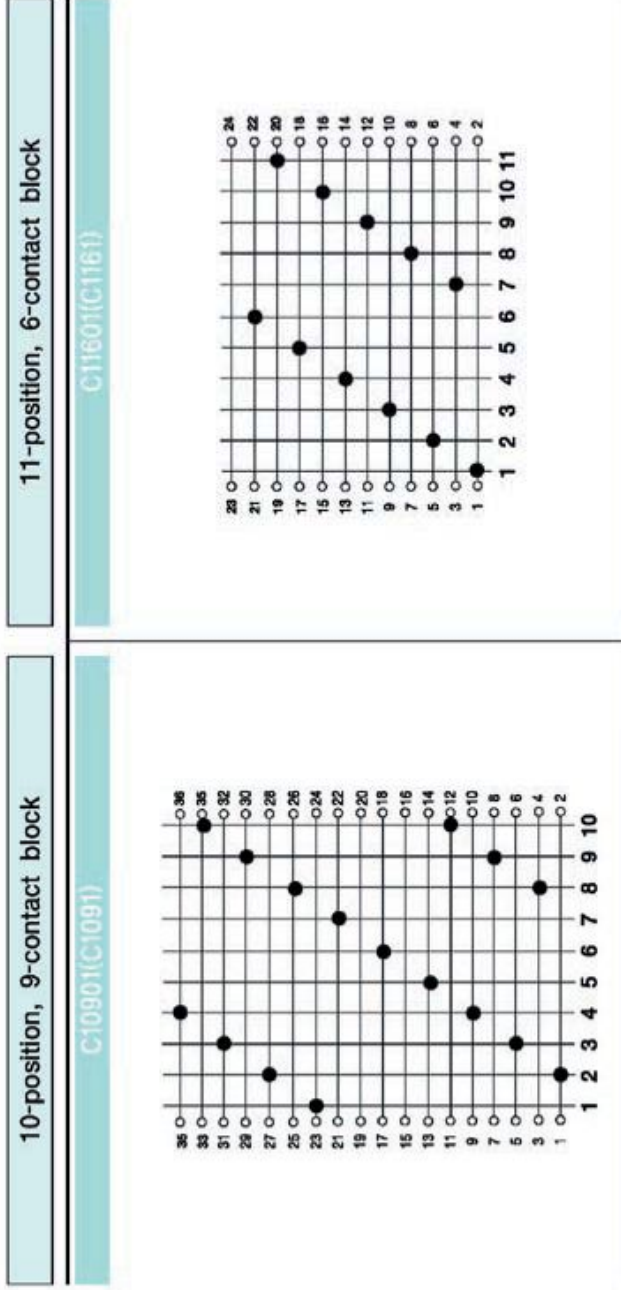
표준 회로집 - example of standard circuit

7-position, 3-contact block	
C7301	C7302
7-position, 4-contact block	
C7401	C7402
7-position, 7-contact block	
C7701	C7403

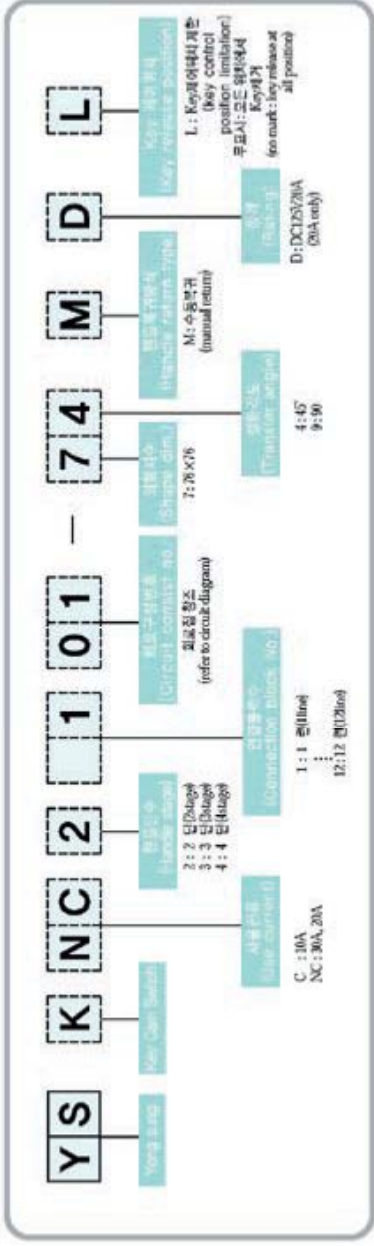
표준 회로집 - example of standard circuit



표준 회로집 - example of standard circuit



• 形式 區分圖 - Type classification diagram



• 特徵 - Features

- 각 단에서 핸들을 고정시킬 수 있습니다.
- 절한 각도 90° 2단, 45° 4단까지 제작 가능합니다.
- key 뺄는 위치 제한 가능합니다.
- 산업용 설비, 공장기계, 자동 개폐 조작기 등 각종 전기회로의 절환용으로 광범위하게 사용할 수 있습니다.
- Key 종류는 22종입니다.
- Handle can be fixed at each stage
- Transfer angles can be manufactured 90° 2stages to 4 stages
- Key release position can be controlled.
- Various using for transfer of each electrical circuit for industrial equipments, machine tool, auto on-off control machines.
- There are 22 different type of key.

• 部品 材質 - Part Materials

部 品 (Part)	材 質 (Materials)
손잡이 (Handle)	아연 다이캐스팅 (Zn diecasting, Ni plating)
키 (Key)	黃銅 (Brass, Ni plating)
키 몸체 (Key ass'y)	아연 다이캐스팅 (Zn diecasting)
키 몸체 (Key body)	아연 다이캐스팅 (Zn diecasting)
부착판 (Mounting plate)	아연 다이캐스팅 (Zn diecasting, Black coating)

※ 스위치부 부품 재질은 기존 캠스위치와 동일합니다. (The part material of switch is same as Cam Switch existed.)

- 성능 및 정격은 Cam Switch를 참조하십시오.
- Refer to Cam Switch for performance and rating.

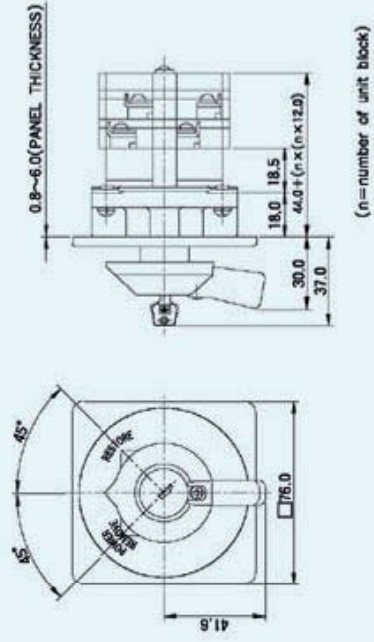
• 제작 가능연수 - Possible manufacturing number of connection block

정격 (Rating)	10A	20, 30A
핸들복귀 방식 (Handle return type)	12핀 (lines)	10핀 (lines)
수동 복귀식 (Manual return type)		

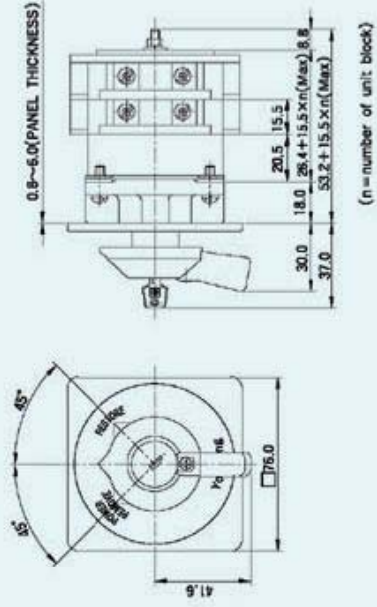
● 外形/値數圖 - Shape/Dimension Drawing

(unit : mm)

10A

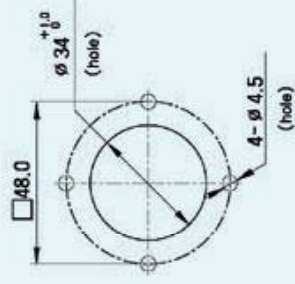


20A/30A



● 판넬 取付値數 - Panel attachment dimension

(unit : mm)



Lockout Relay 동작원리 - Operation description of Lockout Relay

(그림1) Lockout Relay의 핸들이 "TRIP" 위치에 있을 때(회로는 이상없음).

"FC" 접점과 "LR" 접점이 함께 떨어져 있다.

(그림2) 핸들을 수동으로 "RESET" 위치로 돌렸을 때(정상위치, 회로이상없음)
스위치가 기계적으로 잠겨지므로, 수동으로는 "TRIP" 시킬 수 없다.

이때 "LR" 접점은 불고, "FC" 접점은 계속 떨어져 있다.

(그림3) 회로에 이상이 발생했을 때, 즉 "FC" 접점이 붙었을 때, "LR" 접점을 통하여 순간전압이 Coil에 공급되면, 핸들은 자동으로 "TRIP" 위치로 가고, "LR" 접점은 떨어진다.

따라서 Coil에는 계속 전압공급이 되지 않으므로, Coil의 과열현상을 방지해 준다. 이 때 스위치의 핸들을 "RESET" 위치로 돌리면, "FC"와 "LR" 접점을 통하여 Coil에 전압이 공급되므로, 손을 놓으면 핸들은 다시 "TRIP" 위치로 돌아온다. 즉, 외부회로의 이상상태에 의해서 접촉되는 점점 "FC"가 떨어지지 않는 한 핸들은 "RESET" 위치로 돌아올 수 없다. 회로의 이상이 고쳐지면 점점 "FC"가 떨어지고 다시 그림(1)의 상태로 돌아오게 된다.

(Fig. 1) When the handle of Lockout Relay is in the "TRIP" position(circuit is normal), both "FC" contact and "LR" contact are separated.

(Fig. 2) Since switch stops mechanically if handle is manual operated turned to "RESET" position(circuit is normal), cannot "TRIP" manually.

In this case, "LR" contact sticks, "FC" contact is continually separated.

(Fig. 3) When circuit is abnormal state, that is when "FC" contact sticks, if moment voltage is supplied to coil through "LR" contact, handle becomes "TRIP" position automatically and "LR" contact is separated.

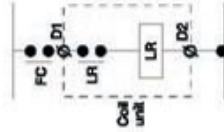
Accordingly, because continuous voltage supply to coil is not occurred overheating of coil is avoided.

Here, if handle of switch is turned to "RESET" position manually, since voltage is supplied to coil through "FC" & "LR" contacts, handle again returns to "TRIP" position when hand released.

That is, unless contact "FC" is separated by abnormal state of external circuit, handle can't return to "RESET" position. If abnormal circuit is corrected, contact "FC" is separated and returns to (Fig.1) state again.

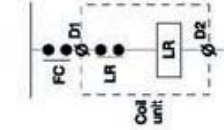
(그림 1)(fig. 1)

정상회로(circuit is normal)
- "TRIP" 위치 ("TRIP" position)
- 점점 "LR" "FC" 떨어져있음
(contact "LR" "FC" separated.)



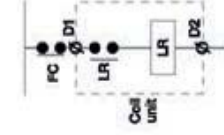
(그림 2)(fig. 2)

정상회로(circuit is normal)
- "RESET" 위치 ("RESET" position)
- "LR" 점점 붙어있음 (contact "LR" stick)
- "FC" 점점 떨어져 있음 (contact "FC" separated.)



(그림 3)(fig. 3)

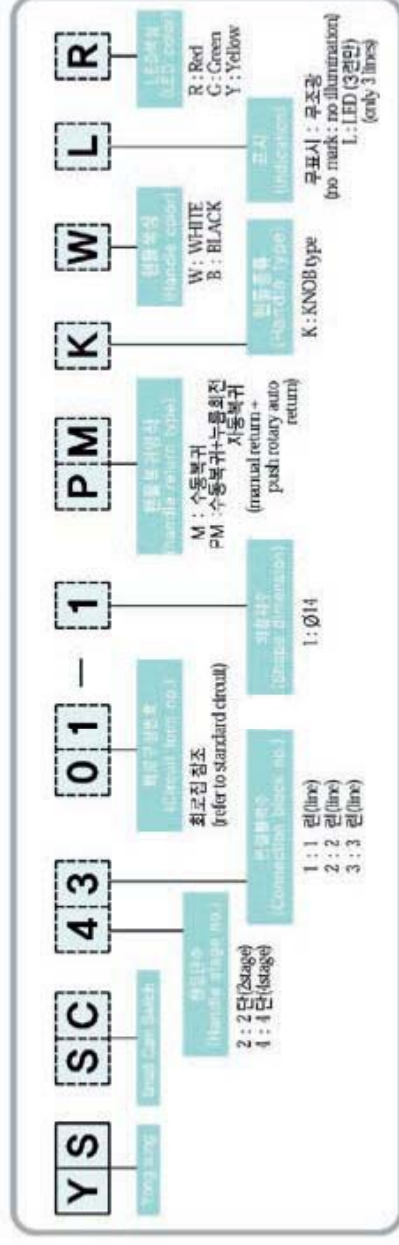
이상(고장) 회로 (circuit is abnormal state.)
- "TRIP" 위치로 S/P복귀 (S/P return to "TRIP" position)
- 점점 "LR" 떨어짐 (contact "LR" separated.)
- "FC" 점점 붙어있음(contact "FC" stick)



2-5

모자이크용 캡스위치 (AC250V, 5A)
Discrepancy Cam Switch (AC250V, 5A)

• 形式 區分圖 - Type classification diagram



• 特徵 - Features

- 모자이크 판넬 취부가 편리합니다.
- LED조광형, 무조광형으로 구분되어 있습니다. (조광형 제작은 3선만 가능)
- 복귀방법은 수동복귀, 수동복귀+누름회전자동복귀 두 종류로 되어 있습니다.
- 한국전기연구원 개발시험 합격.
- 좁은 공간에, 밀집 부착에 매우 적합합니다.

• 使用時의 注意事項 - Remarks in use

- Lamp용 단자 배선시 극성에 주의하십시오.
- DC定格電壓은 完全直流電壓을 表示한 것입니다.

• 部品 材質 - Part materials

部 品 (Part)	材 質 (Materials)
출 다 (Holder)	아 연 (zinc)
하 부 (Unit block)	폴리카보네이트수지 (polycarbonate resin)
손잡이 (Handle)	66나일론수지 (66nylon resin)
端子 (Terminal)	黃 銅 (brass)
接 点 (Contact)	銀 (silver)

• 定格 - Rating

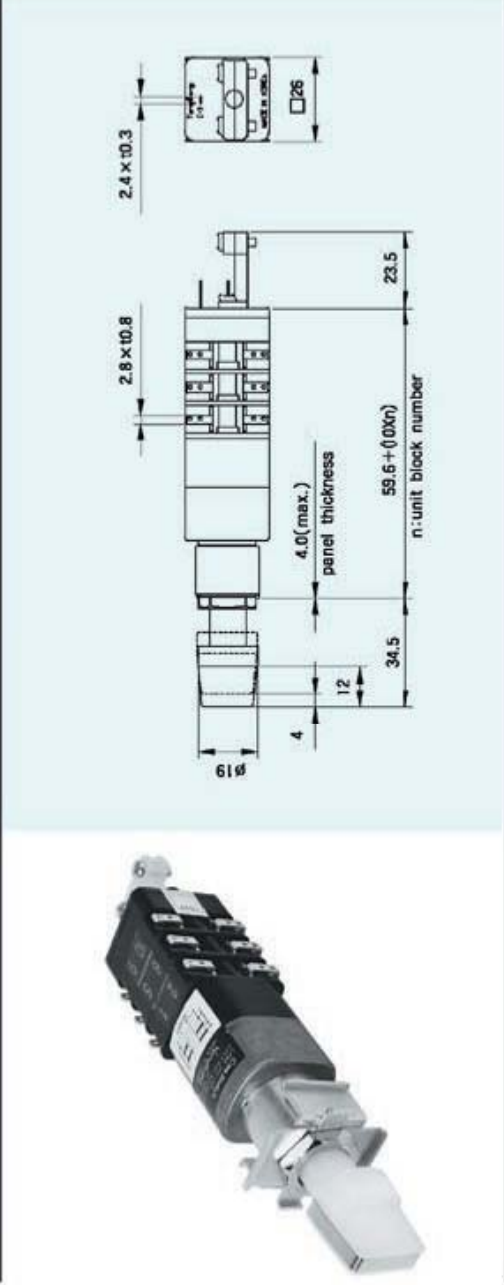
接点 定格 (Contact rating)	交 流 (AC)	AC 220V 5A
	直 流 (DC)	DC 24V 5A, DC 110V 2A
	通電電流 (conductive current)	10A
LED 定格 (LED rating)	DC 24V 20mA	

性能概要 - Performance summary

機械的壽命 (Mechanical lifetime)	500,000回 以上 (above 500,000 times)
電氣的壽命 (Electrical lifetime)	100,000回 以下 (above 100,000 times)
接觸抵抗 (Contact resistance)	20mΩ 以下 (初期値) (below 20mΩ (initial value))
絕緣抵抗 (Insulation resistance)	100MΩ 以上 (above 100MΩ (DC 500V, Meg))
耐電壓 (Withstand voltage)	AC 2,000V/min
使用周圍溫度 (Ambient temperature)	-25℃ ~ + 40℃
相對濕度 (Relative humidity)	45 ~ 85%

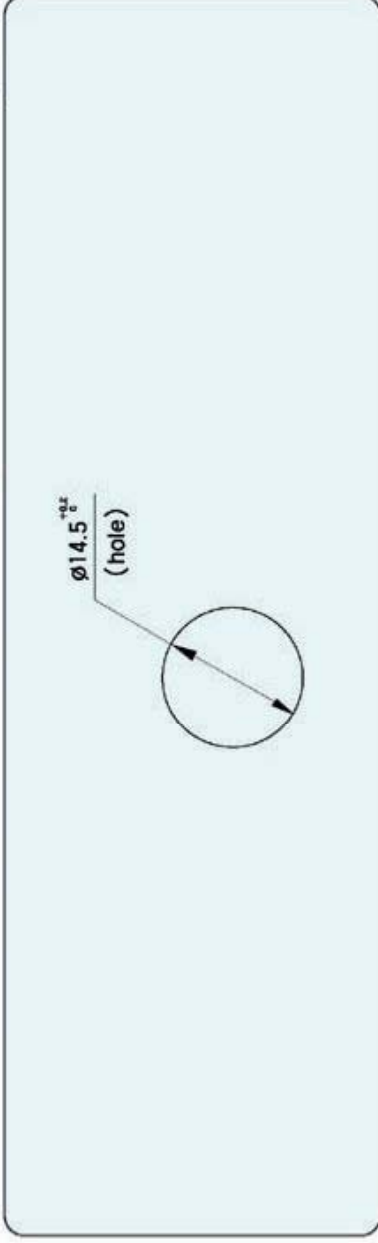
外形/值數圖 - Shape/Dimension Drawing

(unit : mm)

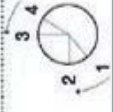


PANEL 取付値數 - Panel attachment dimension

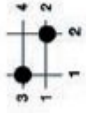
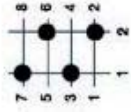
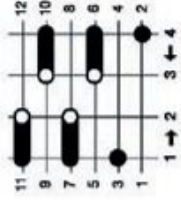
(unit : mm)



● 標準 핸들 位置圖 - Standard handle position diagram

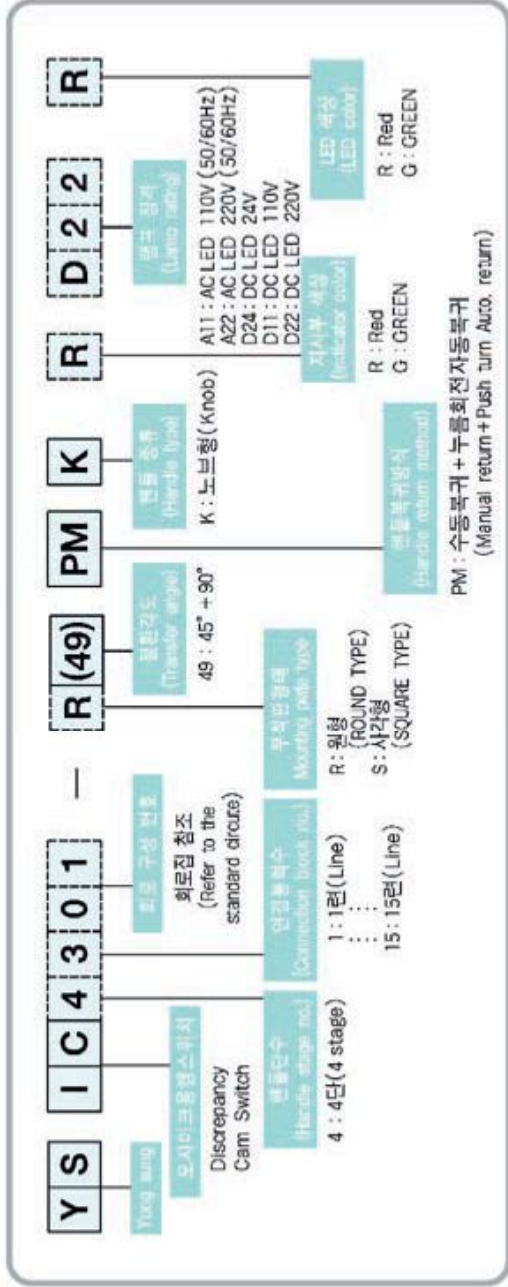
복귀방법 (Return method)	전환각도 (Transfer angle)	2단 (2stages)	4단 (4stages)
M : 수동복귀식 (Manual return)	90°		
P.M. 수동복귀+돌리서 돌려서 자동복귀 (Manual return push rotation and automatic return)	90° + 35°		

● 標準 回路圖 - Standard circuit diagram

2단 1련(2position 1contact block)	2단 2련(2position 2contact block)
SC 2101 	SC 2201 
2단 3련(2position 3contact block)	4단 2련(4position 2contact block)
SC 2301 	SC 4201 
4단 3련(4position 3contact block)	
SC 4301 	

모자이크용 캠스위치 (AC250V, 10A)
Discrepancy Cam Switch (AC250V, 10A)

● 形式區分圖 - Type classification diagram



● 特徴 - Features

- LED를 사용하여 램프 수명이 반영구적임(정격에서 약100,000시간)
- 다양한 점점 구성이 가능합니다.
- Lamp life is semi-permanent by using LED. (about 100,000 hours)
- various Circuit diagram is possible.

● 使用時の注意事項 - Remarks in use

- LAMP용 단자 배선시 극성에 주의하십시오.
- 과전압 또는 과전류에 의한 LED 소손이 발생할 수 있으므로, 용성전기(주) 종합카다로그(Version 8) 225~227쪽을 참고하여 대체수립 바랍니다.
- LED점등용으로 무점등 스위치, PLC, 점등 보호 회로등을 사용할 경우 누설 전류에 의해 출력 OFF 상태에서도 LED가 반 점등하는 경우가 있습니다. 이 경우는 용성전기(주) 종합카다로그(Version 8) 228쪽을 참조하여 대책 수립 바랍니다.
- Please be careful of polarity when a terminal is wired.
- If there is occurred damage of LED by over current or over voltage please refer to the catalogue of YongSung Electric Co.,Ltd (Version. 8) page 225-227
- Semi lighting is occurred sometimes even though power-off in case of using switch of non-circuit, PLC, or protecting circuit of a point of contact. please refer to the catalogue of Yong Sung Electric Co.,Ltd (Version.8) page 228.

● 部品 材質 - Part materials

부 품(Part)	재 질(Materials)
케이스(Case)	내열성 ABS수지(Heat Resistance ABS resin)
홀더(Holder)	내열성 ABS수지(Heat Resistance ABS resin)
손잡이(handle)	6NYLON 수지(6NYLON resin)
베이스(Base)	폴리카보네이트 수지(PC resin)
너트(Nut)	황동(Brass)
단자(Terminal)	황동(Brass)

• LAMP 定格 - LAMP Rating

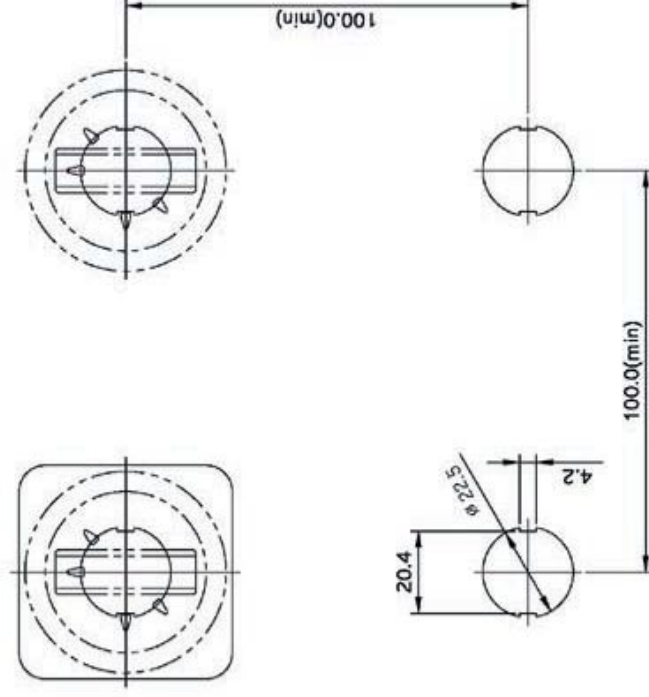
정격전압(Rating voltage)	DC 24V	AC110V 50/60Hz DC110V	AC220V 50/60Hz DC220V
소비전력(Power consumption)	0.5W 이하 (below 0.5W)	2.2VA/2.2W 이하 (below 2.2VA/2.2W)	4.4VA/4.4W 이하 (below 4.4VA/4.4W)
정격전류(Rating current)	20mA 이하 (below 20mA)	20mA 이하(below 20mA)	
LAMP 색상(Lamp color)	적(RED), 녹색(GREEN)		

- 스위치 정격은 기존 캠스위치(10A)와 동일합니다.
- 정격전압의 허용범위는 $\pm 10\%$ 입니다.
- Rating of switch is same as existing cam switch(10A)
- A Permitted limit of rating voltage is $\pm 10\%$

• 性能 概要 - Performance summary

절연 저항(Insulation resistance)	100M Ω 이상 (Above 100M Ω (DC 500V. Meg))		
내전압(Withstand voltage)	AC2,500V/1min		
사용주위온도(Ambient temperature)	$-25 \sim +40^{\circ}\text{C}$		
상대습도(Relative humidity)	45 ~ 85%		

• PANEL 取付値數 - Panel attachment dimension



- 너트 조임공구는 27mm용 스패너 사용 가능합니다.
- Fastening tools for a nut is possible to use a wrench.

接点定格 - Contact Rating-10A

定格絶縁電圧 (Ui) (Rating insulation voltage)	AC 600V, DC 250V					
定格通電電流 (Ith) (Rating conductive current)	20A					
定格電圧 (Ue) (Rating voltage)		24V	110V	220V	440V	
定格電流 (Ie) (Rating current)	交流(AC)	抵抗負荷 (ACI2)	Resistive load	20A	10A	3A
		誘導負荷 (ACI5)	Inductive load	15A	5A	3A
	直流(DC)	抵抗負荷 (DCI2)	Resistive load	15A	5A	2.5A
		誘導負荷 (ACI3)	Inductive load	5A	2A	0.5A

交流誘導負荷—— $\cos \phi = 0.4$

直流誘導負荷----- $T_{0.95} = 300\text{ms}$

● 外形/值數圖 - Shape/Dimension Drawing

	YSIC-R TYPE(원형 부착판 형식)	LAMP 결선도 LAMP 결선도	외형 치수(Shape Dimension)
	YSIC-S TYPE(사각형 부착판 형식)		외형 치수(Shape Dimension)

2-7

캠스위치 5A(ø 22, □30, □48)
Cam Switch 5A(ø 22, □30, □48)

●特徴 - Features

- Ø22, □30은 조작부와 점점부가 분리형으로 되어 있습니다.
- 조작부와 점점부는 한번의 밀착으로 자동 LOCKING이 되도록 설계되었습니다.
- 제품의 소형화 및 경량화를 목적으로 개발되었습니다.
- ø 22 & □30 Cam switch 5A are separated the operating part from the contact part (body).
- They are designed automatically locking at once.
- It is developed for light weight and small size.

●取扱時 注意事項 - Instruction

1. 사용하기전에 반드시 취급설명서를 확인 후 사용하십시오.
2. 정격을 확인하여 정격 이외의 사용을 하지 마십시오.
3. 스위치 이외의 목적에는 사용하지 마십시오.
4. 환경조건(습기, 먼지)을 확인하여 안전조치를 취하십시오. (감전 및 쇼트의 원인)
5. CAM SWITCH 안에 내장되어 있는 2점점(4단자)은 캠에 대하여 대칭으로 배치되어 있어서 핸들의 각도가 180° 회전되면 2점점 모두 폐로 또는 개로 상태가 되니 임의 개조하지 마십시오.
6. 배선시 무리하게 비틀거나 힘을 가하지 마십시오.
7. 나사의 조임강도는 8 kg·f·cm 이하로 해주십시오.
8. 자동 LOCKING 제품은 조작부와 점점부를 분리시켰다가 재조립시 자리파기함과 회전축의 모따기가 일치되어 조립되지 않으면 회로가 변경될수 있으니 취급설명서에 준하여 사용하십시오.

※ 상기 취급시 주의사항에 명기된 내용은 제품 고장을 유발할 수 있으므로 반드시 지켜주십시오.

1. Read the instruction before using.
2. Make sure your rated current. Do not use it but right rated current.
3. Use only for the switch.
4. Check the surrounding condition (Moisture, Dust), and make sure safety condition (Reason of an electric shock) and shut.
5. Do not convert or disassemble. 4terminal points(2 contact point) in CAM SWITCH positioned symmetry point of CAM. Therefore when handle turns at an angle of 180 degrees, all 2 contact point are opened or closed.
6. Do not twist or give pressure to them, when wiring.
7. Screw up under 8 kg·f·cm.

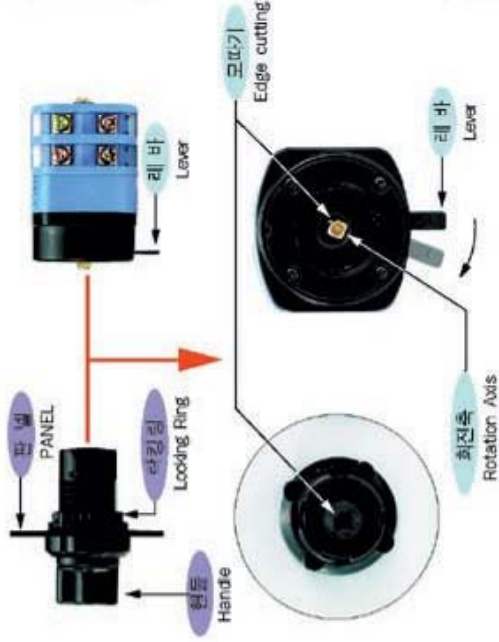
8. AUTO LOCKING product can be changed the circuit, if you do not assemble correctly space-groove cutting of the operating part with edge cutting of rotation-axis of the contact part. So please follow our user guide.

※ When you use this, these happening can be occurred. Please observe the instruction.

組立方法 - Type Ø22

조작부 Operating part

접점부 Contact part



1. 레버를 돌려 조작부와 접점부를 분리합니다.
2. Locking Ring을 빼낸 후 조작부를 Panel에 삽입시키고 다시 Locking Ring으로 고정합니다.
3. 조작부의 모따기와 접점부의 회전축 모따기가 서로 일치하도록 밀착시켜 결합합니다.

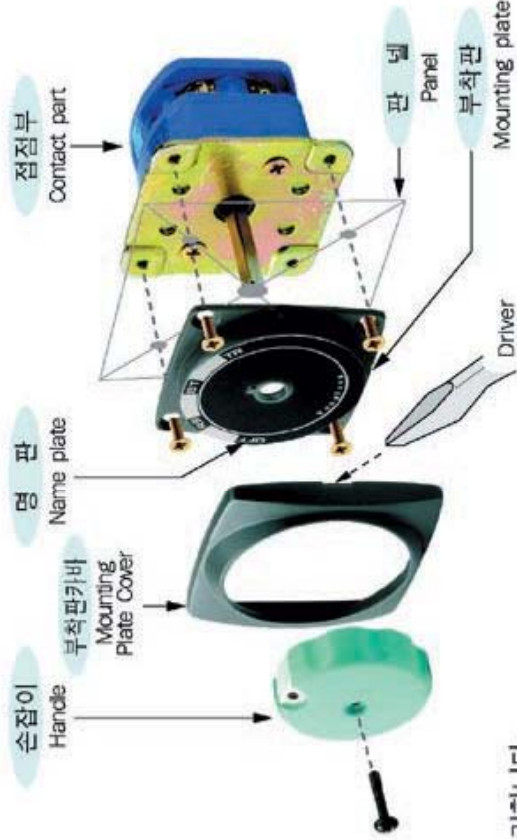
주의사항

분리후에는 Panel에 부착하여 설치가 완료되기 전까지는 조작부 핸들을 임의 조작하지 마십시오. (회로가 변경될 수 있습니다.)

1. Turn the lever, and then separate the operating part and the contact part (body).
2. After take off the LOCKING RING, insert the operating part to PANEL. Then fix it by LOCKING RING.
3. Join space-groove cutting of the operating part with edge cutting of rotation-axis of the contact part correctly.

Attention: After separation, do not touch the operating part handle before finish to set up into the panel.

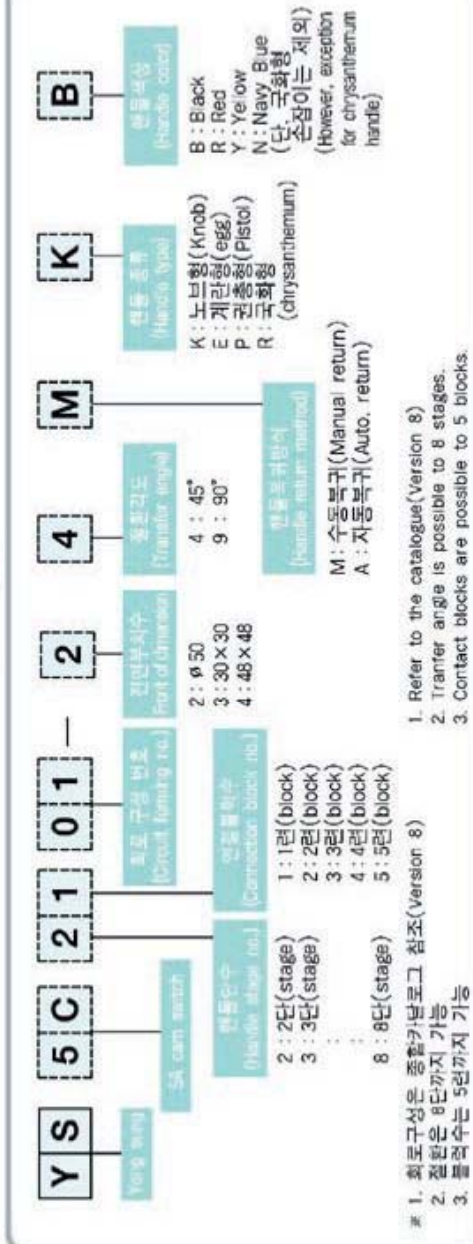
組立方法 - Type □48



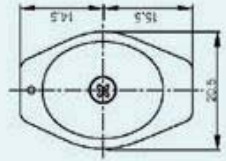
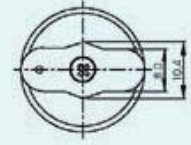
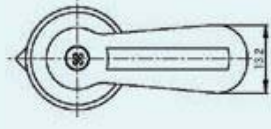
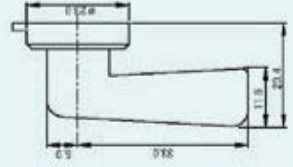
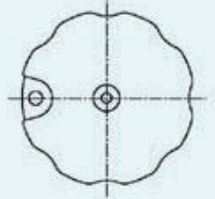
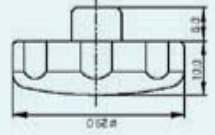
1. 손잡이를 분리합니다.
2. -자 드라이버를 이용하여 부착판 커버를 분리합니다.
3. 부착판 볼트를 풀어 점점부를 판넬에 부착합니다. (명판과 부착판 홈이 일치하도록 합니다.)
4. 부착판 커버를 부착판에 조립하고 손잡이를 조립합니다.

1. Disassemble the handle.
2. Disassemble the mounting plate cover with (-) type driver.
3. Attach the contact part on the panel after unfastening bolt of attachment plate. Do coincide the name plate and the groove(○).
4. Assemble the handle after assembly the mounting plate cover on the mounting plate.

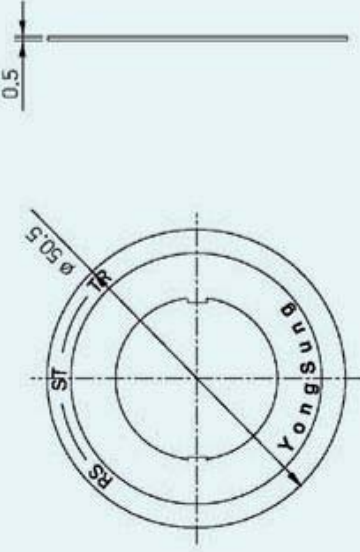
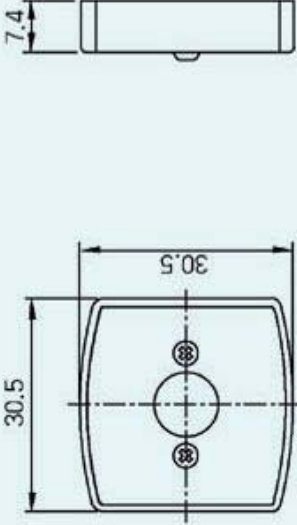
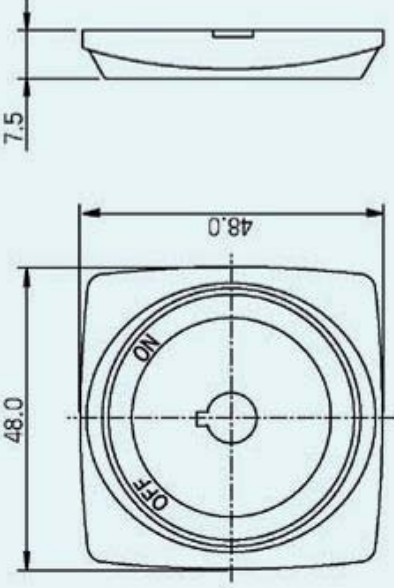
● 形式 區分圖 - Type classification diagram



● 핸들 - Handle

E형: 계란형 (Egg)			
K형: 노브형 (Knob)			
P형: 권총형 (Pistol)			
R형: 국화형 (Chrysanthemum)			

● 前面板 外形值數 – Front shape dimension

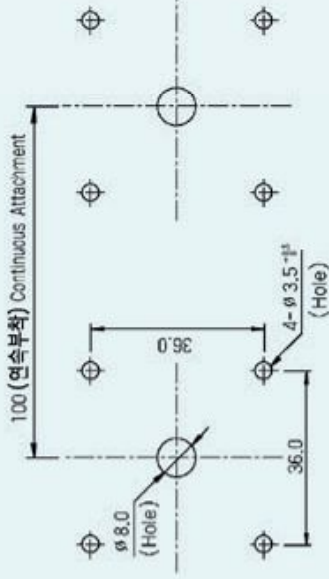
전면판 종류(Front section type)	외형 치수(Shape Dimension)
φ 22 (φ 50) TYPE 	
φ 22 (□ 30) TYPE 	
□ 48 TYPE 	

- 外形/值數圖 - Shape/Dimension Drawing

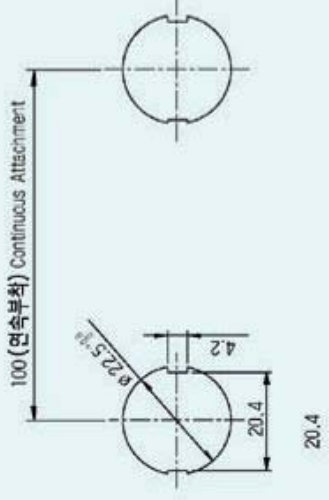
[illegible]

● PANEL 取部 値數 - Panel attachment Dimension

□ 48 TYPE



∅ 22(∅ 50, □ 30)TYPE



● 部品 材質 - Part materials

부 품 (Part)	재 질 (Materials)
몸체 (Body)	ABS내열 (Heat Resistance ABS) Resin
접점블럭 (contact block)	ABS내열 (Heat Resistance ABS) Resin
캠 (cam)	Acetal Resin
손잡이 (handle)	ABS Resin
고정단자 (fixed terminal)	황동 (brass)
유동단자 (moving terminal)	인칭동 (phosphor bronze)
접점 (contact)	은 (silver)

● 接点定格 - Contact Rating

정격전압 (Ue)-(Rating voltage)			24V	110V	220V
점접정격 (Contact rating)	交流 AC	抵抗負荷 (AC12)-Resistive load	7A	7A	5A
	直流 DC	誘道負荷 (AC15)-Inductive load	7A	2.4A	1.2A
		抵抗負荷 (DC12)-Resistive load	5A	1.4A	0.7A
		誘道負荷 (DC13)-Inductive load	1.5A	0.5A	0.2A
통전 전류(Conductive current)		7A			

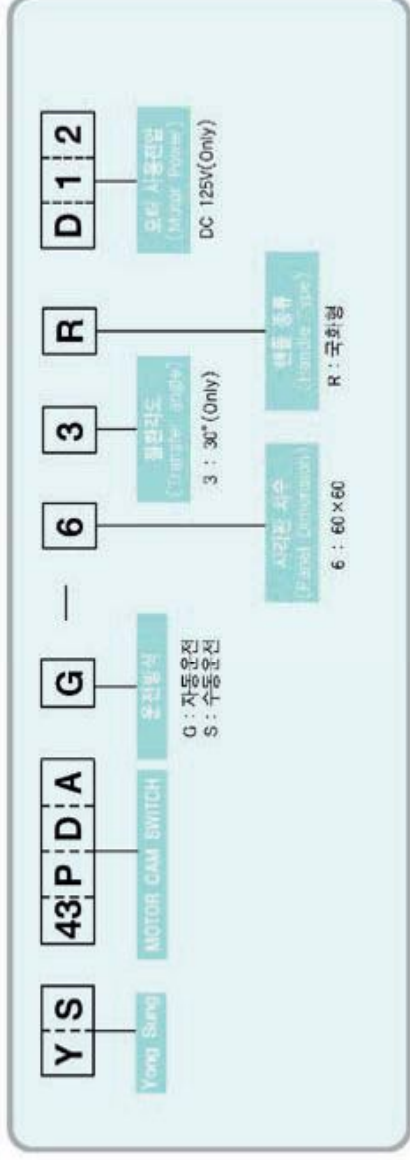
閉路遮斷電流 = 定格電流 × 1.1	交流誘導負荷-----COS ϕ = 0.4
適用規格-----IEC 60947-5-1, KSC 4519	直流誘導負荷-----T _{0.95} = 300ms

● 性能 概要 - Performance summary

기계적 수명(Mechanical lifetime)	500,000회 이상(above 500,000 times)
전기적 수명(Electrical lifetime)	100,000회 이상(above 100,000 times)
접촉 저항(Contact resistance)	50mΩ 이하(초기치) (Below 50mΩ (initial value))
절연 저항(Insulation resistance)	100MΩ 이상 (Above 100MΩ (DC 500V. Meg))
내전압(Withstand voltage)	AC2,500V/1min
사용주위온도(Ambient temperature)	-25 ~ + 40°C
상대습도(Relative humidity)	45 ~ 85%

2-8 43PDA MOTOR CAM SWITCH

●形式 區分圖 - Type classification diagram



●제품의 적용범위 - Applications

본 기기는 수직 자립형 보호배전반의 계전기등에 입력되는 변전소의 이중모선의 P.T 2차 전압을 모선(BUS)의 연결 상태에 따라 자동으로 절체 하여 보호계전기 및 계기용 METER, 기타 제어용 전압등을 공급하는 장치로, 2차전압을 수동절체 시에 발생할 수 있는 각종 기기의 오동작을 방지 하고 DC 제어용 외부점점을 가지고 자동화 및 무인화(SCADA)를 위한 종합 제어보호 시스템의 효율적 계통 운용의 다양한 요구에 적합함.

● 보호계전기반 적용 장소 ●

- ☞ T/L 선로 보호용 배전반.
- ☞ 모선(BUS) 보호용 배전반.
- ☞ U.F.R 보호용 배전반.
- ☞ P.T 전압이 절체가 요구되는 계통전압.
- ☞ M.TR 154/23kv 보호용 배전반.

●기술 사양 - Technical Specification

1. 점접 정격 : AC 60Hz, 250V, 20A
2. 최고사용 전압 : AC 60Hz, 600V
3. DC 개폐용량 : DC 125V, 2.0A(시정수 50ms)
4. 제어전원 : DC 125V (사용전압 범위 : DC 94V ~ DC 156V)
5. 동작전류 : 1.0A 이하
6. 절체 속도 : 외부 신호 입력후 A→B 또는 B→A로, P.T 전압이 완전절체 되는 시간 2.5sec 이내 (정격 제어전압 DC 125V 공급시)
7. 전압절체시간 : 스위치 작동후 A→B 또는 B→A로 P.T 전압이 절체 되는 시간 P.T 무전압 시간은 2.5초 이내. (정격제어 전압 DC 125V 공급시)
8. 절연저항 : 50MΩ 이상
9. 기기 수명 : 20만회 이상(1회 작동 후 5초간 정지 동작)

•43PDA 운전회로 기능 설명

수동조작, 자동조작, 원방조작, 운전 등을 선택하여 사용할 수가 있으며, 운전 방법은 다음과 같습니다.

■ 수 동 운 전

1. 현장 시험 또는 수동조작이 요구될 경우 전면 손잡이를 앞으로 당겨서 PULL-OUT 상태(수동조작위치)에서 인위적인 조작이 이루어짐.
2. 원방 신호의 유, 무 및 자동조작을 위한 관련 Aux-S/W 접점 위치에 관계없이 수동 조작 됨.
3. 수동조작 위치 표시용 LED 녹색램프 점등.
4. 전면 손잡이를 앞으로 밀어 PULL-IN 상태 (자동조작위치)가 되면 LED 램프는 적색 점등으로 바뀌고 자동운전 조건에 따라 작동됨.

■ 자 동 운 전

1. 43PD 결선도면(그림1)과 같이 모션 Aux-S/W 점점을 연결하여 사용.
2. 모션 Aux-S/W 절체가 이루어지면 (A→B모션) 해당모션(B모션)으로 자동절체.
3. 모션 Aux-S/W가 동시에 투입되어 있는 브리지 (BRIDGE) 상태에서는 작동하지 않고 모션 Aux-S/W 절체가 끝나는 시점에 작동됨.
4. 전면 손잡이를 앞으로 밀어 PULL-IN 상태 (자동조작위치)에서만 자동 작동되며 전면 LED 램프는 적색 점등됨.

■ 원방조작운전

1. 43PD 결선도면(그림2)과 같이 원방조작 점점을 결선하여 사용.
2. 원방조작 신호는 A-BUS, B-BUS, OFF 3가지 점점을 사용함.
3. 자동조작 상태(PULL-IN상태)에서만 작동하고 수동조작 상태(PULL-OUT 상태)에서는 작동되지 않음.

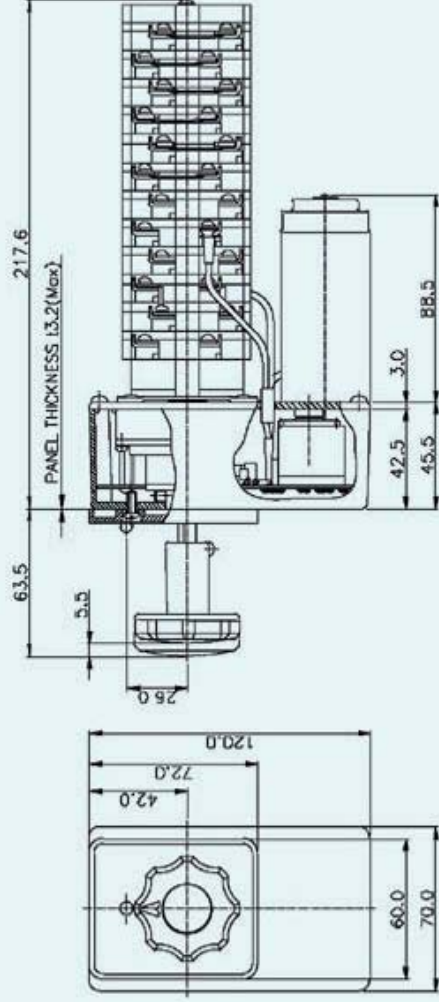
■ 자동 / 원방조작운전

1. 43PD 결선도면(그림3)과 같이 결선하여 사용.
2. 동작은 자동 운전이나 원방조작 운전 시와 동일.

■ 기기 자체원방 운전방법

1. 캡스위치 손잡이를 FULL-IN하고 19번, 20번 단자에 제어전원 DC125V 공급. 이때 LED 녹색으로 점등 확인후 손잡이를 밀어 넣어 LED가 적색으로 변하는지 확인
2. 손잡이를 중앙 OFF에 위치하여 밀어넣어 원방조작을 체크한다.
3. 캡스위치 5번 단자에 DC+를 공급할때 스위치 손잡이가 B-BUS 쪽으로 들어가는지 확인
4. 캡스위치 7번 단자에 DC+를 공급할때 스위치 손잡이가 A-BUS 쪽으로 들어가는지 확인
5. 캡스위치 9번 단자에 DC+를 공급할때 스위치 손잡이가 중앙의(OFF)쪽으로 들어가는지 확인

• 외형/치수도 - Shape/Dimension



• 판넬 취부 치수 - Panel Attachment

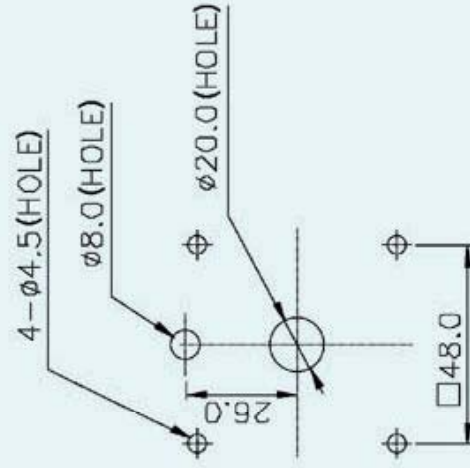


그림1. 43PDA 결선 도면(A,B 모션 자동 운전시)

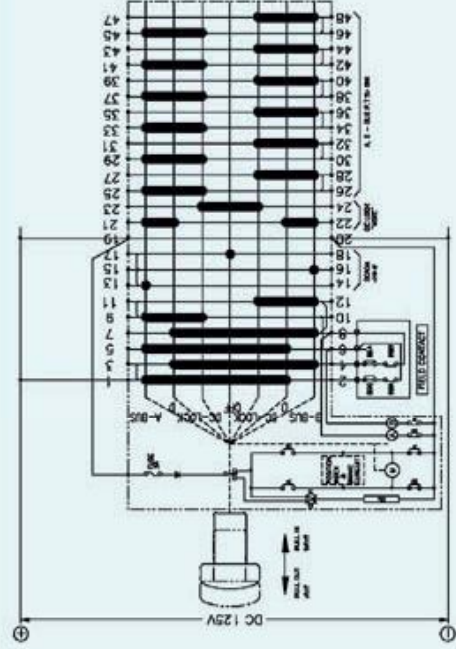


그림2. 43PDA 결선 도면(A,B 모션 원방 운전시)

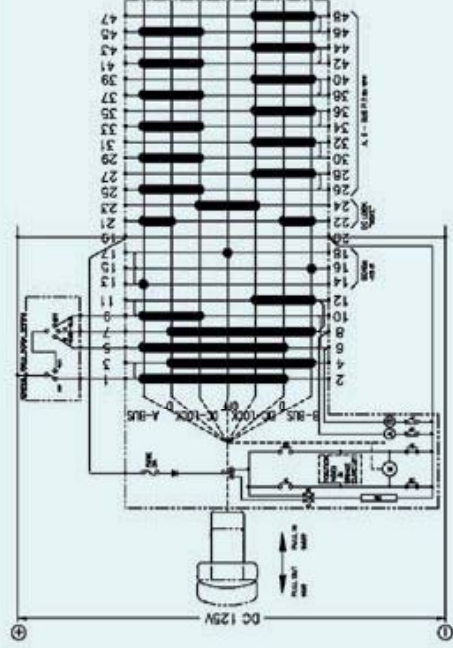
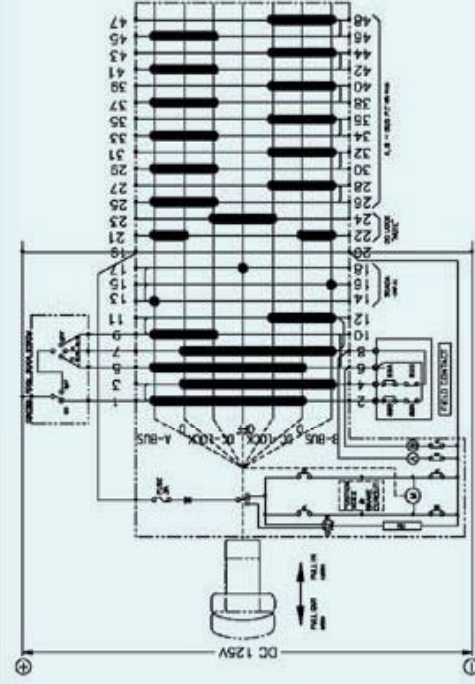


그림3. 43PDA 결선 도면(A,B 모션 자동 및 원방 운전시)



NOTE

1. DC LOCK 점점 구성은 43PD MODEL에 따라 차이가 있을 수 있음.
2. 43PD 점점 구성은 기본 점점 구성도 임.
3. 수동 조작 및 현장에서의 시험은 43PD의 전면 행들을 앞으로 당겼을때에만 조작이 가능 함.



Ø16 SERIES

- 3-1 Push Button / Emergency Push Button Switch
- 3-2 Illuminated / Emergency Illuminated Push Button Switch
- 3-3 Pilot Lamp
- 3-4 Rotary Switch

3 Ø16 시리즈 Ø16 SERIES

- 3-1 누름버튼/비상누름버튼스위치
- 3-2 조광형/비상조광형누름버튼 스위치
- 3-3 표시등
- 3-4 로타리 스위치

- 3-1 Push Button/Emergency Push Button Switch
- 3-2 Illuminated/Emergency Illuminated Push Button Switch
- 3-3 Pilot Lamp
- 3-4 Rotary Switch

스위치 特徵 및 構造 - Feature and Structure of Switch

- 판스프링 구조로 되어 있습니다. 순간적인 작동으로 ARC에 의한 점접 소손 방지
- 몸체가 투명합니다. 작동유무가 확인됩니다.
- Consist of plate spring structure. Protect contact from burning due to Arc.
- Body is transparent. Can verify whether operated or not.

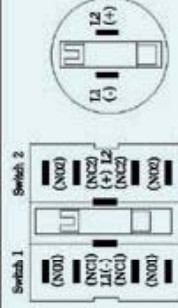
스위치 概要 - Performance summary of switch

定格容量 (Rating capacity)	AC 250V 3A (Resistance Load)	
絶縁抵抗 (Insulation resistance)	above 100MΩ (DC 500V, Meg)	
接觸抵抗 (Contact resistance)	below 50mΩ (initial value)	
耐電壓 (Withstand voltage)	단자와 접지 : AC1,500V/min, 통극단자 : AC1,000V/min	
機械的壽命 (Mechanical lifetime)	Automatic return	above 500,000times
	Lock type	above 200,000times
電氣的壽命 (Electrical lifetime)	above 100,000times (20times/min)	

스위치 部品材質 - Part materials of switch

部 品 (Part)	材 質 (Materials)
몸 체 (Body)	Polycarbonate resin
接 点 (Contact)	銀 (silver)
固定端子 (Fixed terminal)	黃 銅 (Brass)
可動端子 (Moving terminal)	베릴륨동 (Beryllium copper)
스프링 (Spring)	Stainless steel

단자배치 (内部接續) - Terminal arrangement (inside connection)



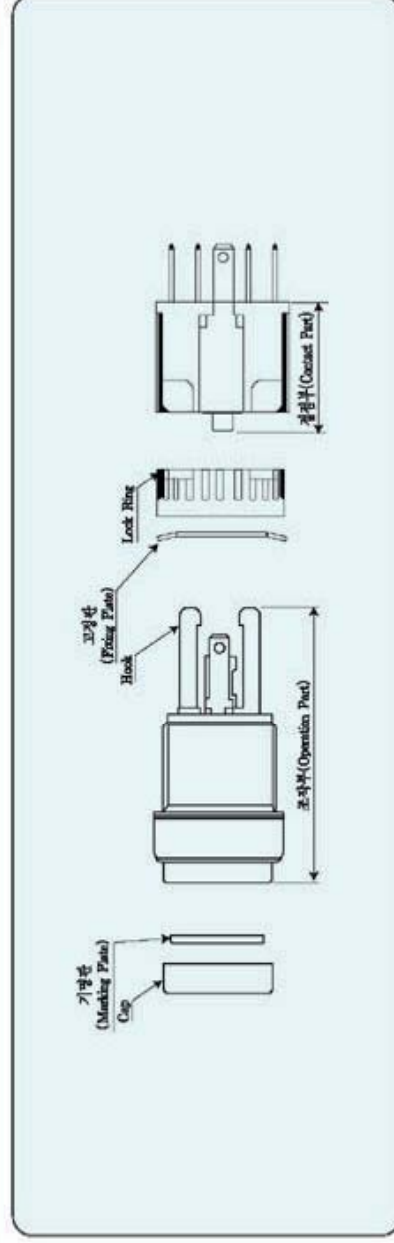
※배선시 단자의 극성에 주의하십시오.
(Note polarity of terminal in wiring.)

● 製品 特徴 및 構造 - Features and structure of product

- 조작부와 점점부가 분리형으로 되어 있습니다. 원터치 탈착방식
- 별도의 Lock Ring을 사용합니다. 보수 및 교체가 편리
- 점점부는 판 스프링 구조로 되어 있습니다. 작동유무가 확인되며, 순간적인 작동으로 Arc에 의한 점점손방지
- 누름버튼, 조광형 및 표시등은 기명판을 교환하게 되어 있습니다. 기명판에 문자각인하여 사용할 수 있습니다.
- Operation part and contact part are consist of separate type. One touch transfer type
- Using other lock ring. Easy for repair and replacement
- Contact part is consist of plate spring structure. Can verify whether operated or not, and protect contact from burning due to Arc of moment operation
- Push button switch, illuminated push button switch and pilot lamp can be replaced by marking plate. Carving a letter at marking plate is possible.

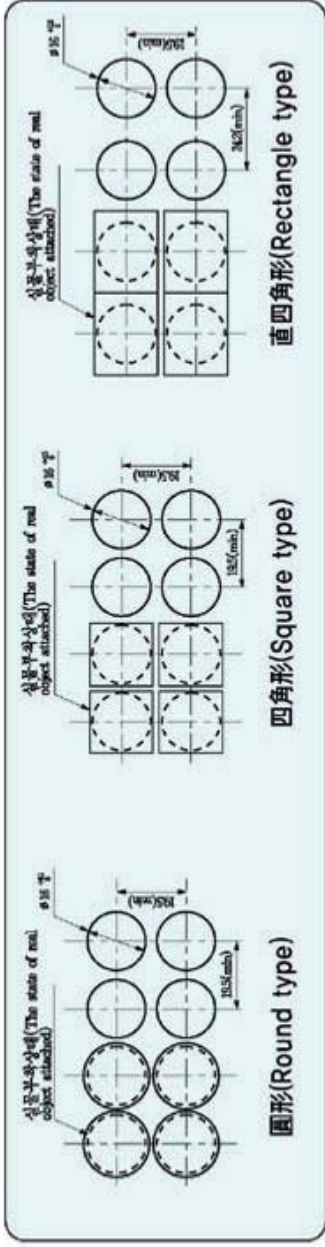
Ø 16 시리즈

● 取扱 説明書 - User guide

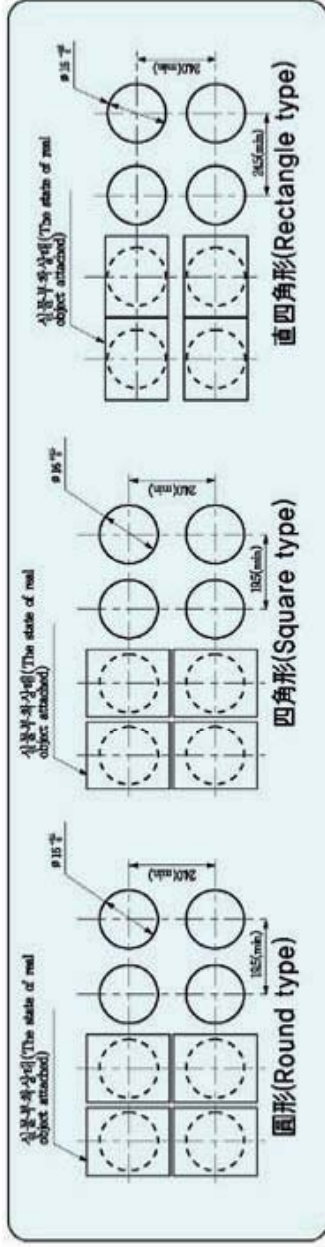


1. Hook부를 벌려서 점점부를 분리합니다.
2. Lock Ring를 빼낸 후 조작부를 판넬에 삽입시키고, 다시 Lock Ring으로 고정합니다.
3. 점점부를 다시 조작부에 조립시에는 점점부의 「」형상과 조작부의 「」형상에 맞추어 끼운 후 딸깍 소리가 나면 결합이 된 상태입니다.
4. 조립 후 고정상태를 확인하십시오.
1. Separate contact part by opening hook part.
2. After removing lock ring, insert operation part into the panel and attach lock ring again.
3. When attaching contact part to operation part between the 「」 Side of contact part and the 「」 side of operation part again, if you hear "Dal Cak" it is a good assembling.
4. Verify fixed state after assembling.

● Panel 取付値數 - Panel attachment dimension



● 보호카바 부착형 - Protection cover attachment type



● Lamp 교체방법 - Lamp replacement method

전구 착탈 공구 사용 방법 (그림 참조)

1. 공구를 최대한 밀어 넣는다(전구 베이스까지).
2. 공구의 최대한 앞부분을 잡아 뺐는다.

Using methoed lamp take in-out tool

(Refer to figure)

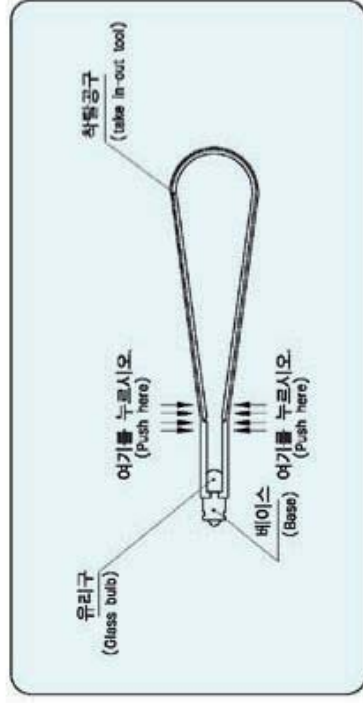
1. Push and insert the tool utmostly.(till lamp base)
2. Pull out the utmost forefront of the tool.

(주의사항)

1. 최대한 밀지 않고(베이스까지) 유리구를 잡게 될 경우 유리구가 파손될 수 있음.
2. 공구의 손잡이의 뒤를 잡을 경우 전구 이탈이 안될 수 있음.

(Note)

1. Glass bulb may be damaged if take the glass bulb without the utmost push(till lamp base).
2. Bulb may not be taken out if take the rear part of the tool.



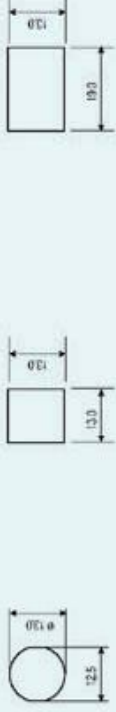
● 램프 정격 - Lamp rating

形式(Type) 性能(Performance)	全電壓式 (Overall-voltage type)				LED Type		
	定格電壓 (Rating voltage) 램프定格 (Lamp rating)	AC 5V 6V/1W	AC 12V 14V/1W	AC 24V 28V/1W	DC 6V 40mA	DC 12V 40mA	DC 24V 20mA

※ 스위치 특성은 P72 참조 바랍니다. (Refer to the page72 about switch features)

● 기명판 Size - Size of marking plate

(unit : mm)



원형(round type)

사각형(square type)

직사각형(rectangle type)

● 외형의 형태 - Type of shape

(unit : mm)



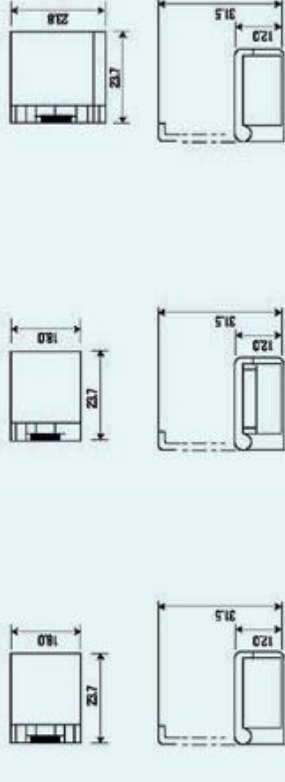
원형(round type)

사각형(square type)

직사각형(rectangle type)

● 보호 카바 - Protection cover

(unit : mm)



원형(round type)

사각형(square type)

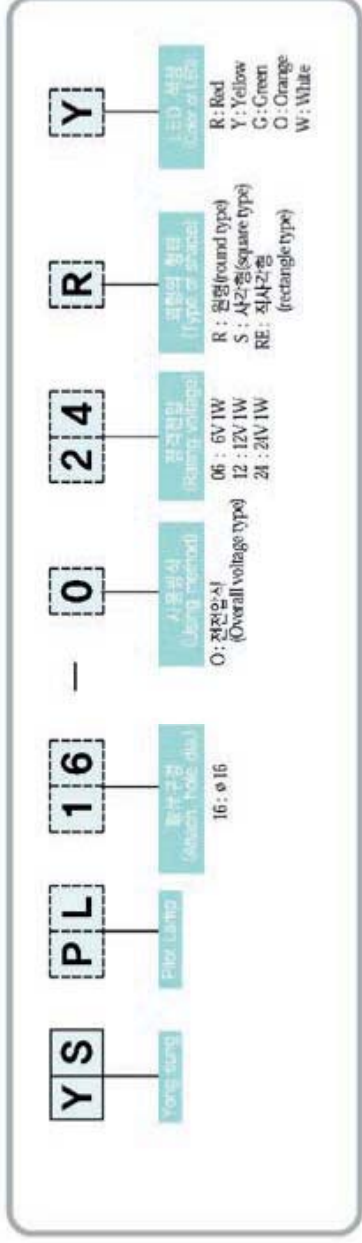
직사각형(rectangle type)

● Rotary Switch 손잡이 동작방향도 Directional diagram of handle action of Rotary Switch



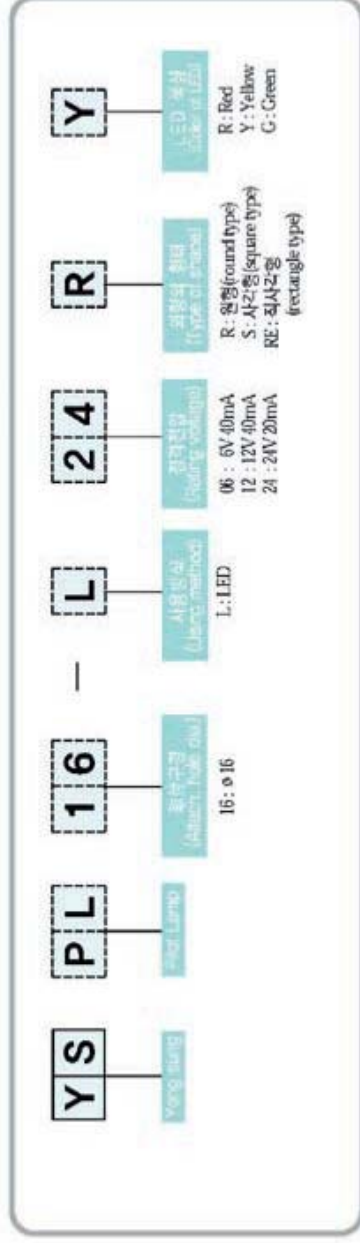
3-3 표시등 Pilot Lamp

• 形式 區分圖 - Type classification diagram ... BULB Type



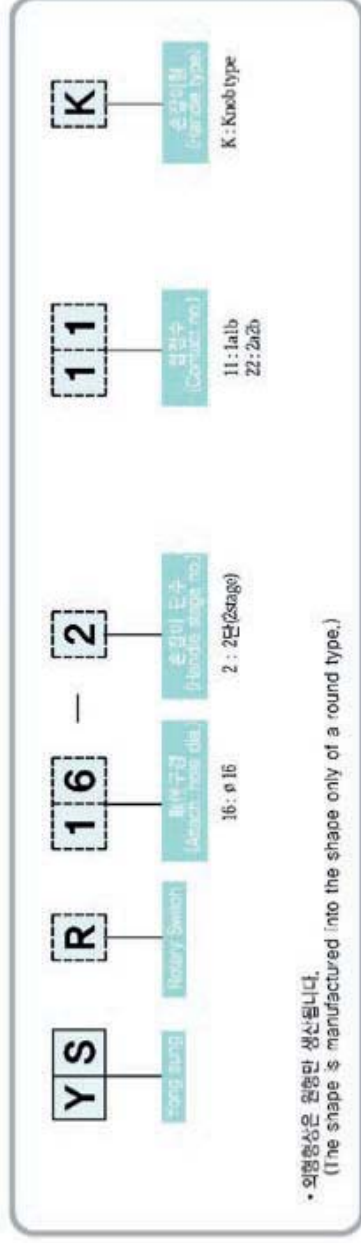
Ø 16 시리즈

• 形式 區分圖 - Type classification diagram ... LED Type



3-4 로타리 스위치 Rotary Switch

• 形式 區分圖 - Type classification diagram

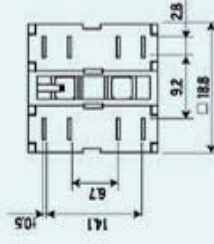
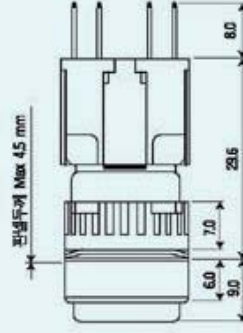


• 외형형상은 원형만 생산됩니다.
(The shape is manufactured into the shape only of a round type.)

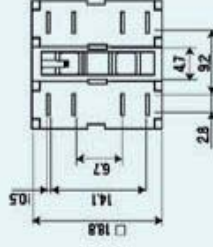
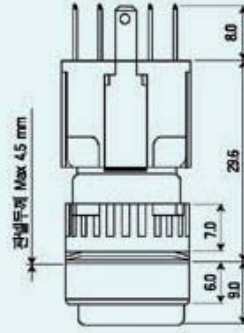
● 外形/値數圖 - Shape/Dimension Drawing

(unit : mm)

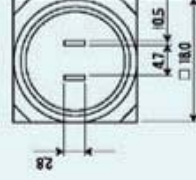
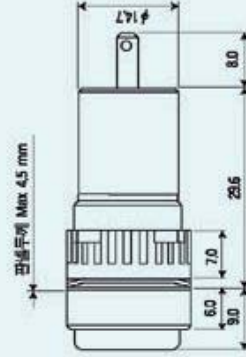
누름버튼스위치



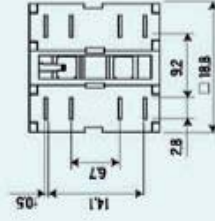
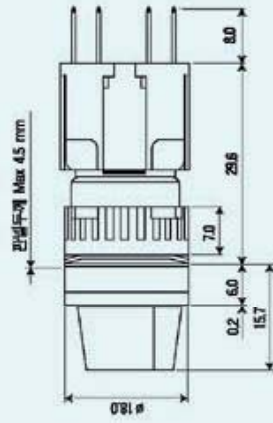
조광형 누름버튼스위치



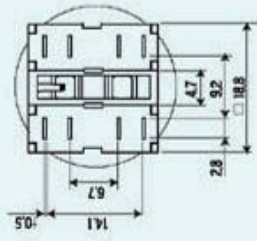
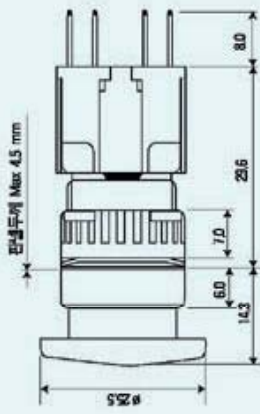
표시등



로타리스위치



비상형스위치



● 綜合 區分圖 - Total classification diagram

	YS PL 16 (Pilot Lamp)	YS E/PBL□16 (Emergency/Illuminated Push Button Switch)	YS E/P□16 (Emergency/Push Button Switch)	YS R16 (Rotary Switch)
外形形態 (Type of shape)	R S RE 	R S RE 	R S RE 	R 
光源의 種類 (Kind of light)	電球 LED (BULB, LED)	電球 LED (BULB, LED)		
LED 色相 (Color of LED)	赤, 綠, 黃 (Red, Green, Yellow)	赤, 綠, 黃 (Red, Green, Yellow)		
LED 定格 (Rating of bulb)	6V 40mA 12V 40mA 24V 20mA	6V 40mA 12V 40mA 24V 20mA		
電球 定格 (Rating of bulb)	6V 1W 14V 1W 28V 1W	6V 1W 14V 1W 28V 1W		
캡 또는 핸들 色相 (Color of cap or handle)	赤, 綠, 黃, 橙, 白 (Red, Green, Yellow, Orange, White)	赤, 綠, 黃, 橙, 白 (Red, Green, Yellow, Orange, White)	赤, 綠, 黃, 橙, 白 (Red, Green, Yellow, Orange, White)	黑 (Black)
接点數 (Number of contact)		1a1b 2a2b	1a1b 2a2b	1a1b 2a2b
電球 規格 (Bulb standard)	S5.7S	S5.7S		



- 4-1 Push Button Switch
4-2 Illuminated Push Button Switch
4-3 Pilot Lamp
4-4 Emergency Switch(Push Button/Illuminated)
4-5 Rotary Switch

4 Ø22 시리즈 Ø22 SERIES



- ▶ IP 56 (원형 : round type)
EX99 IP535
SEL80125-EL001

4-1 누름버튼 스위치	4-1 Push Button Switch
4-2 조광형 누름버튼 스위치	4-2 Illuminated Push Button Switch
4-3 표시등	4-3 Pilot Lamp
4-4 비상 스위치 (누름버튼/조광형)	4-4 Emergency Switch (Push Button/Illuminated)
4-5 로타리 스위치	4-5 Rotary Switch

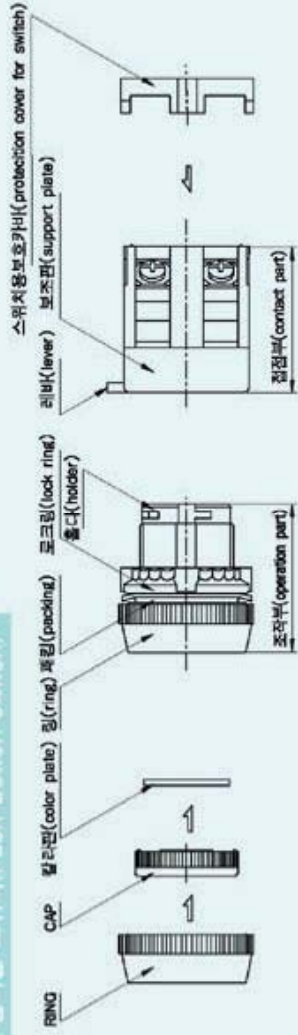
• 제품 특징 및 구조 - Features and structure of product

- 조작부와 점접부가 분리형으로 되어 있습니다. 원터치 탈착방식
- 별도의 Lock Ring을 사용합니다. 보수 및 교체가 편리
- 점접부는 판스프링 구조로 되어 있습니다. 작동유무가 확인되며, 순간적인 작동으로 Arc에 의한 점접소손도 방지할 수 있습니다.
- 누름버튼, 조광형 및 표시등은 별도의 칼라판을 교환하게 되어 있습니다. 칼라판에 문자각인 하여 사용할 수 있습니다.
- Operation part and contact part are consist of separate type. One-touch transfer type
- Using other lock ring. Easy for repair and replacement
- Contact part is consist of plate spring structure. Can verify whether operated or not, and moment operation can protect contact from burning due to Arc.
- Push button switch, illuminated push button switch and pilot lamp can be replaced by other color plate. Carving a letter at color plate is possible.

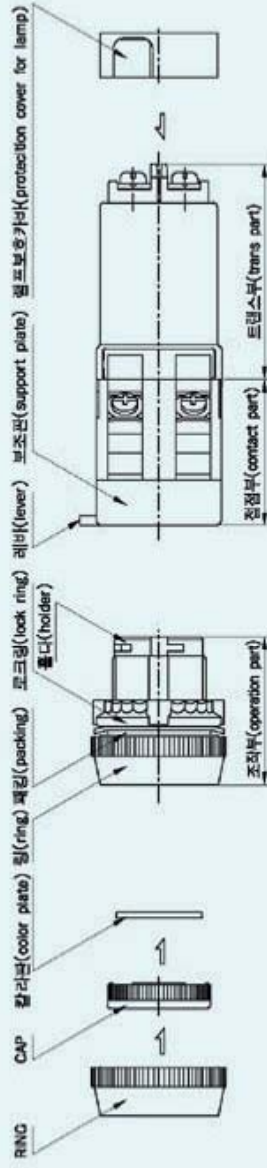
• 取扱 説明書 - User guide

1. 레바를 돌려서 조작부와 점접부(트랜스부)를 분리합니다.
2. Lock Ring을 빼낸 후 조작부를 판넬에 삽입시키고 다시 Lock Ring으로 고정합니다.
3. 점접부(트랜스부)를 다시 조작부에 밀어 넣으면 자동으로 결합됩니다.
4. 조립후 고정상태를 확인하십시오.
1. Separate operation part and contact part(trans part) by turning lever.
2. After removing lock ring, insert operation part into the panel and fix with lock ring again.
3. Push in contact part(trans part) to the operation part again, automatic combine both of parts.
4. Verify fixed state after assembling.

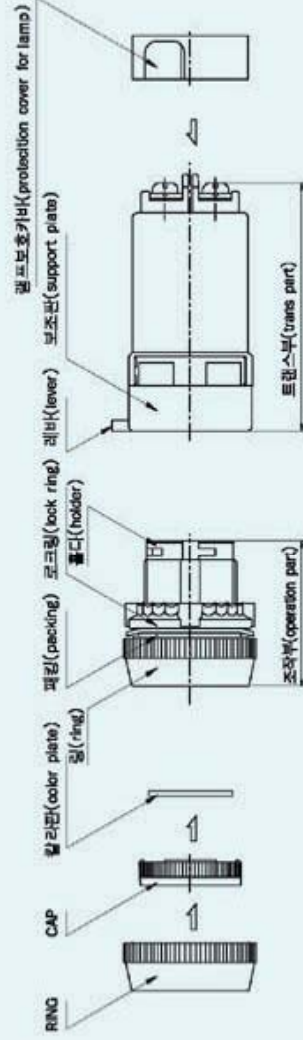
누름버튼 스위치(Push button switch)



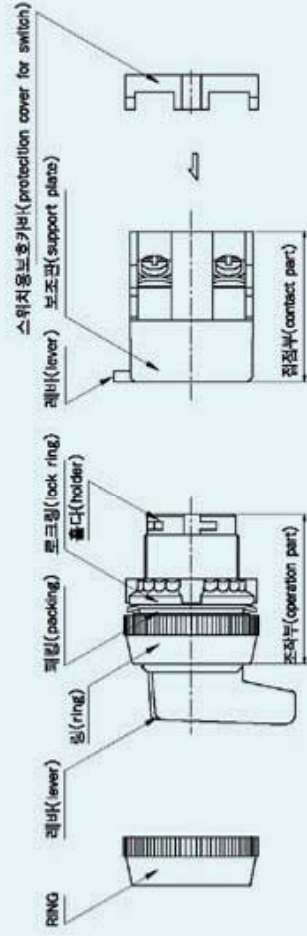
조광형 누름버튼 스위치(Illuminated push button switch)



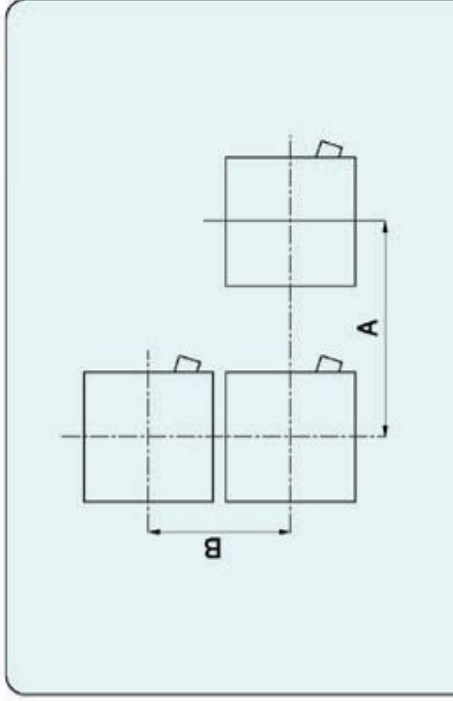
표시등(Pilot lamp)



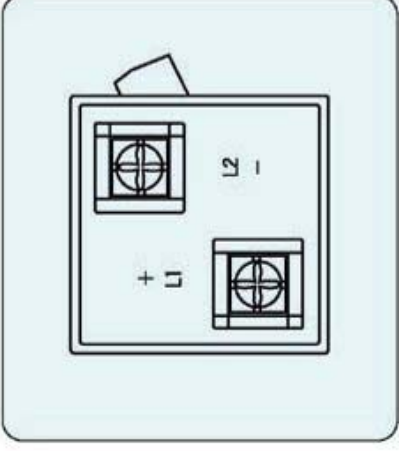
로타리 스위치(Rotary switch)



• 판넬가공 및 부착간격도 - Panel dimension and attachment interval diagram



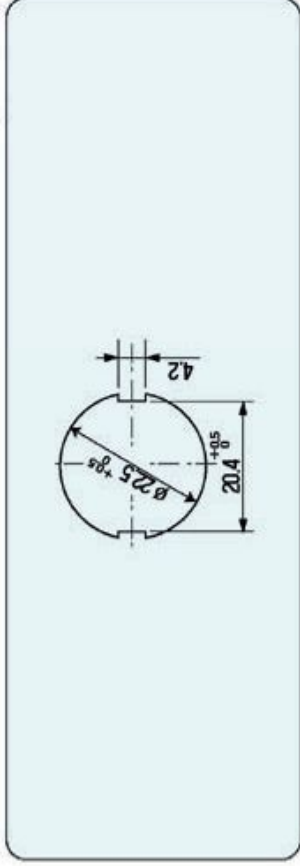
• 단자 극성 - Terminal Polarity



A 가로간격 (Horizontal interval)		(unit : mm)
B 세로간격 (Vertical interval)	누름버튼 (Push button)	above 50
	조광형 누름버튼 (Illuminated push button)	above 33
	표시등 (Pilot lamp)	above 33
	비상스위치 (Emergency switch)	above 33
누름버튼형 (Push button)		above 50
조광형 (Illuminated)		above 50

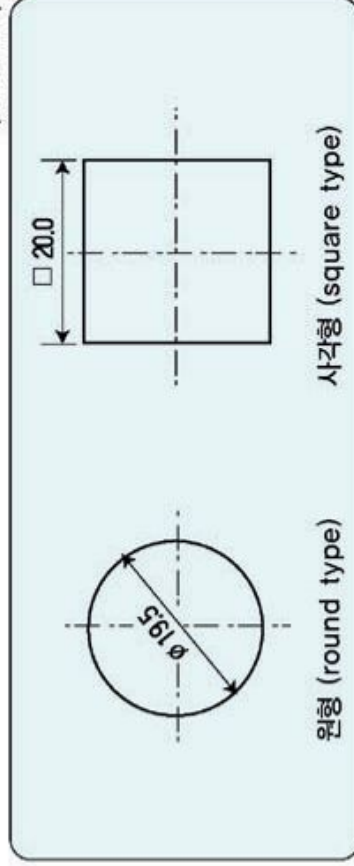
• 판넬 取付値數 - Panel attachment dimension

(unit : mm)



• 조각면 SIZE - Size of marking plate

(unit : mm)

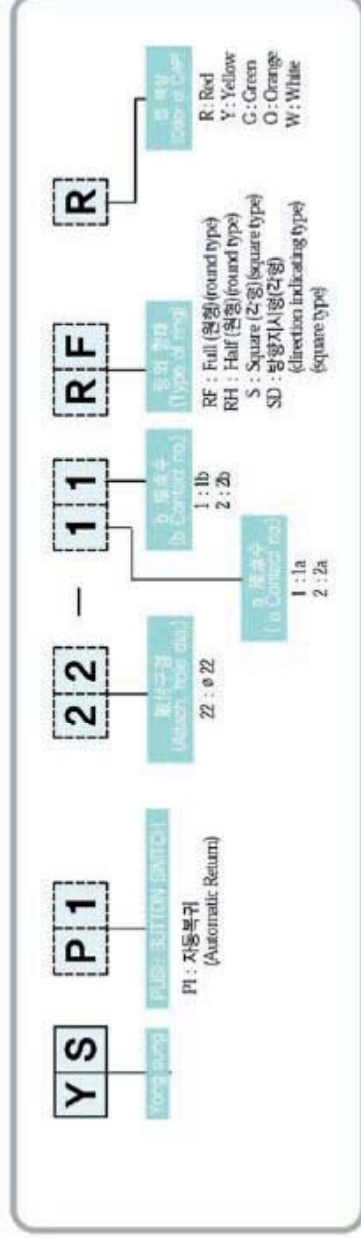


4-1

누름버튼 스위치 Push Button Switch



• 形式 區分圖 - Type classification diagram



• 部品 材質 - Part materials

部 品 (Part)	材 質 (Materials)
몸 체 (Body)	ABS내열 (Heat resistance ABS) Resin
홀 다 (Holder)	ABS내열 (Heat resistance ABS) Resin
접 점 (Contact)	은점점 (Silver)
단 자 (Terminal)	黃銅 (Brass)
볼 트 (Bolt)	MSWR-3 (Zn plating)
CAP	Polycarbonate Resin
스프링 (Spring)	Stainless Steel
링 (Ring)	ABS Resin

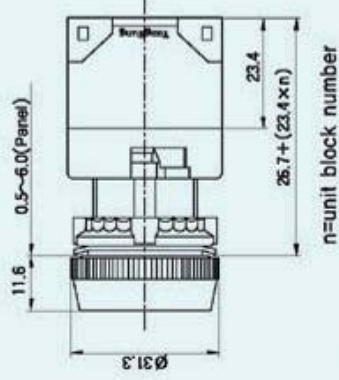
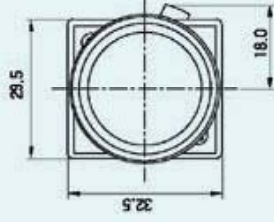
• 性能 概要 - Performance summary

定格容量 (Rating capacity)	AC250V 6A
絶縁抵抗 (Insulation resistance)	above 100MΩ (DC 500V, Meg)
接觸抵抗 (Contact resistance)	below 20mΩ (initial value)
耐電壓 (Withstand voltage)	AC2,500V/min
機械的 壽命 (Mechanical life time)	about 500,000times (20times/min)
電氣的 壽命 (Electrical life time)	about 100,000times (20times/min)
스트로크 (Stroke)	3.0mm
작동에 필요한 힘 (Operating force)	200 ~ 350g
使用周圍溫度 (Ambient temperature)	-25°C ~ +40°C
相對濕度 (Relative humidity)	45 ~ 85%

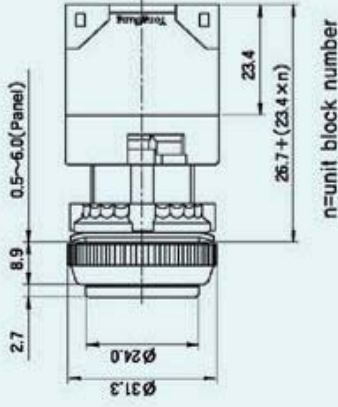
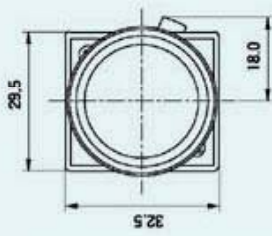
外形/値數圖 - Shape/Dimension Drawing

(unit : mm)

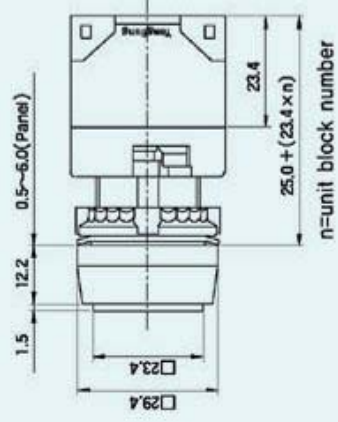
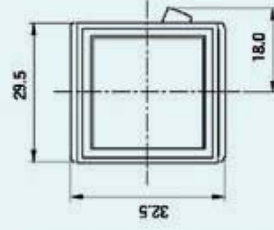
Round Full(RF)



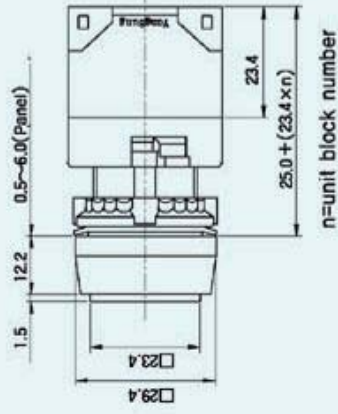
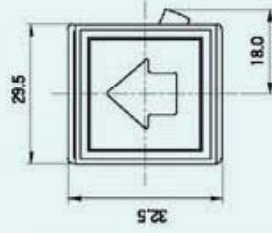
Round Half(RH)



사각형(S)



방향지시형(SD)



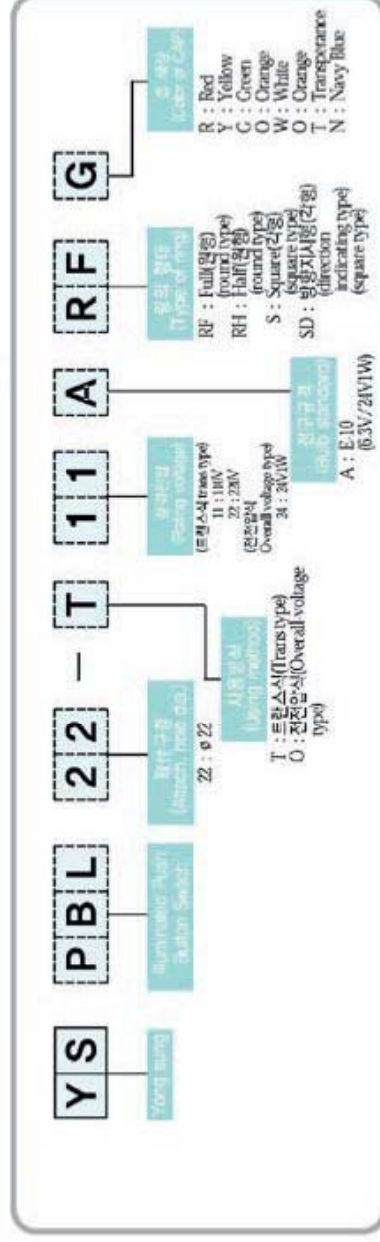
4-2

조광형 누름 버튼 스위치 Illuminated Push Button Switch

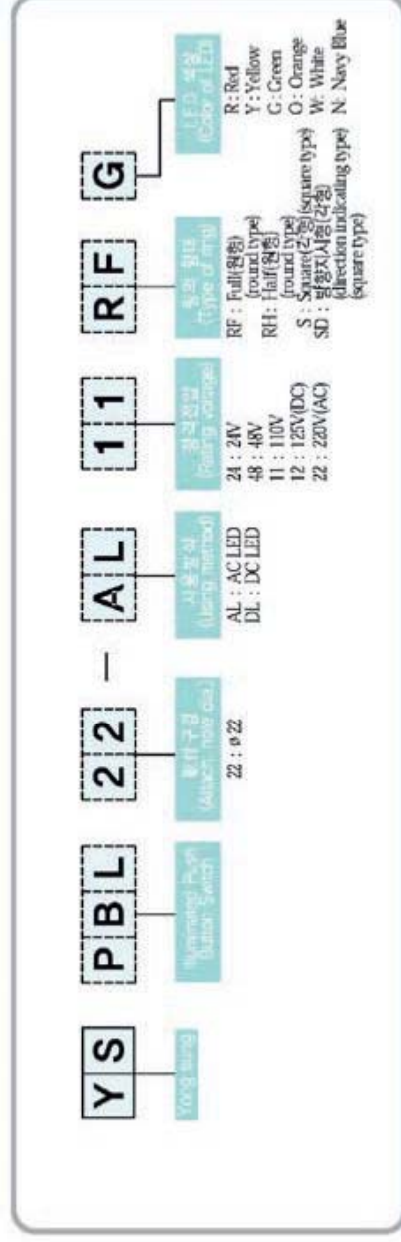
CU[®] US



• 形式 區分圖 - Type classification diagram ... BULB Type



• 形式 區分圖 - Type classification diagram ... LED Type



• 性能 概要 - Performance summary

定格容量 (Rating capacity)	AC250V 6A
絶縁抵抗 (Insulation resistance)	above 100MΩ (DC 500V, Meg)
接觸抵抗 (Contact resistance)	below 20mΩ (initial value)
耐電壓 (Withstand voltage)	AC2,500V/min
機械的壽命 (Mechanical life time)	about 500,000 times (20 times/min)
電氣的壽命 (Electrical lifetime)	about 100,000 times (20 times/min)
스트로크 (Stroke)	3.0mm
작동에 필요한 힘 (Operating force)	200 ~ 350g
使用周圍溫度 (Ambient temperature)	-25℃ ~ +40℃
相對濕度 (Relative humidity)	45 ~ 85%

• LAMP 定格 - LAMP Rating

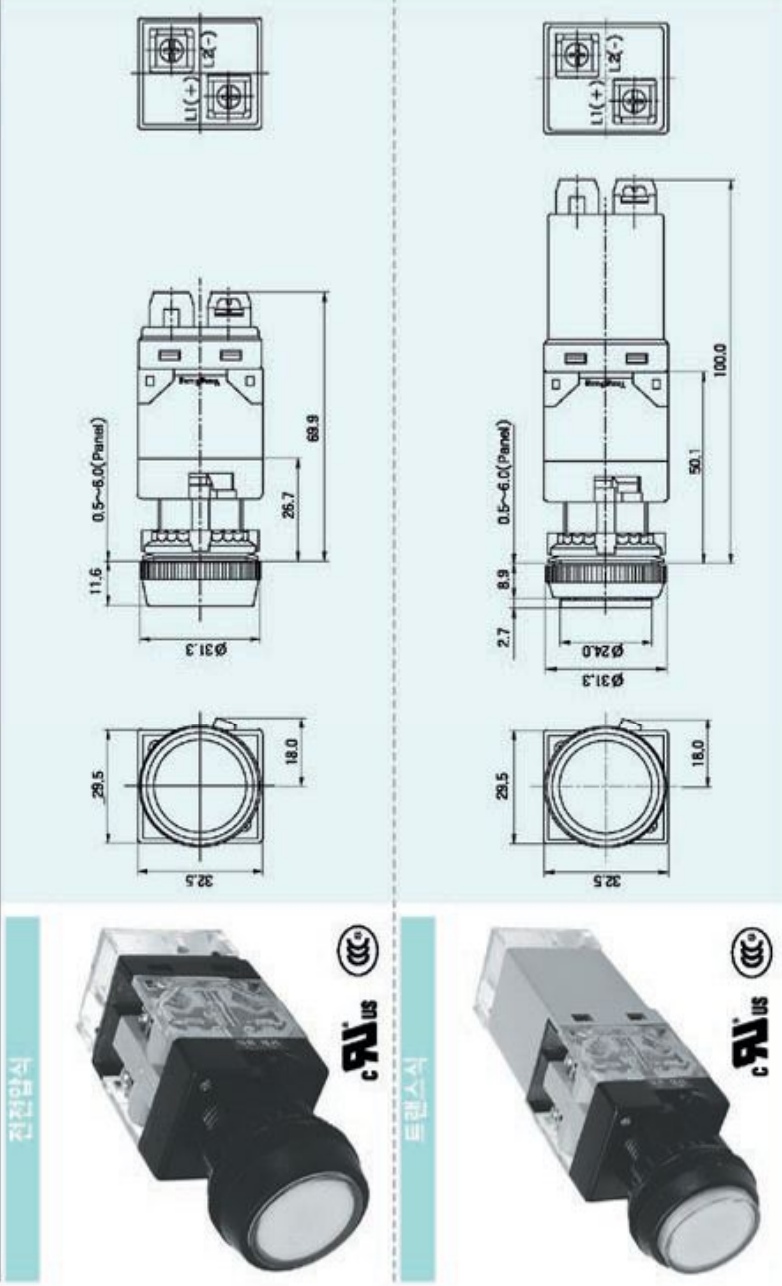
형식(Type) 성능(Performance)	트랜스식 (trans type)	전전압식 (overall-voltage type)	LED type
定格電壓 (Rating voltage)	AC 110V, 220V	AC/DC 24V	AC/DC 24V, 48V, 110V, DC 125V, AC 220V
2次電壓 (Secondary voltage)	5.5V		24V
램프定格 (Lamp voltage)	6.3V/1W	24V/1W	20mA

• 部品 材質 - Part materials

部 品 (Part)	材 質 (Materials)
몸 체 (Body)	ABS내열 (Heat resistance ABS) Resin
홀 다 (Holder)	ABS내열 (Heat resistance ABS) Resin
접 점 (Contact)	은접점 (Silver)
端 子 (Terminal)	黃 銅 (Brass)
볼 트 (Bolt)	MSWR-3 (Zn plating)
C A P	Polycarbonate Resin
링 (Ring)	ABS Resin

• 外形/値數圖 - Shape/Dimension Drawing

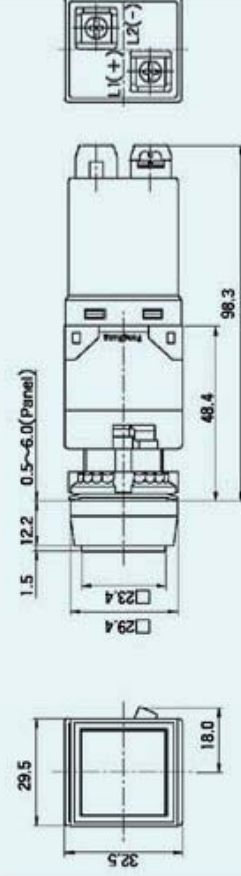
(unit : mm)



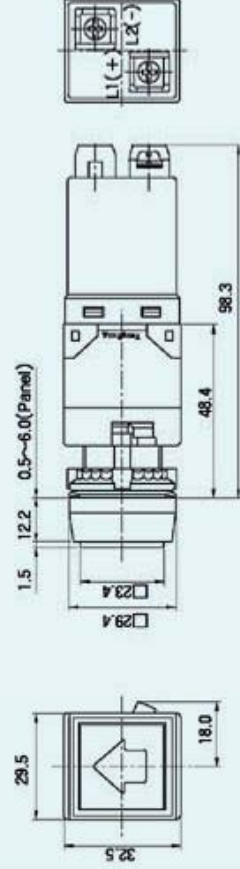
● 外形/値數圖 - Shape/Dimension Drawing

(unit : mm)

트랜스식(사각Type)



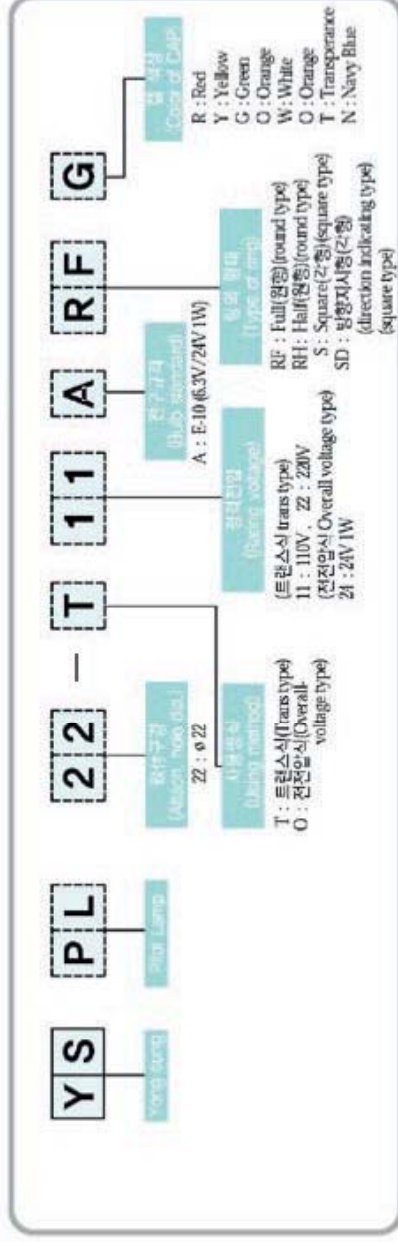
트랜스식(방형지시Type)



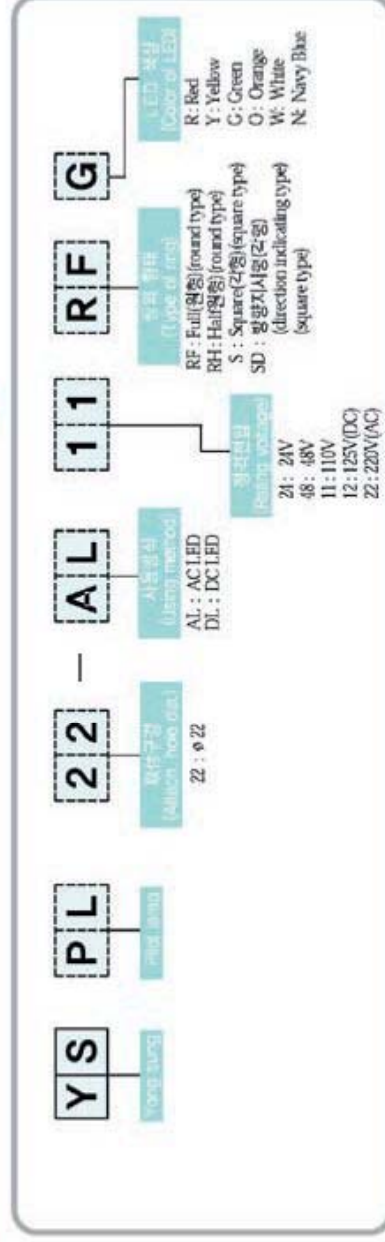
4-3 표시등 Pilot Lamp



• 形式 區分圖 - Type classification diagram ... BULB Type



• 形式 區分圖 - Type classification diagram ... LED Type



• LAMP 定格 - LAMP Rating

형식(Type)	트랜스식(trans type)	전전압식 (overall-voltage type)	LED TYPE
定格電壓 (Rating voltage)	AC 110V, 220V	AC/DC 24V	AC/DC 24V, 48V, 110V, DC 125V, AC 220V
2次電壓 (Secondary voltage)	5.5V	-	24V
램프定格 (Lamp rating)	6.3V1W	24V1W	20mA

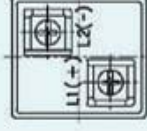
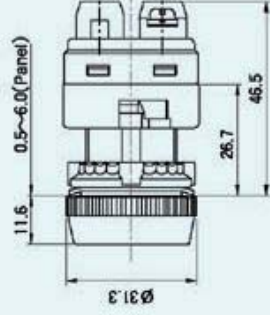
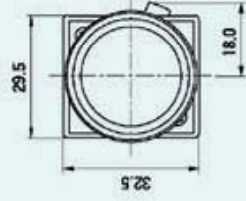
• 部品 材質 - Part materials

部 品 (Part)	材 質 (Materials)
몸 체 (Body)	ABS내열 (Heat resistance ABS) Resin
출 다 (Holder)	ABS내열 (Heat resistance ABS) Resin
端 子 (Terminal)	黃 銅 (Brass)
볼 트 (Bolt)	MSWR-3 (Zn plating)
C A P	Polycarbonate Resin
링 (Ring)	ABS Resin

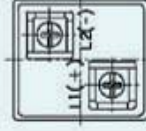
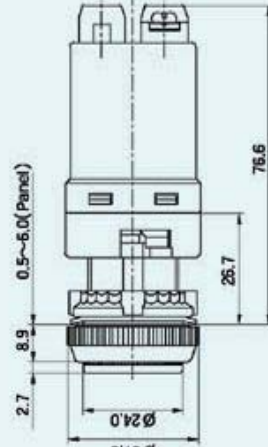
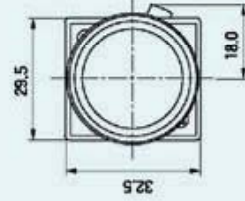
● 外形/値數圖 - Shape/Dimension Drawing

(unit : mm)

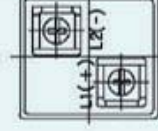
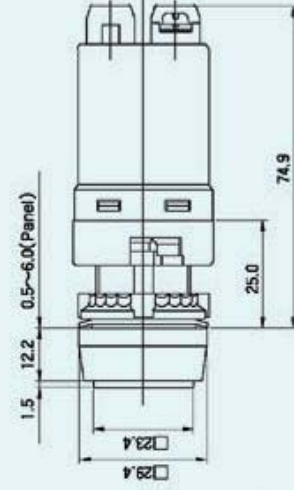
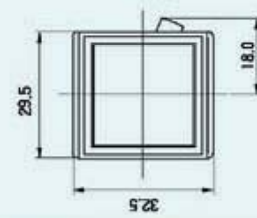
전지합식



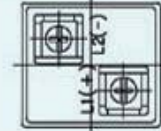
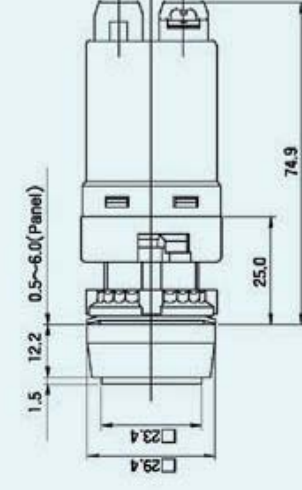
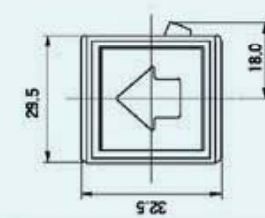
트랜스식



트랜스식(사각 Type)



트랜스식(방향형지시 Type)



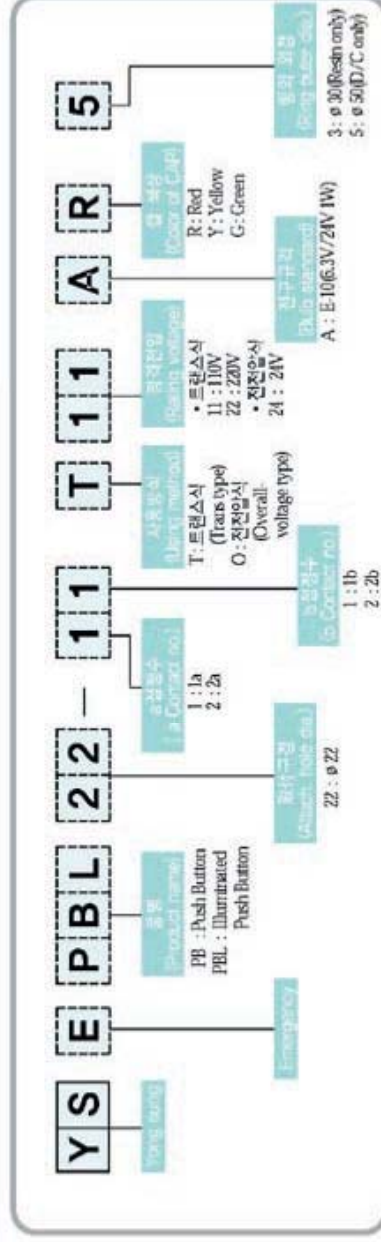
4-4

비상스위치 (누름버튼/조광형)

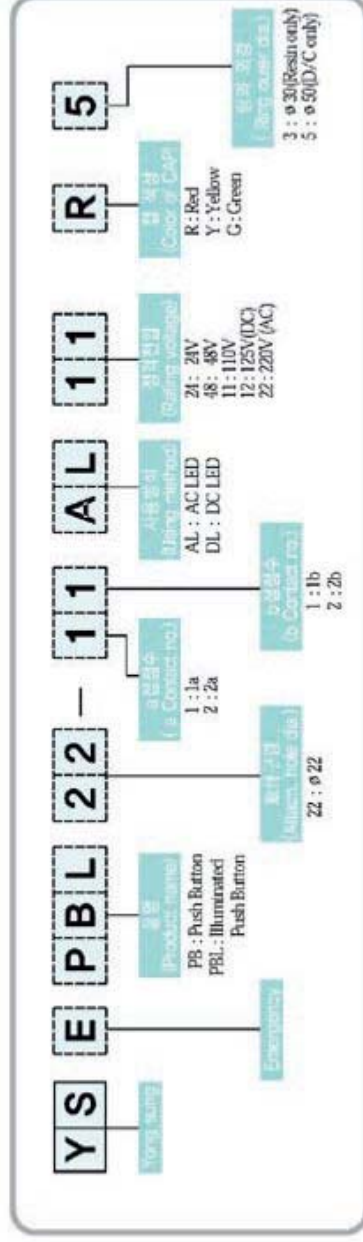
Emergency Switch (Push Button/Illuminated)



● 形式区分図 - Type classification diagram ... BULB Type



形式區分圖 - Type classification diagram ... LED Type



● LAMP 定格 - LAMP Rating

형식(Type)	트랜스식 (trans type)	전전압식 (overall-voltage type)	LED TYPE
성능(Performance)			
定格電壓 (Rating voltage)	AC 110V / 220V		AC/DC 24V, 48V, 110V, DC 125V, AC 220V
2次電壓 (Secondary voltage)	5.5V	AC/DC 24V	24V
燈浦定格 (Lamp rating)	6.3V1W	24V1W	20mA

● 部品 材質 - Part materials

部 品 (Part)	材 質 (Materials)
몸 체 (Body)	ABS내열 (Heat resistance ABS) Resin
홀 다 (Holder)	ABS내열 (Heat resistance ABS) Resin
接 点 (Contact)	은접점 (Silver)
端 子 (Terminal)	黃銅 (Brass)
볼 트 (Bolt)	MSWR-3 (Zn plating)
C A P	AS Resin
스프링 (Spring)	Stainless steel

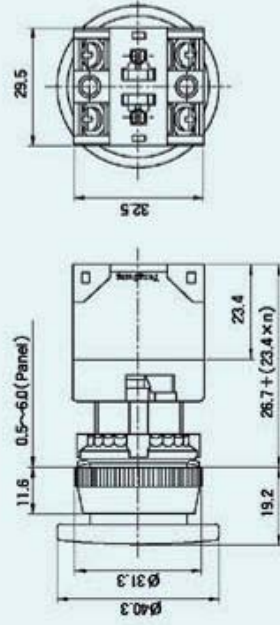
● 性能 概要 – Performance summary

定格容量 (Rating capacity)	AC250V 6A
絶縁抵抗 (Insulation resistance)	above 100MΩ (DC 500V, Meg)
接点抵抗 (Contact resistance)	below 20mΩ (initial value)
耐電圧 (Withstand voltage)	AC 2,500V/min (50~60Hz)
機械的 壽命 (Mmechanical life time)	about 500,000 times (20 times/min)
電氣的 壽命 (Eelectrical lifetime)	about 100,000 times (20 times/min)
ストローク (Stroke)	3.0mm
作動に 필요한 力 (Operating force)	200 ~ 350g
使用周囲温度 (Ambient temperature)	-25℃ ~ +40℃
相対湿度 (Relative humidity)	45 ~ 85%

● 外形/値数圖 – Shape/Dimension Drawing

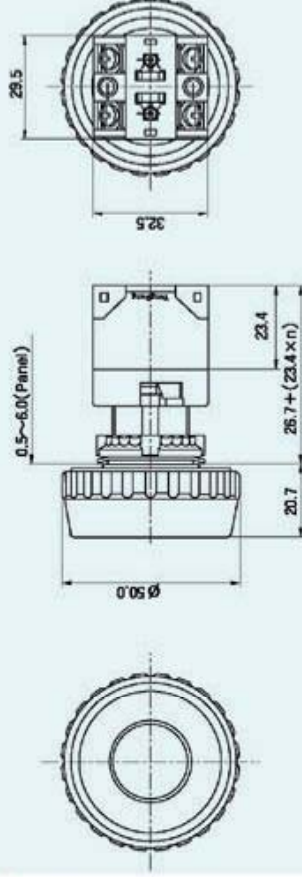
(unit : mm)

Emergency Push Button(CAP Ø30)



n=unit block number

Emergency Push Button(RING Ø50)

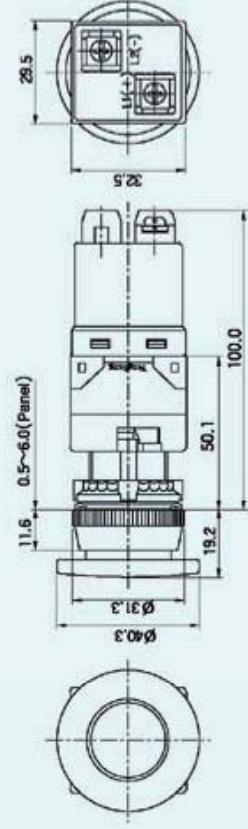


n=unit block number

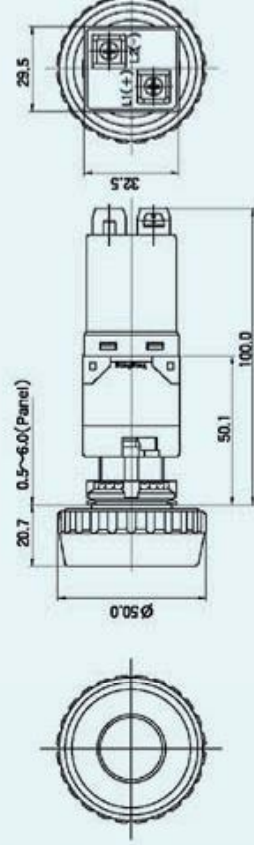
● 外形/値數圖 - Shape/Dimension Drawing

(unit : mm)

Emergency Illuminated Push Button(CAF030)



Emergency Illuminated Push Button(RVG030)

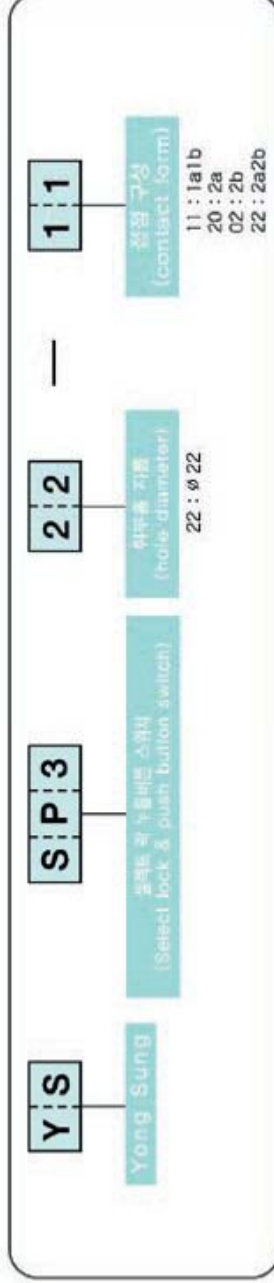


4-5

22파이 셀렉트 락 누름 버튼 스위치

Select lock push button switch ø 22

• 형식 구분도 - Type Classification Diagram



• 特徴 - Features

- 90° 회전 락킹 및 누름버튼 혼합구조입니다.
- 1a1b를 기본으로 2a, 2b, 2a2b까지 제작됩니다.
- 단지커버를 투명재질로 제작하여 동작상태를 육안으로 확인할 수 있습니다.
- 보호등급은 IP56입니다.
- 단지보호 Cover 사용으로 안전 보호될 수 있습니다.
- Mixing formation of 90 degree revolution locking with push button.
- Various contact composition is possible like 2a, 2b and 2a2b, based on 1a(NO), 1b(NC) for seeing operation.
- Terminal cover is transparent for seeing operation.
- Structure grade for protection is IP56.
- It can be safe by using terminal protection cover.

• 부품 재질 - Part Materials

부품(Part)	재질(Materials)
홀더(Holder)	아연합금(Zinc alloy)
링(Ring)	알루미늄(Aluminium)
가이드(Guide)	알루미늄(Aluminium)
손잡이(Handle)	내열성 ABS 수지(Heat resistance ABS resin)
몸체(Body)	내열성 ABS 수지(Heat resistance ABS resin)
커버(Cover)	폴리카보네이트 수지(Polycarbonate resin)
캡(Cap)	폴리카보네이트 수지(Polycarbonate resin)
스토퍼(Stopper)	폴리카보네이트 수지(Polycarbonate resin)
샤프트(Shaft)	아세탈 수지(Acetal resin)
기어(Gear)	아세탈 수지(Acetal resin)
단자(Terminal)	황동(Brass)
접점(Contact)	은(Silver)

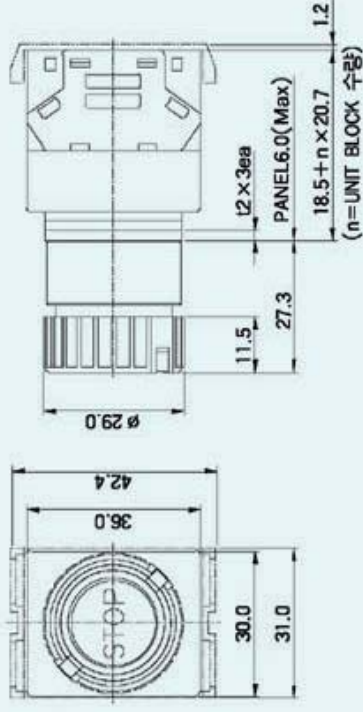
• 성능 개요 - Performance Summary

기계적 수명(Mechanical lifetime)	500,000회 이상(above 500,000 times)
전기적 수명(Electrical lifetime)	100,000회 이상(above 100,000 times)
접촉 저항(Contact resistance)	50mΩ 이하(초기치)(below 50mΩ initial value)
절연 저항(Insulation resistance)	100MΩ 이상(above 100MΩ, DC 500V, Meg)
내전압(Withstand voltage)	AC 2,500V/min
사용주위온도(Ambient temperature)	-25℃~+40℃
상대습도(Relative humidity)	45~85%

• 접점 정격 - Contact Rating

정격절연전압(Ui)(Rating insulation voltage)		AC600V, DC250V			
정격통전전류(Ith)(Rating conductive current)		10A			
정격 전압(Ue)(Rating voltage)		24V	110V	220V	440V
정격전류 (Ie) (Rating current)	교류 AC	10A	10A	6A	3A
	저항부하 (AC12) Resistive load				
	유도부하 (AC15) Inductive load	10A	2.4A	1.2A	0.5A
	직류 DC	10A	2.2A	1.1A	-
	저항부하 (DC12) Resistive load				
	유도부하 (DC13) Inductive load	5A	1.1A	0.6A	-

• 외형 치수도 - Shape Dimension

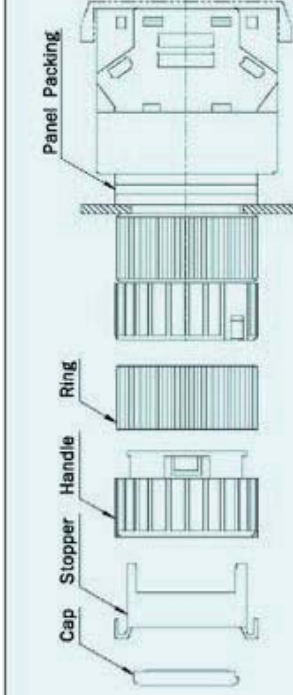


• 使用時 注意事項 - Remark in use

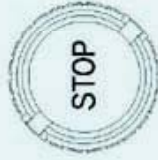
- 배선시 동작회로를 확인바랍니다.
- 패널 부착시 핸들 및 스톱퍼에 무리한 힘을 가하기 마십시오.
- 손잡이 동작 방향을 확인바랍니다.
- 안전보호 필요시 반드시 단자 보호판을 부착 사용하십시오. (별도 주문사항)
- Verify operation circuit during wiring.
- Do not force excessively handle and stopper into panel.
- Verify the operation direction of handle.
- Have to use terminal cover for safety. (order product)

● 판넬 附着 方法 - Panel attachment method

- 스톱퍼를 분리한 후 취급하여 주십시오.
- 판넬부착시 판넬두께를 고려하여 판넬패킹의 양을 확인하여 주십시오.
- 제품을 판넬에 끼워 주십시오.
- 핸들과 스톱퍼를 결합하여 주십시오.
(만일 2mm 이상으로 제작되는 판넬의 경우에는 판넬두께 때문에 패넬패킹을 제거하지 못하면 핸들과 링의 간섭에 의해 제품을 조립할 수도 없고 동작시킬수도 없습니다.)
- Separate stopper, handle than ring.
- In panel attachment, choose quantity of panel thickness in case of constructing panel packing considering panel thickness.
- Insert product into panel.
- Tighten a ring at the front.
- Combine handle and stopper.
(If do not remove panel packing according to panel thickness in case of constructing panel over 2mm, It can not be assembled and operated by interfering handle and ring)



● 손잡이 동작 방향 - DIRECTION OF HANDLE

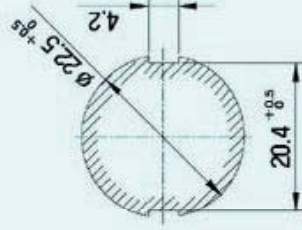


자연상태



LOCK 상태

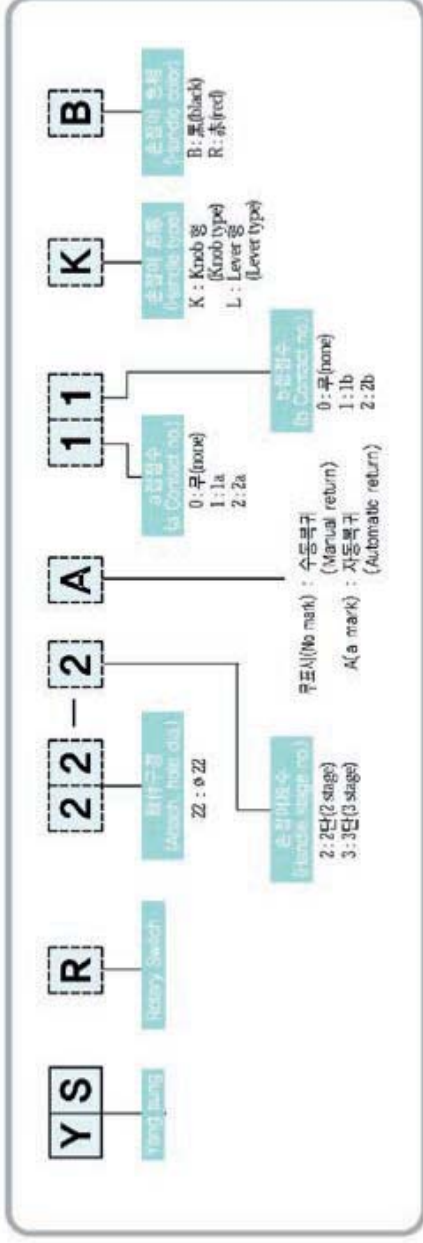
● 판넬 취부 치수도 - PANEL ATTACHMENT DIMENSION



4-6 로타리 스위치 Rotary Switch



• 形式 區分圖 - Type classification diagram



• 特徴 - Features

- 金屬部分을 特殊鍍金처리 또는 鍍金 처리하였기 때문에 壽命이 매우 길니다.
- 接点構成은 하부연결 블록을 사용하여 1a(NO) 1b(NC)를 基本으로 2a2b까지 구성할 수 있습니다.
- Special alloying or plating treatment on metal parts makes longer life.
- Various contact composition is possible like 2a2b, based on 1a(NO) 1b(NC) by use of bottom connection block.

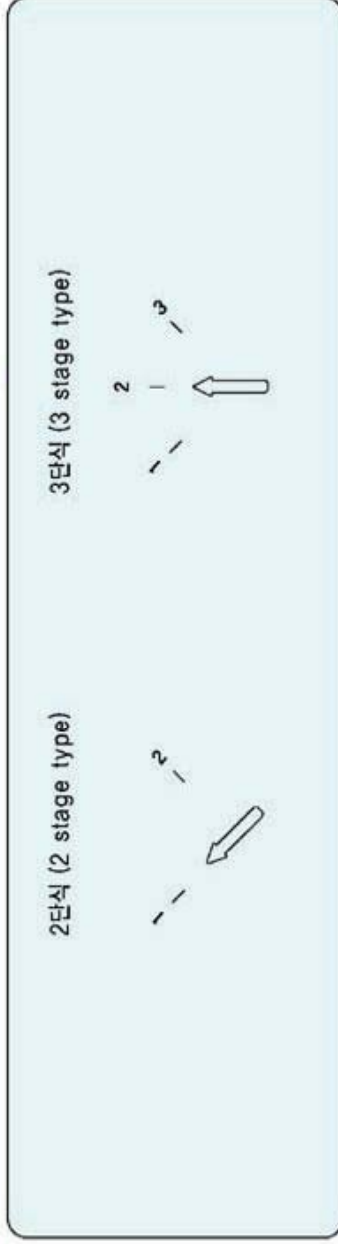
• 接点 構成圖 - Contact form drawing

접점구성번호 Contact No.	접점구성 Contact form	단자부호 Terminal Code	2단(2stage)		접점구성번호 Contact No.	접점구성 Contact form	단자부호 Terminal Code	3단(3stage)		
			Left	Right				Left	Center	Right
11	1a1b	NO		●	11	1a1b	NO	●		
		NC	●				NC			●
20	2a	NO		●	20	2a	NO	●		
		NO		●			NO	●		
22	2a2b	NO		●	22	2a2b	NO	●		
		NC	●				NC			●
		NO		●			NO	●		
		NC	●				NC			●

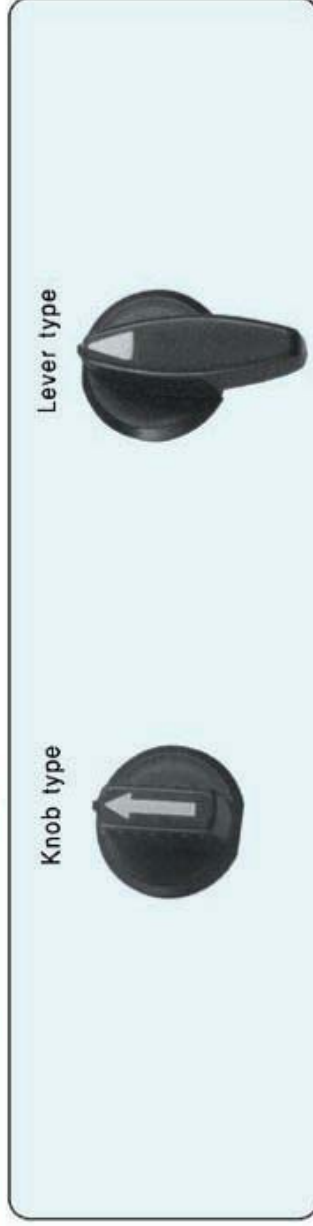
● 性能 概要 - Performance summary

定格容量 (Rating capacity)	AC250V 6A
絶縁抵抗 (Insulation resistance)	above 100MΩ (DC 500V, Meg)
接觸抵抗 (Contact resistance)	below 20mΩ (initial value)
耐電壓 (Withstand voltage)	AC 1,500V/min (50~60Hz)
機械的壽命 (Mechanical life time)	about 500,000 times (20 times/min)
電氣的壽命 (Electrical lifetime)	about 100,000 times (20 times/min)
作動에 필요한 힘 (Operating force)	200 ~ 350g
使用周圍溫度 (Ambient temperature)	-25 ~ +40℃
相對濕度 (Relative humidity)	45 ~ 85%

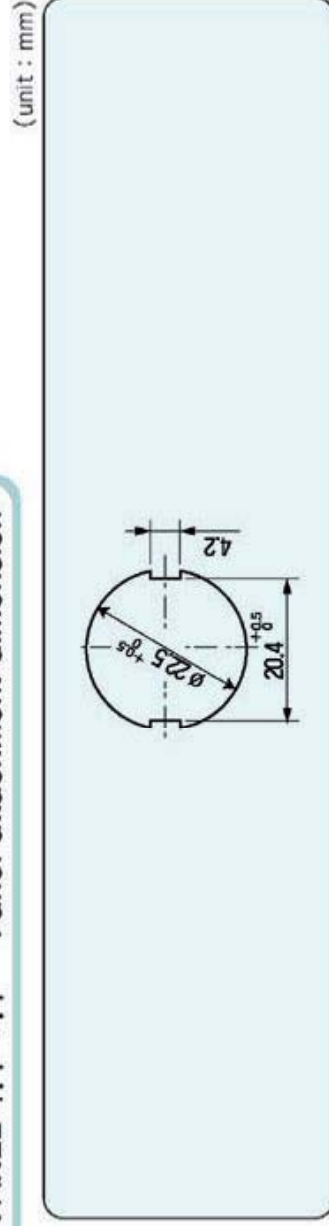
● 손잡이 동작 方向圖 - Directional diagram of handle action



● 손잡이 種類 - Handle type



● PANEL 취부 치수 - Panel attachment dimension



● 部品材質 - Part materials

部 品 (Part)	材 質 (Materials)
몸 체 (Body)	Polycarbonate Resin
홀 다 (Holder)	ABS내열 (Heat resistance ABS) Resin
接 點 (Contact)	은집점 (Silver)
端 子 (Terminal)	黃 銅 (Brass)
볼 트 (Bolt)	MSWR-3 (Zn plating)
핸 들 (handle)	ABS내열 (Heat resistance ABS) Resin
스프링 (Spring)	Stainless 鋼 (Stainless steel)
링 (Ring)	ABS Resin

● 接点定格 - Contact Rating

接点部의 仕様 Contact part spec.	交流 (AC)	定格電壓 (rating voltage)	125V	250V	440V
		定格電流 (rating current)	10A	6A	3A
		遮斷電流 (breaking current)	閉路遮斷電流=定格電流×2.2 (closed breaking current=rating current×2.2)		
		定格電壓 (rating voltage)	24V	110V	220V
直流 (DC) (resistance)	抵 抗 (resistance)	定格電流 (rating current)	10A	2.2A	1.2A
		遮斷電流(breaking current)	閉路遮斷電流=定格電流×1.1 (closed breaking current=rating current×1.1)		
	誘 導 (induction)	定格電流 (rating current)	5A	1.1A	0.6A
		遮斷電流 (breaking current)	閉路遮斷電流=定格電流×1.1 (closed breaking current=rating current×1.1)		
		定格通電電流 (rating conductive current)	10A		

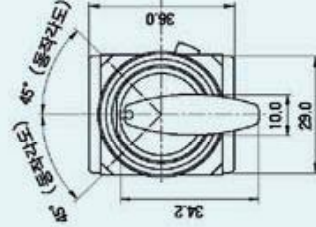
● 外形/値数圖 - Shape/Dimension Drawing

(unit : mm)

Lever type



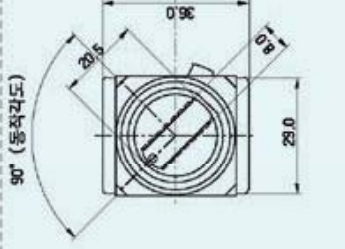
cFUS

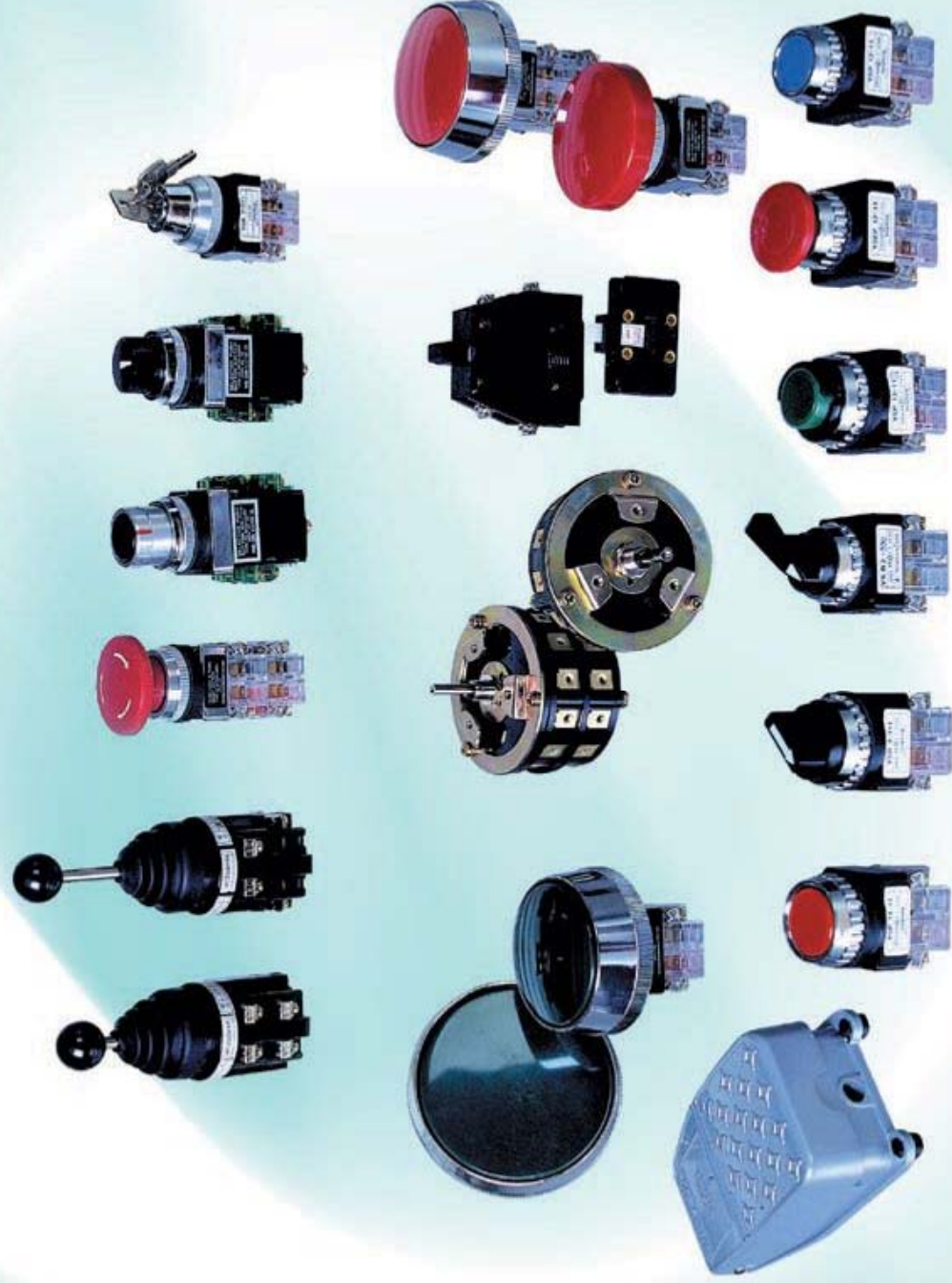


Knob type



cFUS





CONTROL SWITCHES

- 5-1 Lever Switch
- 5-2 Rotary Switch
- 5-3 Key Switch
- 5-4 Selector Push Button Switch
- 5-5 Push Button Switch
- 5-6 Emergency Push Button Switch
- 5-7 Super Emergency Push Button Switch
- 5-8 Portable Switch
- 5-9 Auxiliary Switch
- 5-10 Foot Switch

● 部品 材質 - Part Materials

부 품 명 (Part)	재 질 (Materials)
몸 체 (Body)	Polycarbonate Resin
홀 다 (Holder)	ABS내열 (Heat resistance ABS) Resin
接 点 (Contact)	은접점 (Silver)
端 子 (Terminal)	黃 銅 (Brass)
볼 트 (Bolt)	MSWR-3 (Zn plating)
스프링 (Spring)	Stainless 鋼 (Stainless Steel)
링 (Ring)	Aluminum (Al)

● 接点定格 - Contact Rating

접点部 의仕様 Contact part spec.	交流 (AC)	定格電壓 (rating voltage)	125V	250V	440V
		定格電流 (rating current)	10A	6A	3A
		遮斷電流 (breaking current)	開路遮斷電流=定格電流×2.2 (closed breaking current=rating current×2.2)		
	直流 (DC)	定格電壓 (rating voltage)	24V	110V	220V
		抵抗 (resistance)	10A	2.2A	1.1A
			閉路遮斷電流=定格電流×1.1 (closed breaking current=rating current×1.1)		
		誘導 (induction)	5A	1.1A	0.6A
			閉路遮斷電流=定格電流×1.1 (closed breaking current=rating current×1.1)		
		定格通電電流 (rating conductive current)	10A		

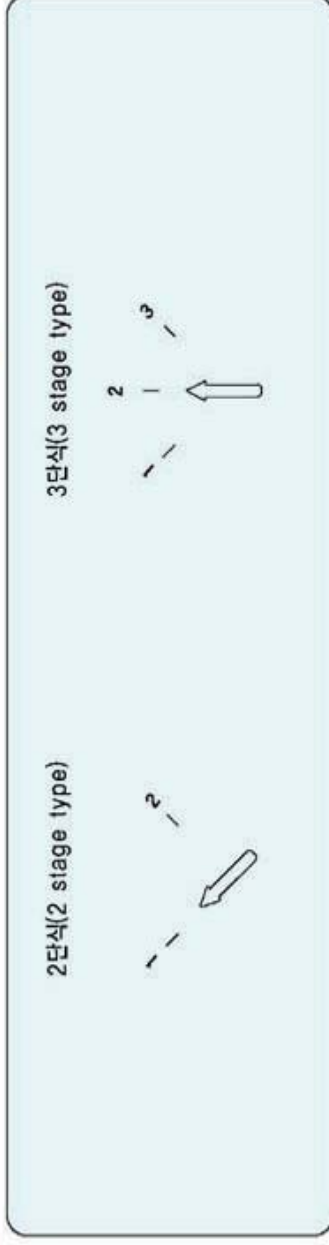
● 性能 概要 - Performance summary

定格容量 (Rating capacity)	AC250V 6A
絶縁抵抗 (Insulation resistance)	above 100MΩ (DC 500V. Meg)
接觸抵抗 (Contact resistance)	below 20mΩ (initial value)
耐電壓 (Withstand voltage)	AC2,500V/min (50~60Hz)
機械的 壽命 (Mechanical lifetime)	about 500,000 times (20 times/min)
電氣的 壽命 (Electrical lifetime)	about 100,000 times (20 times/min)
使用周圍溫度 (Ambient temperature)	-25℃ ~ +40℃
相對濕度 (Relative humidity)	45 ~ 85%

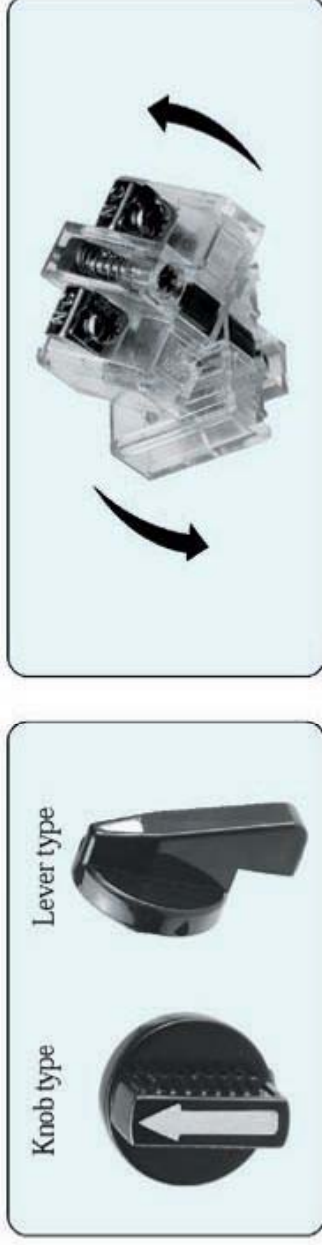
● 성능概要 - Performance summary

定格容量 (Rating capacity)	AC250V 6A
絶縁抵抗 (Insulation resistance)	above 100MΩ (DC 500V, Meg)
接觸抵抗 (Contact resistance)	below 20mΩ (initial value)
耐電壓 (Withstand voltage)	AC 2,500V/min (50~60Hz)
機械的壽命 (Mechanical lifetime)	above 500,000 times (20 times/min)
電氣的壽命 (Electrical lifetime)	above 100,000 times (20 times/min)
작동에 필요한 힘 (Operating force)	200 ~ 350g
使用周圍溫度 (Ambient temperature)	-25℃ ~ +40℃
相對濕度 (Relative humidity)	45 ~ 85%

● 손잡이動作方向圖 - Directional diagram of handle action



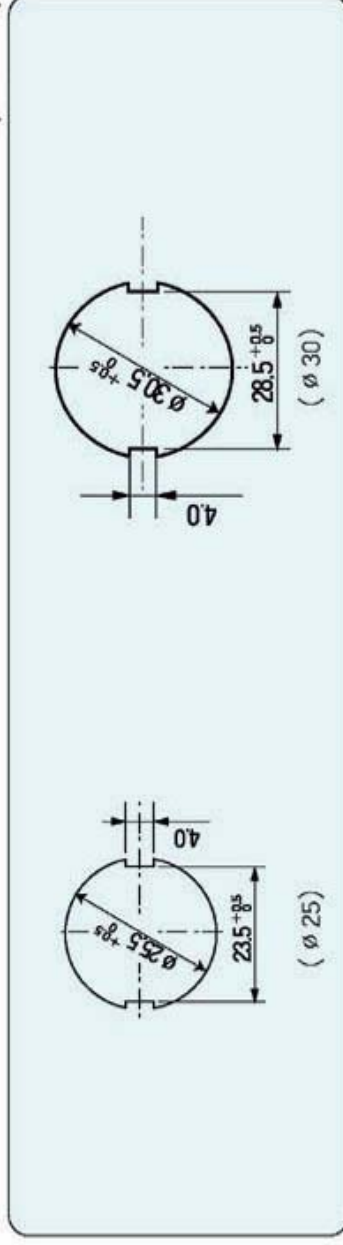
● 손잡이種類 - Handle type



하부 연결블럭 조립방법 (Bottom connection block assembling method)

● PANEL 取付値數 - Panel attachment dimension

(unit : mm)



● 部品材質 - Part Materials

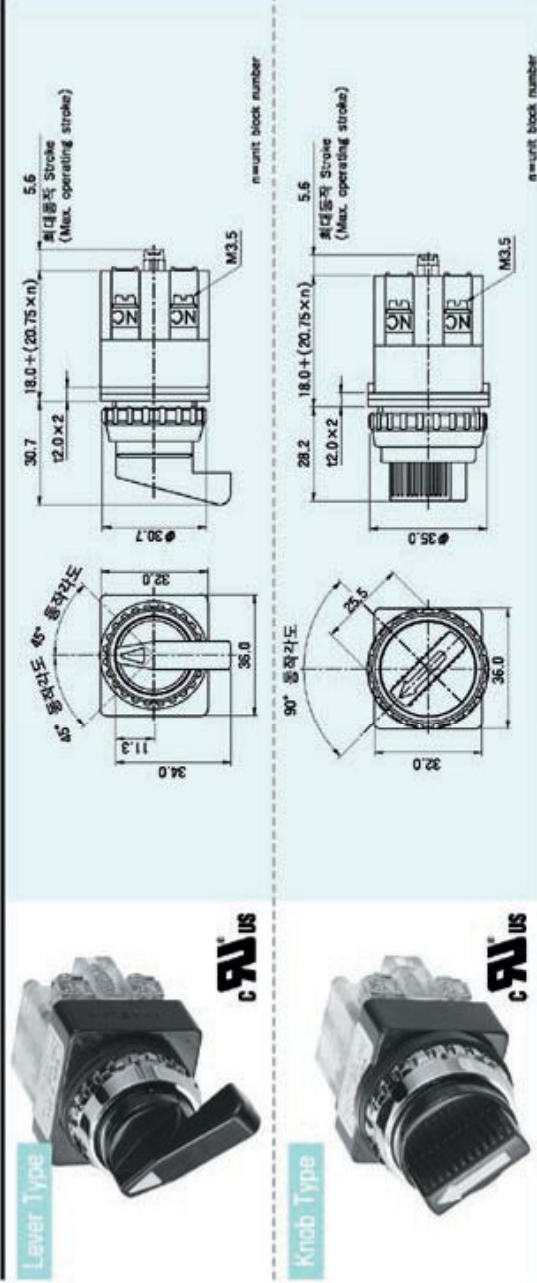
部 品 (Part)	材 質 (Materials)
몸 체 (Body)	Polycarbonate Resin
홀 다 (Holder)	ABS내열 (Heat resistance ABS) Resin
接 点 (Contact)	은접점 (silver)
端 子 (Terminal)	黃 銅 (Brass)
볼 트 (Bolt)	MSWR-3 (Zn plating)
핸 들 (Handle)	Polycarbonate Resin
스프링 (Spring)	Stainless 鋼 (Stainless steel)
링 (Ring)	ABS Resin

● 接点定格 - Contact Rating

接点部の仕様	交流 (AC)	定格電壓 (rating voltage)	125V	250V	440V	
		定格電流 (rating current)	10A	6A	3A	
		遮断電流 (breaking current)	閉路遮断電流=定格電流×2.2 (closed breaking current=rating current×2.2)			
	Contact part spec.	直流 (DC) (resistance)	定格電壓 (rating voltage)	24V	110V	220V
抵抗 (resistance)			10A	2.2A	1.1A	
			閉路遮断電流=定格電流×1.1 (closed breaking current=rating current×1.1)			
誘導 (induction)			定格電流 (rating current)	5A	1.1A	0.6A
			遮断電流 (breaking current)	閉路遮断電流=定格電流×1.1 (closed breaking current=rating current×1.1)		
		定格通電電流 (rating conductive current)	10A			

● 外形/値數圖 - Shape/Dimension Drawing

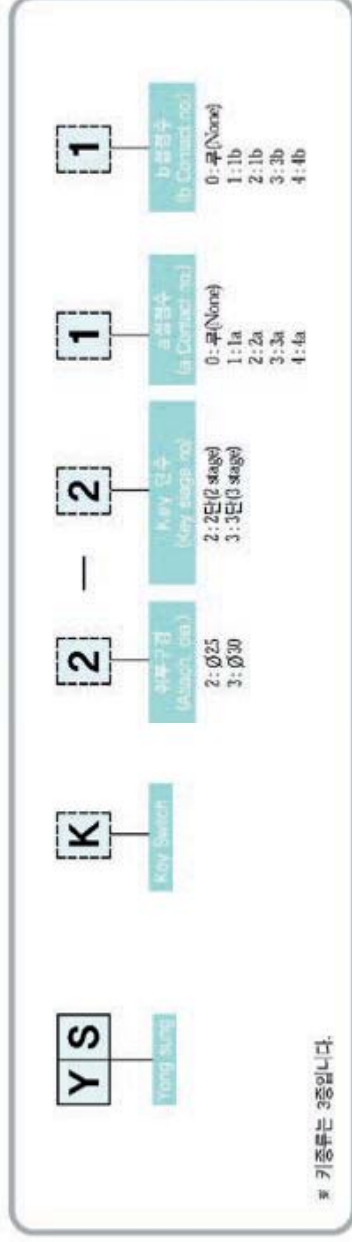
(unit : mm)



5-3 키 스위치 Key Switch



• 形式 區分圖 - Type classification diagram



• 性能 概要 - Performance summary

定格容量 (Rating capacity)	AC250V 6A
絶縁抵抗 (Insulation resistance)	above 100MΩ (DC 500V, Meg)
接觸抵抗 (Contact resistance)	below 20mΩ (initial value)
耐電壓 (Withstand voltage)	AC 2,500V/min (50~60Hz)
機械的壽命 (Mechanical lifetime)	above 500,000 times (20times/min)
電氣的壽命 (Electrical lifetime)	above 100,000 times (20times/min)
작동에 필요한 힘 (Operating force)	200 ~ 350g
使用周圍溫度 (Ambient temperature)	-25℃ ~ +40℃
相對濕度 (Relative humidity)	45 ~ 85%

• 部品 材質 - Part Materials

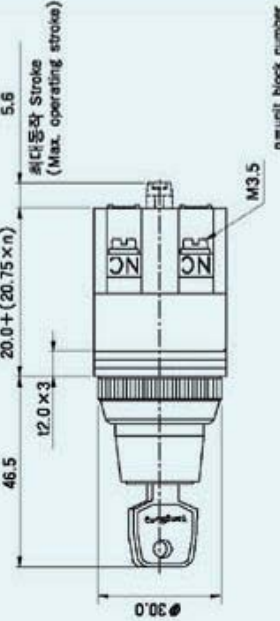
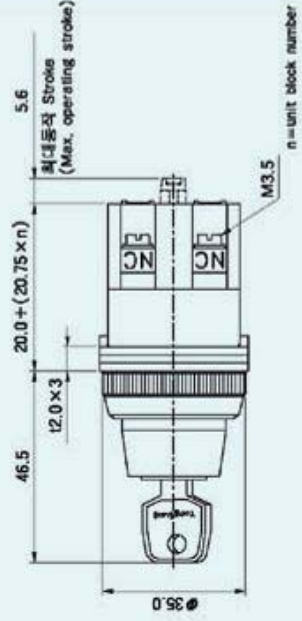
部 品 (Part)	材 質 (Materials)
몸 체 (Body)	Polycarbonate Resin
홀 다 (Holder)	ABS내열 (Heat resistance ABS) Resin
接 点 (Contact)	은접점(Silver)
端 子 (Terminal)	黃 銅 (Brass)
링 (Ring)	알루미늄 (Aluminum)
키몸체 (Key body)	아연 다이캐스팅 (Zn Diecasting)
볼 트 (Bolt)	MSWR-3 (Zn plating)
스프링 (Spring)	Stainless 鋼 (Stainless steel)

• Key 동작방향 - Key operating direction

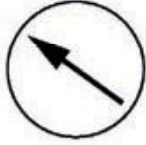
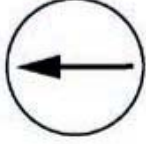
2단 (2 stage)	3단 (3 stage)
	

• 外形/値數圖 - Shape/Dimension Drawing

(unit : mm)

 25	
 30	

• Key 빠지는 위치 - Key release position

2단 (2 stage)	3단 (3 stage)
Left  Right 	Left  Center  Right 

5-4 셀렉타 누름버튼 스위치 Selector Push Button Switch



● 特徴 - Features

- 回路를 切換選擇하여 Push Button 조작을 必要로 하는 工作機械등에 使用하도록 設計된 스위치입니다.
- Switch designed for the application of machine tools etc. requiring Push Button actuation, with transfer selection of circuit.

● 部品 材質 - Part Materials

部 品 (Part)	材 質 (Materials)
接点部 Body (Contact part body)	Phenol Resin
몸 체 (Body)	Zn Diecasting
端 子 (Terminal)	黃 銅 (Brass)
링 (Ring)	알루미늄 (Aluminum)
캡 (CAP)	ABS Resin (N Type), PC Resin (M Type)
接 点 (Contact)	은접점 (Silver)

● 接点定格 - Contact Rating

接点部の仕様 Contact part spec.	交流 (AC)	定格電壓 (rating voltage)	125V	250V	440V	
		定格電流 (rating current)	10A	6A	3A	
		遮断電流 (breaking current)	閉路遮断電流=定格電流×2.2 (closed breaking current=rating current×2.2)			
	直流 (DC)	抵抗 (resistance)	定格電壓 (rating voltage)	24V	110V	220V
			定格電流 (rating current)	10A	2.2A	1.1A
誘導 (induction)		遮断電流 (breaking current)	閉路遮断電流=定格電流×1.1 (closed breaking current=rating current×1.1)			
		定格電流 (rating current)	5A	1.1A	0.6A	
		遮断電流 (breaking current)	閉路遮断電流=定格電流×1.1 (closed breaking current=rating current×1.1)			
		定格通電電流 (rating conductive current)				10A

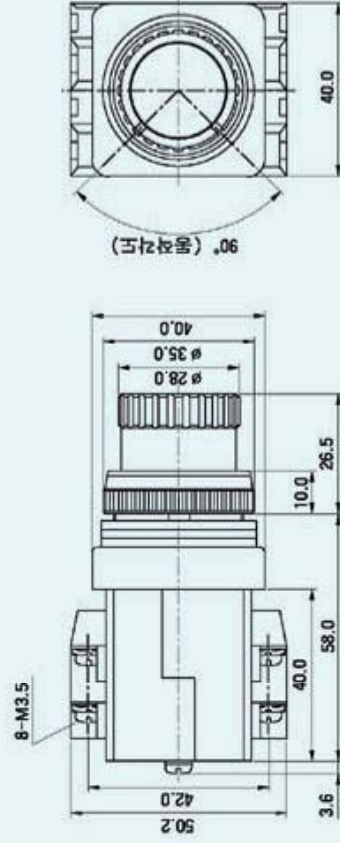
● 性能 概要 - Performance summary

定格容量 (Rating capacity)	AC250V 6A
絶縁抵抗 (Insulation resistance)	above 100MΩ (DC 500V, Meg)
接觸抵抗 (Contact resistance)	below 20mΩ (initial value)
耐電壓 (Withstand voltage)	AC2,500V/min
機械的壽命 (Mechanical lifetime)	above 250,000 times (20times/min)
電氣的壽命 (Electrical lifetime)	above 150,000 times (20times/min)
作動에 必要한 힘 (Operating force)	about 600g
使用周圍溫度 (Ambient temperature)	-25℃ ~ +40℃
相對濕度 (Relative humidity)	45 ~ 85%

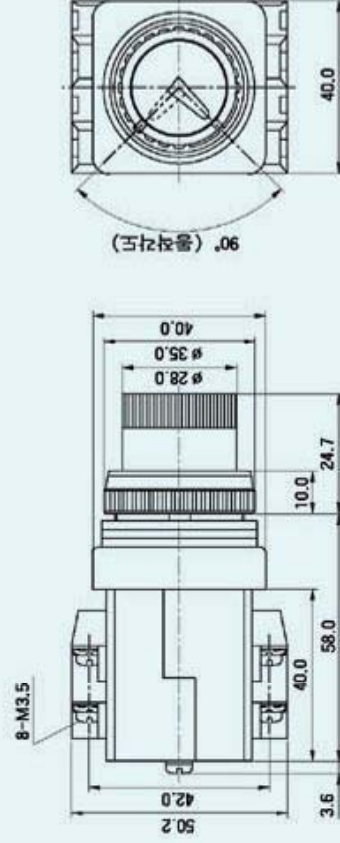
● 外形/値數圖 – Shape/Dimension Drawing

(unit : mm)

YSRP 30-22 BM

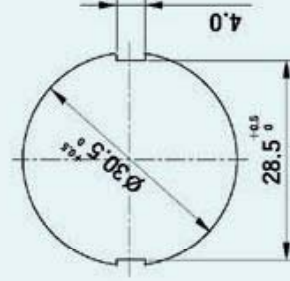


YSRP 30-22 BN



● PANEL 取付値數 – Panel attachment dimension

(unit : mm)





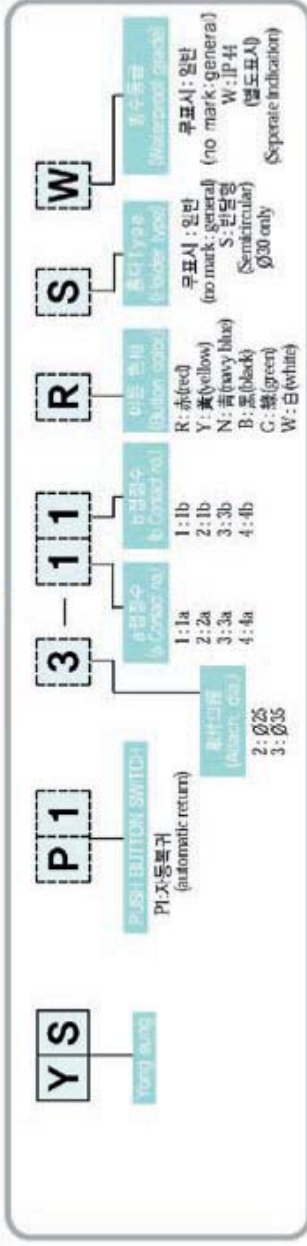
SHO2200-3001

IP : 44(주문생산, Ordered production)

SEL80125-EL001

EX99 IP536

● 形式 區分圖 - Type classification diagram



● 性能 概要 - Performance summary

定格容量 (Rating capacity)	AC250V 6A
絶縁抵抗 (Insulation resistance)	above 100MΩ (DC 500V, Meg)
接觸抵抗 (Contact resistance)	below 20mΩ (initial value)
耐電壓 (Withstand voltage)	AC 2,500V/min (50~60Hz)
機械的壽命 (Mechanical lifetime)	above 500,000 times (20times/min)
電氣的壽命 (Electrical lifetime)	above 100,000 times (20times/min)
작동에 필요한 힘 (Operating force)	200 ~ 350g
使用周圍溫度 (Ambient temperature)	-25℃ ~ +40℃
相對濕度 (Relative humidity)	45 ~ 85%

● 接点定格 - Contact Rating

接点部の仕様 Contact part spec.	交流 (AC)	定格電壓 (rating voltage)		125V	250V	440V
		定格電流 (rating current)		10A	6A	3A
		遮断電流 (breaking current) 閉路遮断電流=定格電流×2.2 (closed breaking current=rating current×2.2)				
	直流 (DC)	定格電壓 (rating voltage)		24V	110V	220V
		抵抗 (resistance)	定格電流 (rating current)	10A	2.2A	1.1A
			遮断電流 (breaking current)	閉路遮断電流=定格電流×1.1 (closed breaking current=rating current×1.1)		
		誘導 (induction)	定格電流 (rating current)	5A	1.1A	0.6A
			遮断電流 (breaking current)	閉路遮断電流=定格電流×1.1 (closed breaking current=rating current×1.1)		
	定格通電電流 (rating conductive current)		10A			

● 部品 材質 - Part Materials

部 品 (Part)	材 質 (Materials)
몸 체 (Body)	Polycarbonate Resin
홀 다 (Holder)	ABS내열 (Heat resistance ABS) Resin
접 점 (Contact)	은접점 (Silver)
端子 (Terminal)	黃銅 (Brass)
볼 트 (Bolt)	MSWR-3 (Zn plating)
버 톤 (Button)	아세탈 (Acetal resin)
스프링 (Spring)	Stainless 鋼 (Stainless steel)
링 (Ring)	ABS Resin

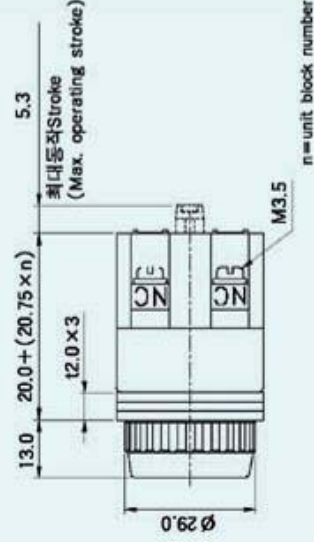
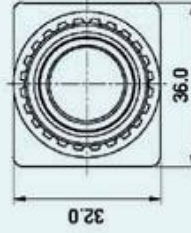
● 外形/値數圖 - Shape/Dimension Drawing

(unit : mm)

Ø25



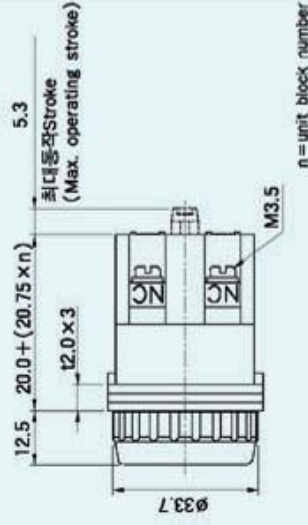
FA
US



Ø30



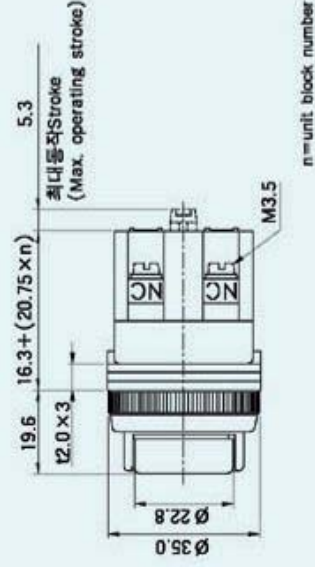
FA
US



Ø30 (S TYPE)

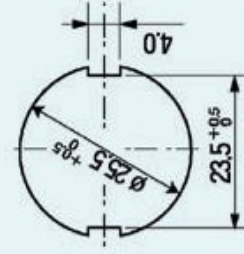


FA
US

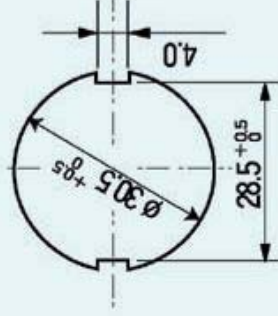


● PANEL 取付値數 - Panel attachment dimension

(unit : mm)



(Ø 25)



(Ø 30)

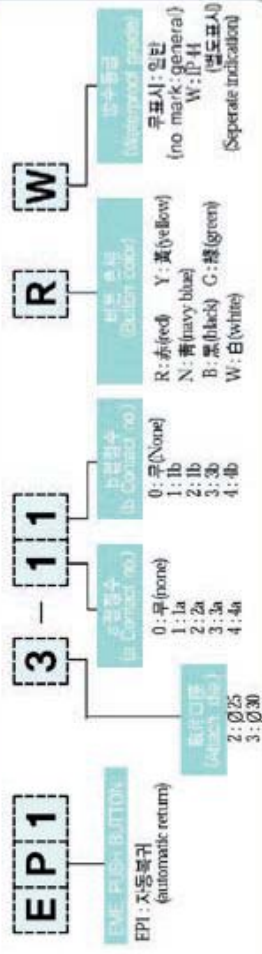


▶ IP: 44, 주문생산 (Ordered production)

SEI 80125-EL 001

EX99 IP536

形式區分圖 - Type classification diagram



- 性能概要 - Performance summary

定格容量 (Rating capacity)	AC250V 6A
絶縁抵抗 (Insulation resistance)	above 100MΩ (DC 500V, Meg)
接觸抵抗 (Contact resistance)	below 20mΩ (initial value)
耐電壓 (Withstand voltage)	AC2,500V/min
機械的壽命 (Mechanical lifetime)	above 500,000 times (20times/min)
電氣的壽命 (Electrical lifetime)	above 100,000 times (20times/min)
作動에 必要한 힘 (Operating force)	200 ~ 350g
使用周圍溫度 (Ambient temperature)	-25℃ ~ +40℃
相對濕度 (Relative humidity)	45 ~ 85%

● 接点定格 - Contact Rating

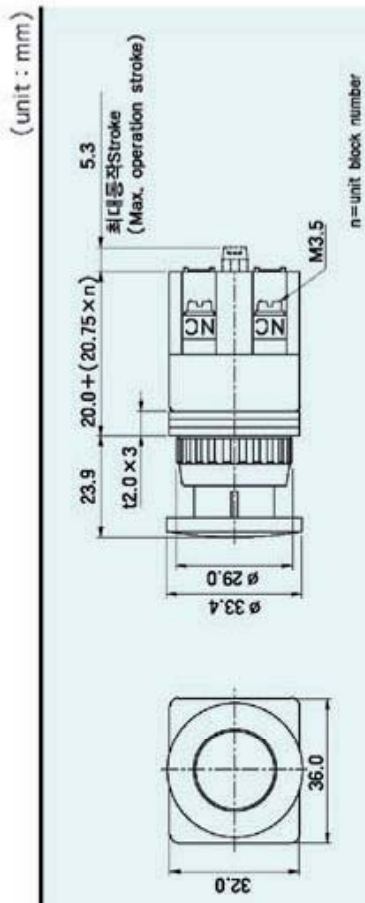
交流 (AC)	定格電壓 (rating voltage)	125V	250V	440V	
	定格電流 (rating current)	10A	6A	3A	
	遮斷電流 (breaking current)	閉路遮斷電流=定格電流×2.2 (closed breaking current=rating current×2.2)			
	定格電壓 (rating voltage)	24V	110V	220V	
直流 (DC)	抵抗 (resistance)	定格電流 (rating current)	10A	2.2A	1.1A
		遮斷電流 (breaking current)	閉路遮斷電流=定格電流×1.1 (closed breaking current=rating current×1.1)		
	誘導 (induction)	定格電流 (rating current)	5A	1.1A	0.6A
		遮斷電流 (breaking current)	閉路遮斷電流=定格電流×1.1 (closed breaking current=rating current×1.1)		
定格通電電流 (rating conductive current)		10A			

● 部品 材質 - Part Materials

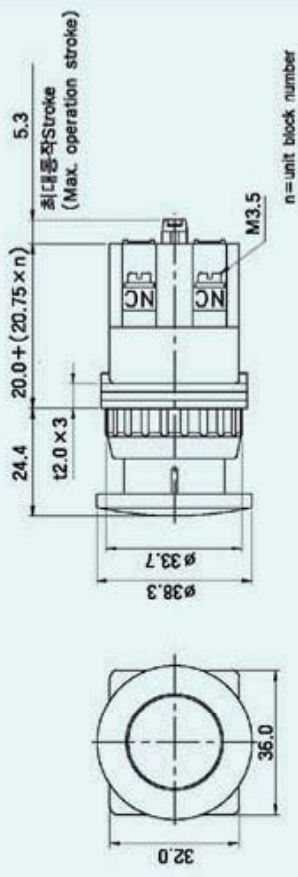
部 品 (Part)	材 質 (Materials)
몸 체 (Body)	Polycarbonate Resin
접 점 (Contact)	은접점 (Silver)
홀 다 (Holder)	ABS내열 (Heat resistance ABS) Resin
端 子 (Terminal)	黃 銅 (Brass)
볼 트 (Bolt)	MSWR-3 (Zn plating)
스프링 (Spring)	Stainless 鋼 (Stainless steel)
링 (Ring)	ABS Resin
캡 (Cap)	ABS Resin

● 外形/値數圖 - Shape/Dimension Drawing

Ø25



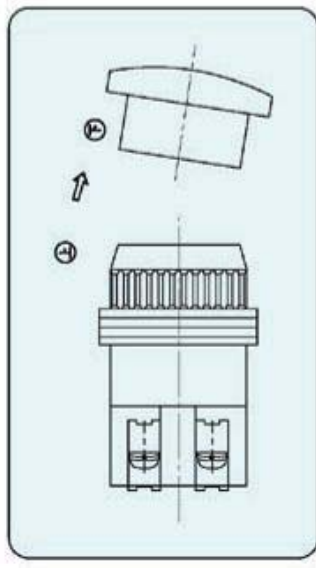
Ø30



● CAP 교체(CAP replacement method)

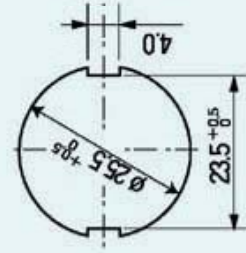
CAP 교체는 잡아당기지 말고 그림과 같이 위에서 아래로
쪼개듯이 뺐다.

When CAP replacing, do not pull out but take out from top
to downward like chopping as shown in fig.

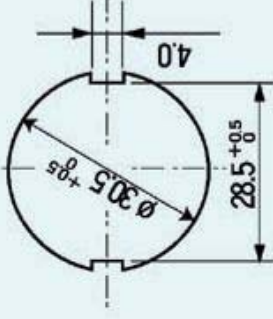


● PANEL 取付値數 - Panel attachment dimension

(unit : mm)



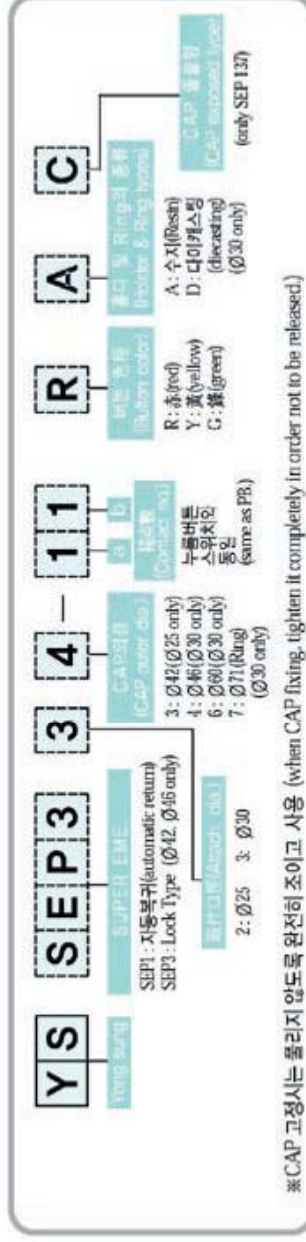
(Ø 25)



(Ø 30)

슈퍼 비상누름버튼 스위치
Super Emergency Push Button Switch

● 形式區分圖 - Type classification diagram



性能概要 - Performance summary

定格容量 (Rating capacity)	AC250V 6A
絶縁抵抗 (Insulation resistance)	above 100MΩ (DC 500V, Meg)
接觸抵抗 (Contact resistance)	below 20mΩ (initial value)
耐電壓 (Withstand voltage)	AC2,500V/min(50~60Hz)
機械的壽命 (Mechanical lifetime)	above 500,000 times (20times/min)
電氣的壽命 (Electrical lifetime)	above 100,000 times (20times/min)
작동에 필요한 힘 (Operating force)	200 ~ 350g
使用周囲温度 (Ambient temperature)	-25℃ ~ +40℃
相對濕度 (Relative humidity)	45 ~ 85%

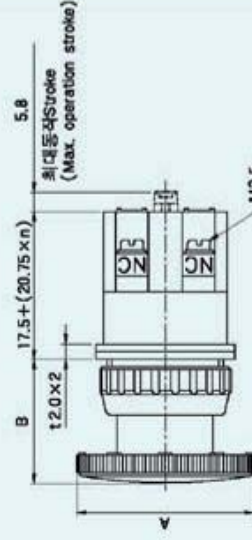
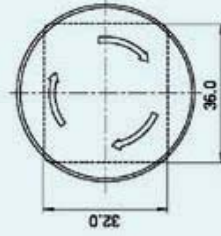
● 接点定格 - Contact Rating

接点部の仕様 Contact part spec.	交流 (AC)	定格電壓 (rating voltage)	125V	250V	440V	
		定格電流 (rating current)	10	6A	3A	
		遮断電流 (breaking current)	閉路遮断電流=定格電流×2.2 (closed breaking current=rating current×2.2)			
	直流 (DC)	定格電壓 (rating voltage)	24V	110V	220V	
		抵抗 (resistance)	10A	2.2A	1.1A	
			遮断電流 (breaking current)	閉路遮断電流=定格電流×1.1 (closed breaking current=rating current×1.1)		
		誘導 (induction)	定格電流 (rating current)	5A	1.1A	0.6A
			遮断電流 (breaking current)	閉路遮断電流=定格電流×1.1 (closed breaking current=rating current×1.1)		
	定格通電電流 (rating conductive current)		10A			

●外形/値數圖 - Shape/Dimension Drawing

(unit : mm)

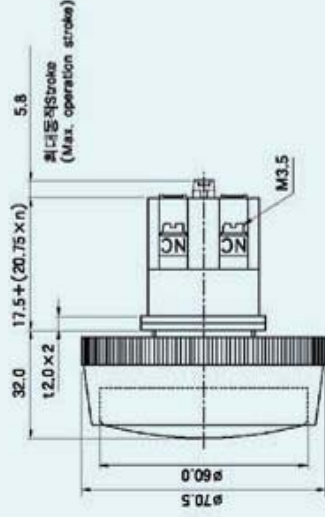
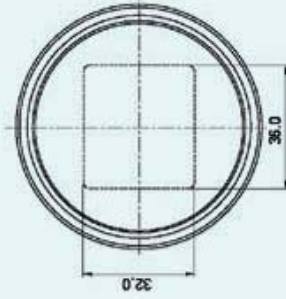
Push lock & Turn Reset Type



	A	B
SEP 323	φ42.0	31.9
SEP 334	φ46.0	33.1

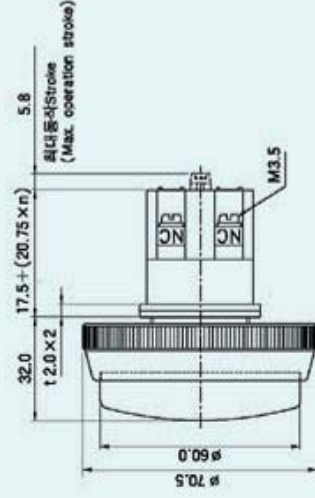
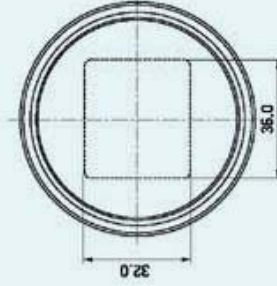
n=unit block number

Ø71(CAP)



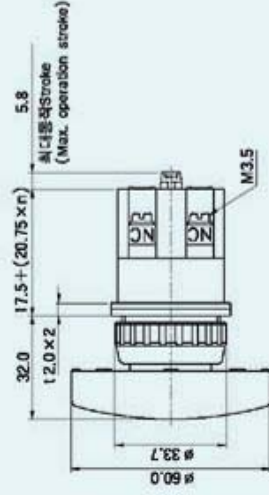
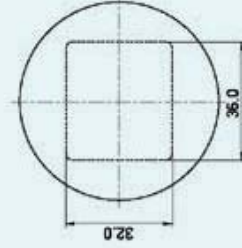
n=unit block number

Ø71(CAP 蓋凸型)



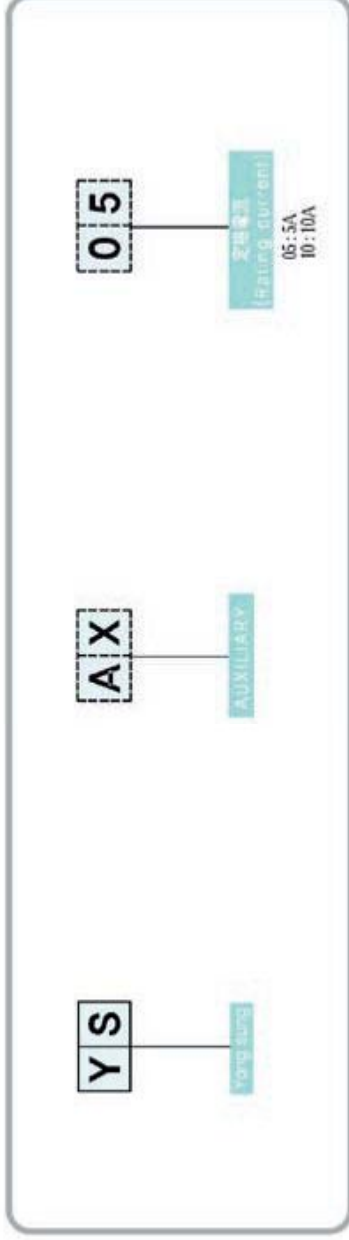
n=unit block number

Ø60(CAP)



n=unit block number

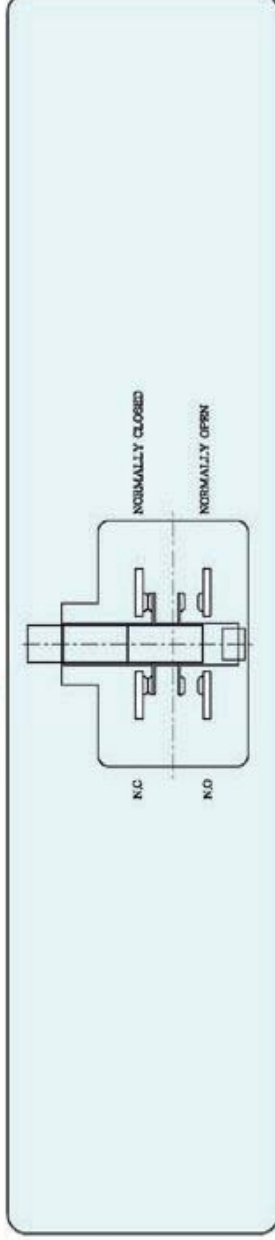
• 形式 區分圖 - Type classification diagram



• 特徴 - Features

- 소형 5A용 보조스위치는 누름형으로 다목적으로 사용할 수 있게 제작되어 편리합니다.
- 폭이 좁고 외형이 작아서 단독부착 뿐 아니라 단열로 수개를 부착하여 사용할 수 있게 제작되어 있습니다.
- 각종 차단기에도 사용하며 자동제어기기, 기계, 일반용으로도 사용하기에 편리합니다.
- Mini 5A type auxiliary switch is manufactured as push type and convenient for multi-purpose.
- With narrow width and small shape, multiple attachments as well as single one can be made.
- Applied to various breaker. It is also conveniently used for automatic controller, machines and general purpose.

• 接点 構成圖 - Contact form diagram



• 性能 概要 - Performance summary

定格容量 (Rating capacity)	AC250V 5A	AC250V 10A
絶縁抵抗 (Insulation resistance)	above 100MΩ (DC 500V. Meg)	
接觸抵抗 (Contact resistance)	below 25mΩ (initial value)	
耐振動 (Withstand vibration)	double amplitude 1.5mm	
耐衝擊 (Withstand impact)	about 30G (300m/s ²)	
耐電壓 (Withstand voltage)	AC1,500V/min	
機械的壽命 (Mechanical lifetime)	above 1,000,000 times (20times/min)	
電氣的壽命 (Electrical lifetime)	above 500,000 times (20times/min)	
使用周圍溫度 (Ambient temperature)	-25℃ ~ +40℃	
相對濕度 (Relative humidity)	45 ~ 85%	

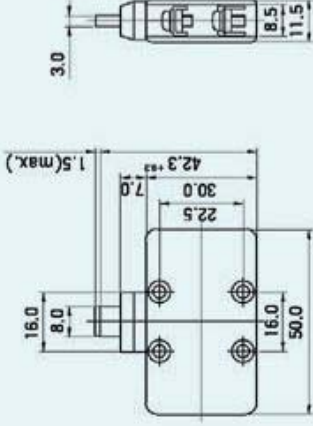
● 部品材質 - Part Materials

部 品 (Part)	材 質 (Materials)	
	5A	10A
몸 체 (Body)	PBT수지	페놀수지
유 동 (Moving)	아세탈수지	페놀수지
端 子 (Terminal)	黃 銅 (Brass)	
接 点 (Contact)	은접점 (Silver)	은산화 카드뮴합금 (Silver-cadmium oxide alloy)
볼 트 (Bolt)	MSWR-3 (Zn plating)	
스프링 (Spring)	Stainless 鋼 (Stainless steel)	

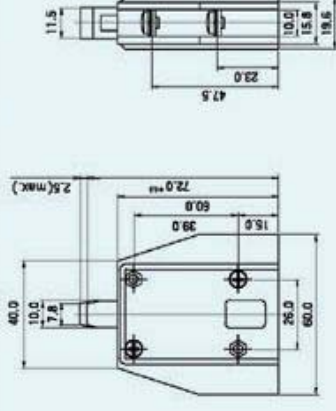
● 外形/値數圖 - Shape/Dimension Drawing

(unit : mm)

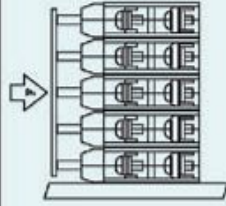
5A



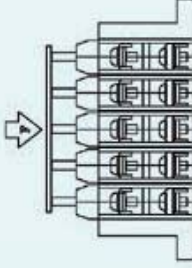
10A



● 使用法の 보기 - Example of using method



어느 한곳의 측면을 사용하여 수개를 부착하여 회로를 켜(ON)하는 장치의 보기
Example of ON/Off operation of circuit with several attachment using any one side



위치를 선정하여 앵글사용으로 수개를 부착하여 회로를 켜(ON)하는 장치의 보기
Example of ON/Off operation of circuit with several attachment using angle after positioning



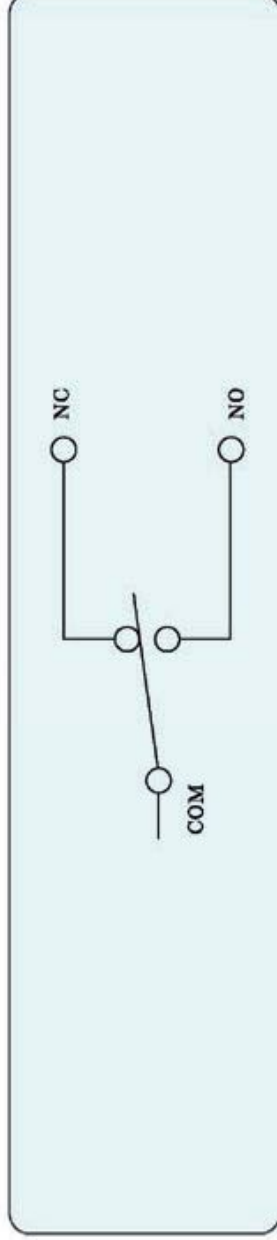
Door에 使用한 예. 문을 열고 닫을 때 회로를 켜(OFF)닫(ON)하는 장치의 보기
Example applied to door. Example of ON/Off operation of circuit in opening/closing door

5-10 발판 스위치 Foot Switch

● 特徴 - Features

- Foot Switch는 Press, Auto Machine등 電動機 應用回路에 널리 使用되고 있습니다.
- Body는 아연 합금으로 Diecasting하여 堅固하며 取扱이 容易합니다.
- 스위치부는 高性能 마이크로 스위치(V형)를 使用하여 정격에서 10萬回 以上을 開閉할 수 있습니다.
- 정격 : 15A 125VAC/10A 250VAC (저항부하)
- Foot switch is widely used for motor application circuit like press, auto machines etc.
- Body with Zinc alloy die casting is solid and maintenance easy.
- With the use of high performance micro switch(V type) on switch part, it can be switched over 100,000 times at rating.
- Rating : 15A 125VAC/10A 250VAC (Resistance load)

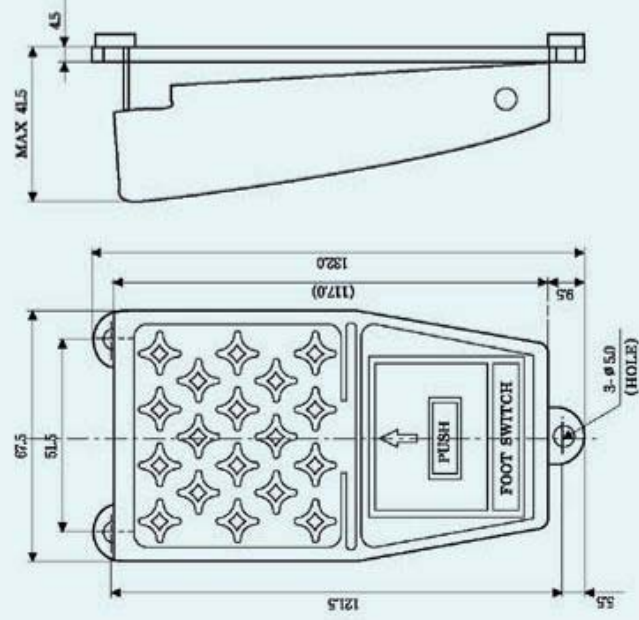
● 接点 構成圖 - Contact form diagram



● 外形/値數圖 - Shape/Dimension Drawing

YSFO-C1

(unit : mm)



6 표시등류 LAMPS

cPI[®]us

- 6-1 조광형 누름버튼 스위치
- 6-2 원형 표시등
- 6-3 정사각 표시등 (SL-25)
- 6-4 정사각 표시등 (SL-33)
- 6-5 신형 직사각 기명 표시등 (NRL-34)
- 6-6 정사각 표시등 (BSL-33)
- 6-7 직사각 표시등 (BRL-34)
- 6-8 직사각 기명 표시등 (SL-48) (SL-72)

- 6-1 Illuminated Push Button Switch
- 6-2 Pilot Lamp
- 6-3 Square Lamp (SL-25)
- 6-4 Square Lamp (SL-33)
- 6-5 New Rectangle Lamp (NRL-34)
- 6-6 Bulletin Square Lamp (BSL-33)
- 6-7 Bulletin Rectangle Lamp (BRL-34)
- 6-8 Square Lamp (SL-48) (SL-72)

6-1 조광형 누름버튼 스위치

Illuminated Push Button Switch

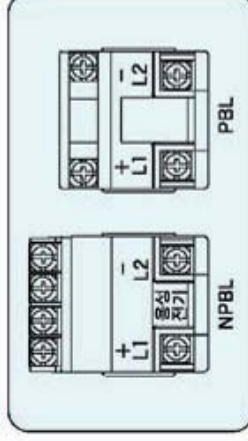
• 特徴 - Features

- 스위치부의開閉가 스프링에 依하여 動作되므로 開閉가 正確하고 低電流에도 使用할 수 있도록 되어 있습니다.
- 側面에서 램프의 點燈狀態를 確認할 수 있도록 造角形링을 使用하였습니다.
- A, B接點을 一切形으로 하여 電線連結이 보다 쉬워졌습니다.(2A 및 2B는 제작이 불가합니다.)
- 스위치 回路確認 作業時 開閉部를 肉眼으로 確認할 수 있어 時間이 短縮됩니다.
- By spring switching operation, exact switching and use at low current are possible.
- Carven type ring used for checking lamp lighting state from side.
- Easier wire connection with one switching type of A, B contact.(2A and 2B are not manufactured.)
- Shortened checking time of switch circuit due to visual checking of switching part.

• 部品 材質 - Part materials

部 品 (Part)	材 質 (Materials)
몸 체 (Body)	ABS 내열 (Heat resistance ABS) Resin
홀 다 (Holder)	ABS 내열 (Heat resistance ABS) Resin
接 点 (Contact)	은점접 (Silver)
端 子 (Terminal)	黃 銅 (Brass)
볼 트 (Bolt)	MSWR 3 (Zn plating)
캡 (CAP)	AS Resin

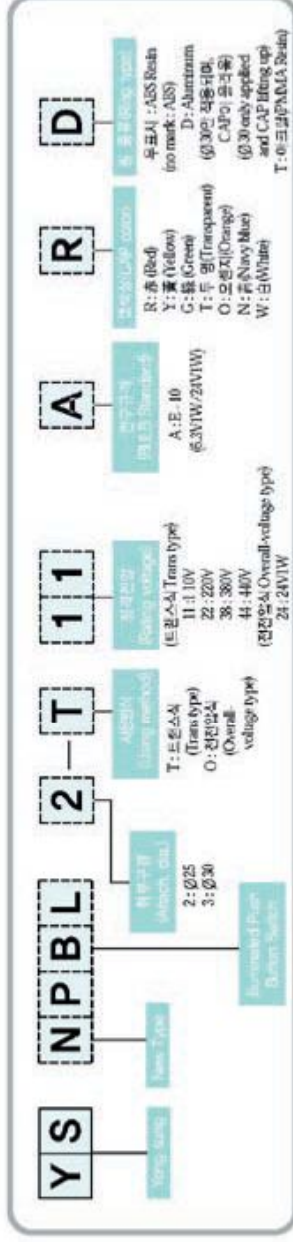
• 端子 極性 - Terminal Polarity



• 性能 概要 - Performance Summary

성능(Performance)	형식(Type)	트랜스식 (trans type)	전전압식 (overall-voltage type)	LED type
定格電壓 (Rating voltage)		AC110V, 220V, 380V, 440V	AC/DC 24V	AC/DC 24V, 48V, 110V, DC 125V, AC220V
2次電壓 (2nd voltage)		5.5V	-	24V
램프定格 (Lamp rating)		6.3V1W	24V1W	20mA
定格容量 (Rating capacity)			AC250V6A	
絶緣抵抗 (Insulation resistance)			above 100MΩ (DC 500V. Meg)	
接觸抵抗 (Contact resistance)			below 20mΩ (initial value)	
耐電壓 (Withstand voltage)			AC 1,500V/min (50~60Hz)	
機械的壽命 (Mechanical lifetime)			above 500,000 times (20times/min)	
電氣的壽命 (Electrical lifetime)			above 100,000 times (20times/min)	
스트로크 (Stroke)			5.5mm	
작動에 必要한 힘 (Operating force)			200 ~ 350g	
使用周圍溫度 (Ambient temperature)			-25℃ ~ +40℃	
相對濕度 (Relative humidity)			45 ~ 85%	

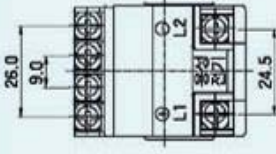
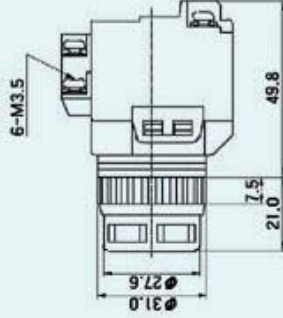
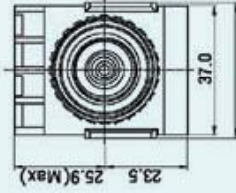
● 形式 區分圖 - Type classification diagram ... BULB Type



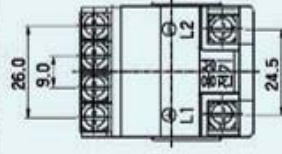
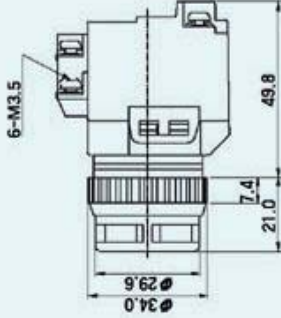
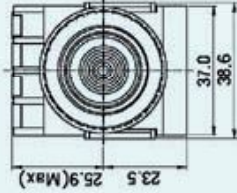
● 外形/値數圖 - Shape/Dimension Drawing

(unit : mm)

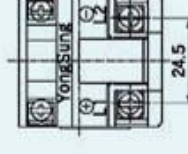
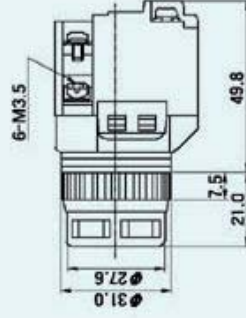
Ø25(NPBL Type)



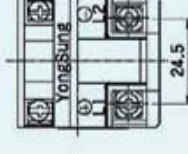
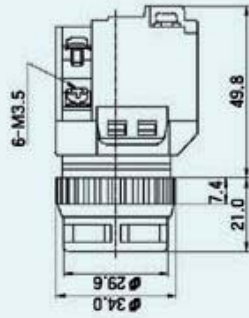
Ø30(NPBL Type)



Ø25(PBL Type)



Ø30(PBL Type)



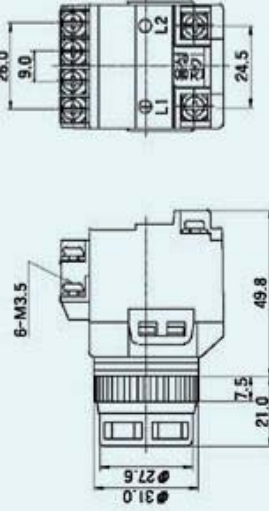
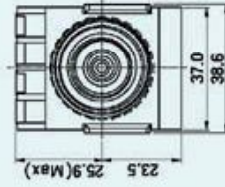
● 形式 區分圖 - Type classification diagram ... LED Type



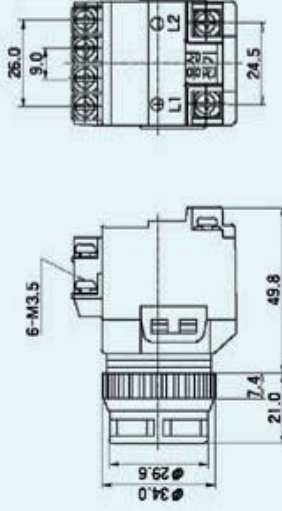
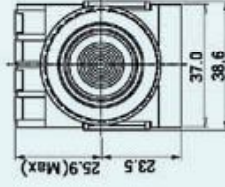
● 外形/值數圖 - Shape/Dimension Drawing

(unit : mm)

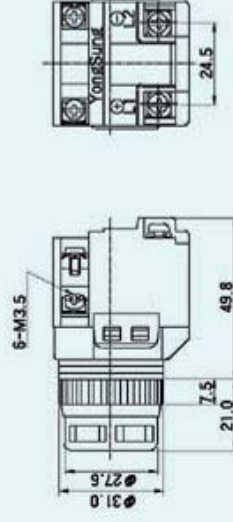
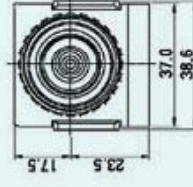
Ø25(NPBL Type)



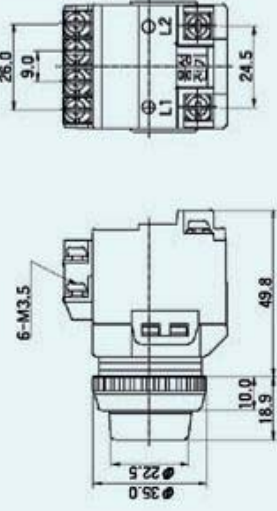
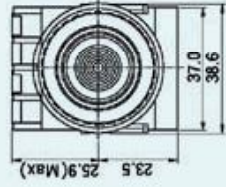
Ø30(NPBL Type)



Ø25(PBL Type)



Ø30(Ring Aluminum Type)



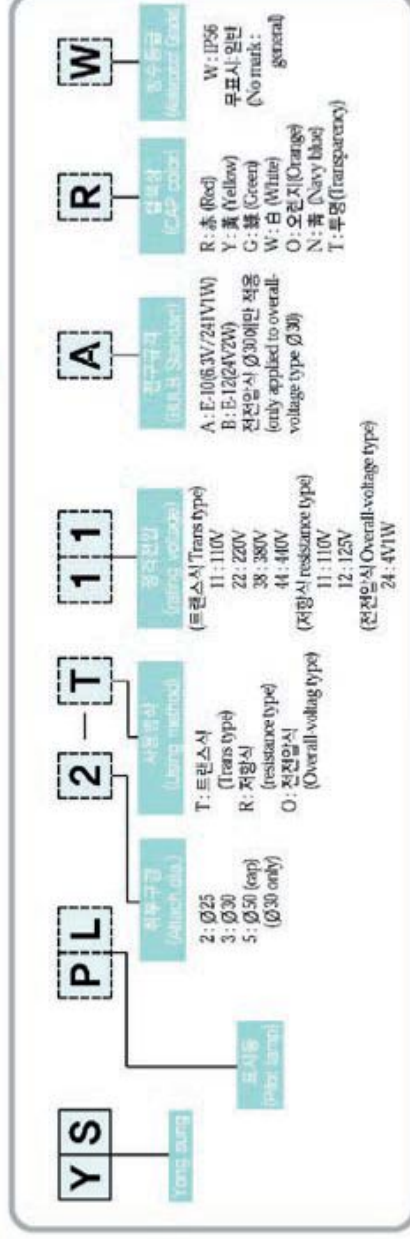
6-2

원형 표시등
Pilot Lamp



- ▶ 한국전기연구개발시험합격 : DE6372, 6371
(Certified by KERI's R&D Test)
- ▶ IP : 56 주문생산 (ordered production)
EX 99 IP 536
SEK 80125-E001

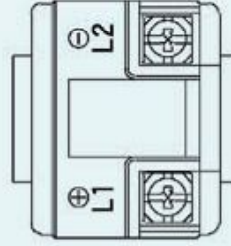
• 形式 區分圖 - Type classification diagram ... BULB Type



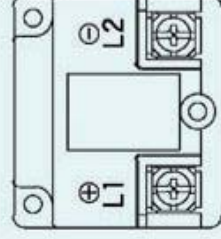
• 部品 材質 - Part materials

部 品 (Part)	材 質 (Materials)
몸 체 (Body)	트랜스식 (trans-type) 저항식 (resistance-type)
홀 다 (Holder)	ABS내열 (Heat resistance ABS) Resin ABS난연 (Flame retardant ABS) Resin
端 子 (Terminal)	ABS내열 (Heat resistance ABS) Resin ABS난연 (Flame retardant ABS) Resin
볼 트 (Bolt)	黃 銅 (Brass)
캡 (CAP)	MSWR-3 (Zn plating)
링 (Ring)	AS Resin ABS Resin

• 端子 極性 - Terminal Polarity



트랜스 Type
전전압 Type



저항 Type

표 시 등

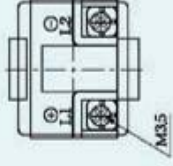
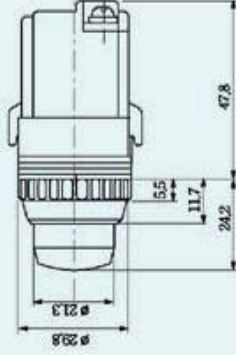
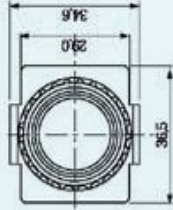
● 外形/値數圖 - Shape/Dimension Drawing

(unit : mm)

Ø25(트렌스식)



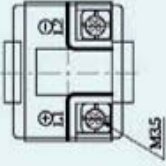
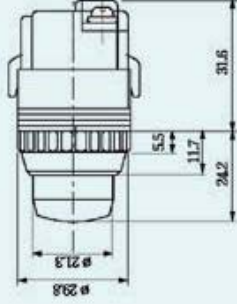
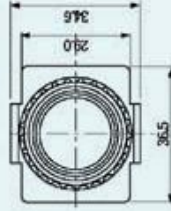
cAU[®] US



Ø25(전진압식)



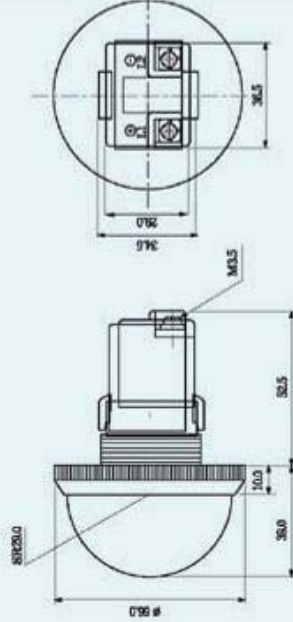
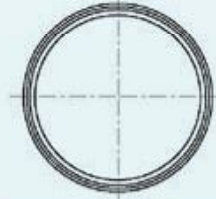
cAU[®] US



Ø50(CAP)



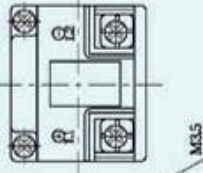
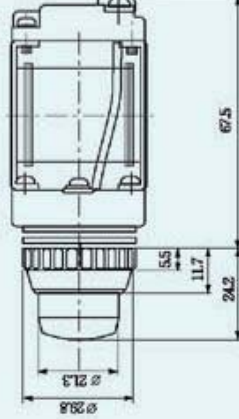
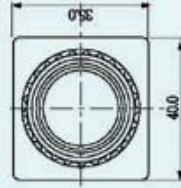
cAU[®] US



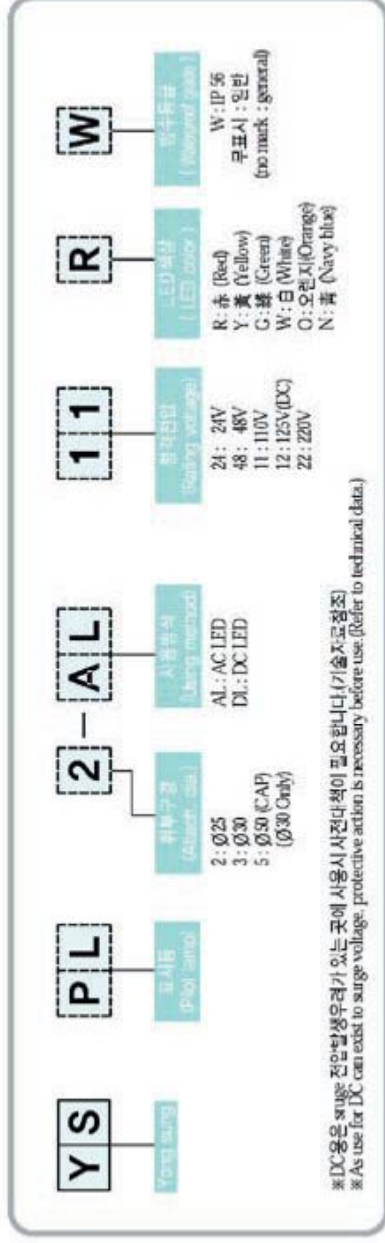
Ø25(저형식)



cAU[®] US

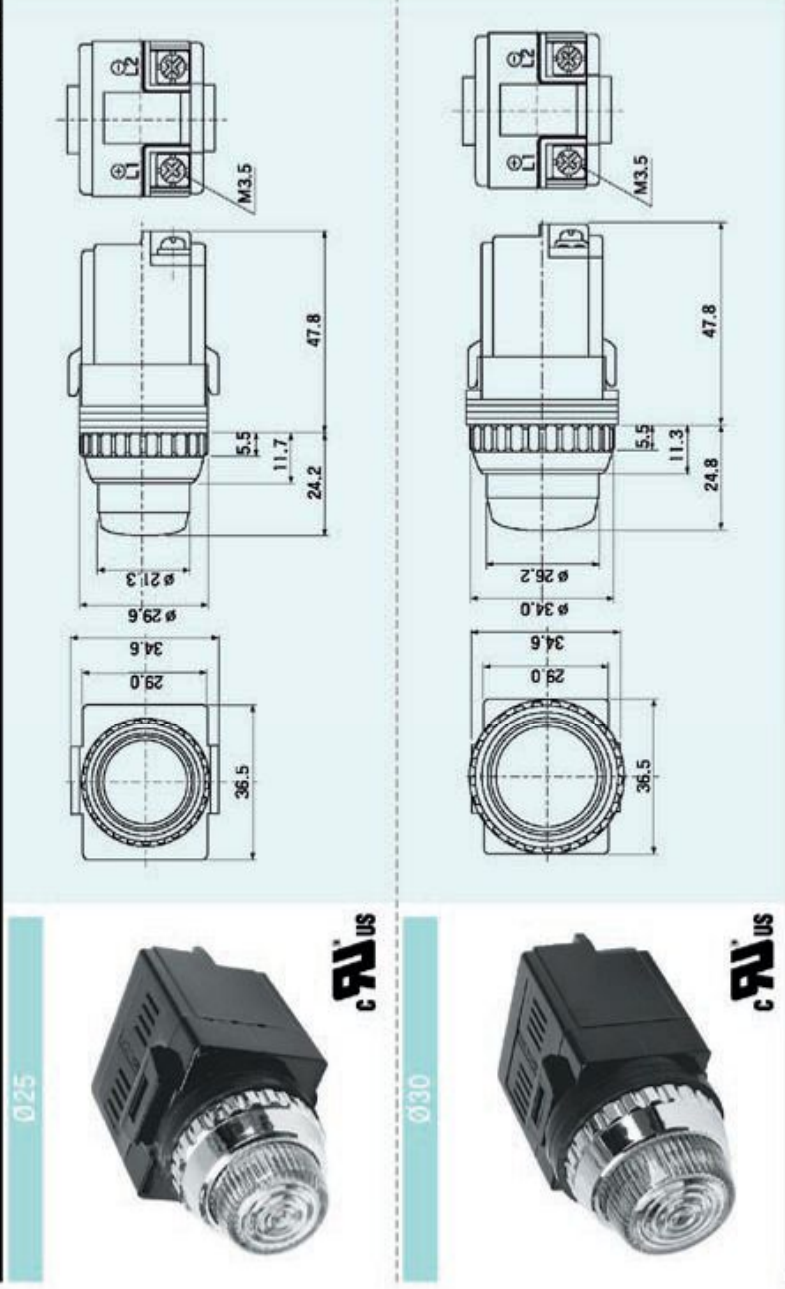


● 形式 區分圖 - Type classification diagram ... LED Type



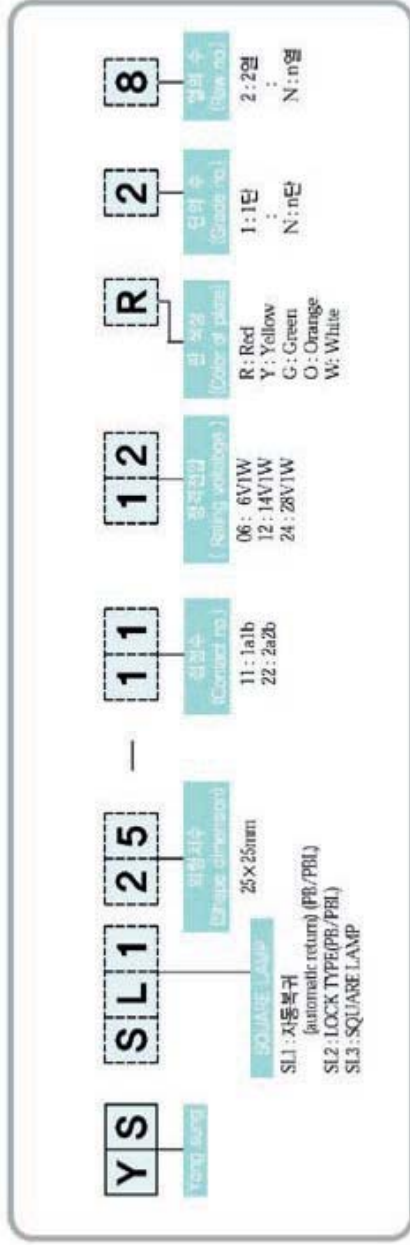
● 外形/值數圖 - Shape/Dimension Drawing

(unit : mm)

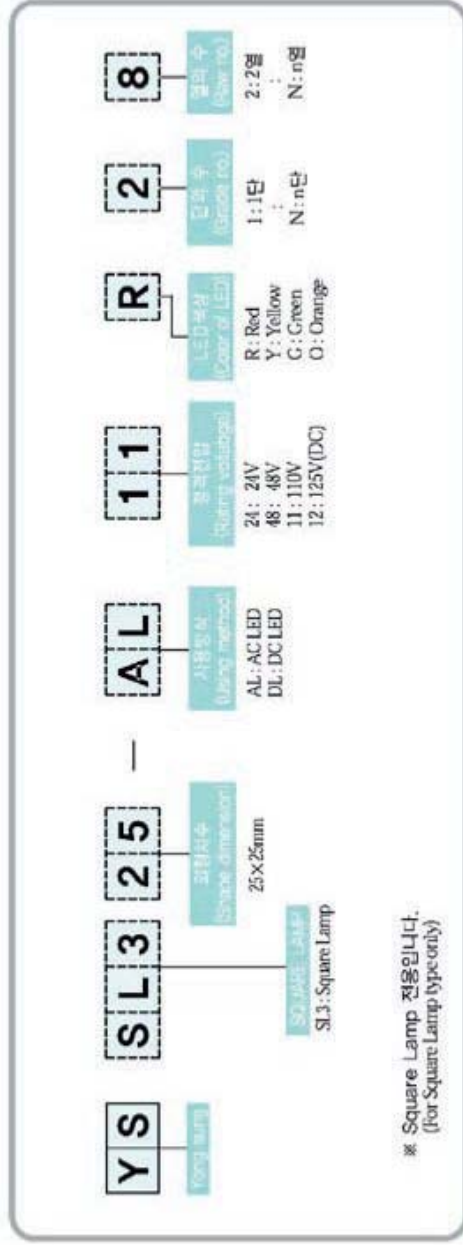


6-3 정사각 표시등 (SL-25) Square Lamp (SL-25)

• 形式 區分圖 - Type classification diagram ... BULB Type



• 形式 區分圖 - Type classification diagram ... LED Type



※ Square Lamp 전용입니다.
(for Square Lamp type only)

仕 樣 Specification

• 白熱球 Type - Bulb Type

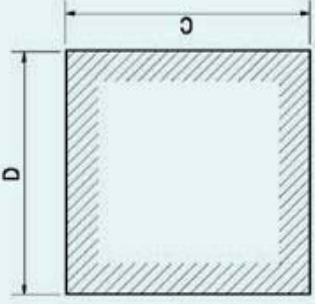
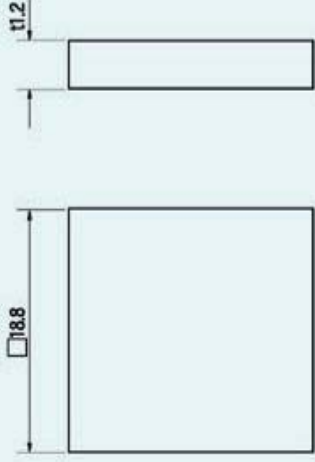
電源入力方式 (Power Source)		全電壓式 (Overall voltage Type)		
種 別 (type)		全面照光 (overall illumination)		
定格電壓 (1次電壓) rating voltage (primary voltage)		AC 5V	AC 12V	AC 24V
内装電球 (built-in lightbulb)	定格電壓 (rating voltage)	6V1W	14V1W	28V1W
	使用電壓 (using voltage)	5~6V	10~12V	18~24V
	BASE	S5.7S		
絶縁抵抗 (Insulation resistance)		above 100MΩ		
耐電壓 (Withstand voltage)		1,500V/min		
使用周囲温度 (Ambient temperature)		-25℃ ~ +40℃		
相對濕度 (Relative humidity)		45 ~ 85%		
점점정격(Contact Rating)		AC250V 3A		

• LED Type

種 別 (type)		單色全面照光 (single color overall illuminating)		
定格電壓 (1次電壓) rating voltage (primary voltage)		AC/DC24V	AC/DC48V	AC/DC110V DC125V
内装 LED (built-in LED)	定格電壓 (rating voltage)	DC24V		
	定格電流 (rating current)	below 20mA		
	發光色 (illuminating color)	Red, Green, Yellow, Orange		
絶縁抵抗 (Insulation resistance)		above 100MΩ (DC 500V. Meg)		
耐電壓 (Withstand voltage)		1,500V/min		
使用周囲温度 (Ambient temperature)		-25℃ ~ +40℃		
相對濕度 (Relative humidity)		45 ~ 85%		

● 外形 値數圖 및 PANEL 取付値數圖 - Shape/panel dimension drawing

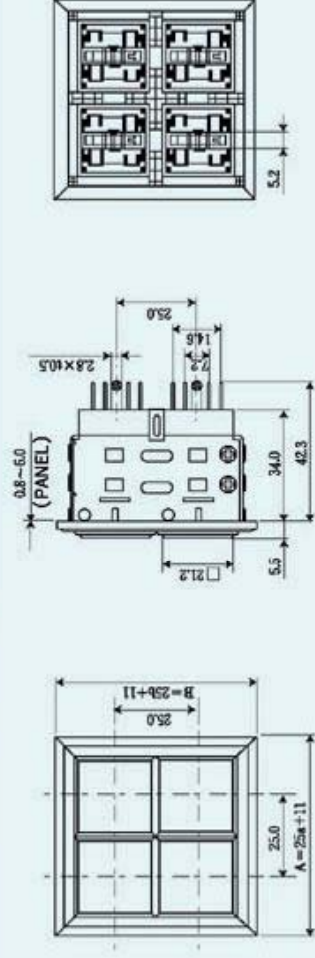
(unit : mm)

列의 數(raw number)		b	01	02	03	04	05	06	07	08	09	10
段의 數 (grade number)	外形値數(shape dimension)	B	36	61	86	111	136	161	186	211	236	261
	PANEL 加工値數 (panel dimension)	(D)	$29^{+0.5}_{-0}$	$54^{+0.5}_{-0}$	$79^{+0.5}_{-0}$	$104^{+0.5}_{-0}$	$129^{+0.5}_{-0}$	$154^{+0.5}_{-0}$	$179^{+0.5}_{-0}$	$204^{+0.5}_{-0}$	$229^{+0.5}_{-0}$	$254^{+0.5}_{-0}$
a	A	(C)	● PANEL 부착値數 (panel attachment dimension) : 列(row), 段(grade) : $25n+4$ (n : number)  ● 조각면 SIZE (size of marking plate) 									
01	36	$29^{+0.5}_{-0}$										
02	61	$54^{+0.5}_{-0}$										
03	86	$79^{+0.5}_{-0}$										
04	111	$104^{+0.5}_{-0}$										
05	136	$129^{+0.5}_{-0}$										
06	161	$154^{+0.5}_{-0}$										
07	186	$179^{+0.5}_{-0}$										
08	211	$204^{+0.5}_{-0}$										
09	236	$229^{+0.5}_{-0}$										
10	261	$254^{+0.5}_{-0}$										

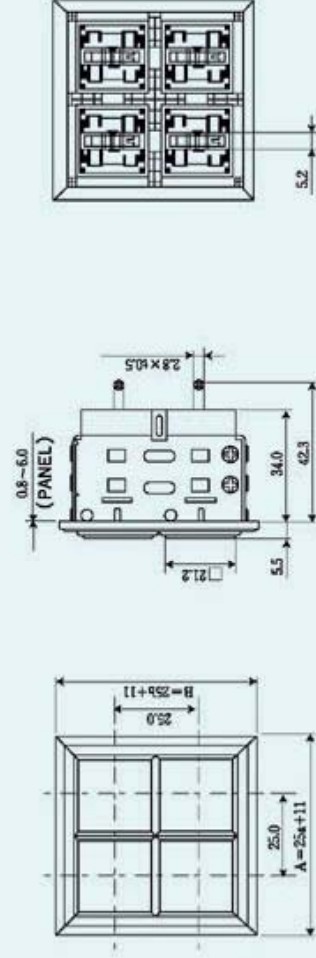
● 外形/値數圖 - Shape/Dimension Drawing

(unit : mm)

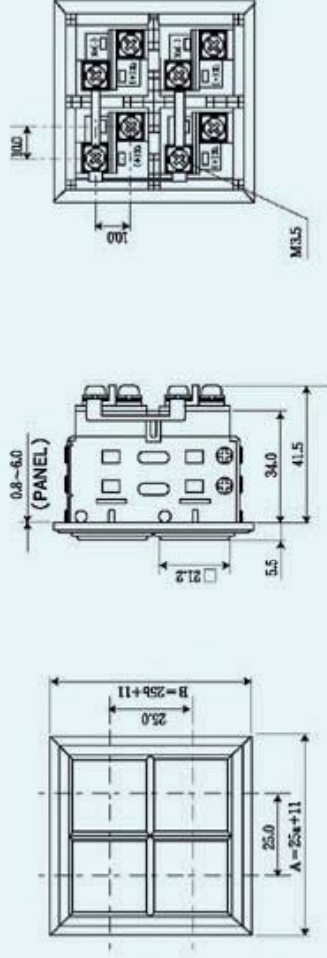
YS SL125-1124R22(누름버튼)



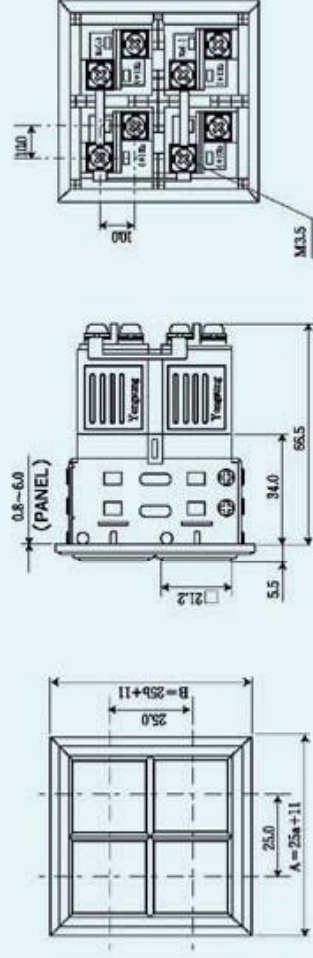
YS SL325-24R22(전전압 BULB포시동)



YS SL325-DL24R22(전전압 LED포시동)



YS SL325-DL11R22(저항식 LED포시동)



● 特徴 - Features

- 정사각형과 직사각형으로 구분되어 있어 용도에 따라 사용하기에 편리하게 되어있습니다.
- 특히 LED 램프는 전력소모도 크게 절감되고 조도도 보다 밝고 고휘도 LED를 적용하였습니다.
- DC LED Type은 CHECK 단자를 적용하여 전면부의 점등유무를 확인할 수 있습니다.
- Since divided into square and rectangle type, it is convenient to use according to application purposes.
- Especially, LED lamp is made up of LED which has high brightness and largely reduced consumption of electric power.
- DC LED Type can be verified whether front part light-up or not by applying CHECK terminal.

● 取付時(使用時)의 主注意事項 - Attachment(using) Note

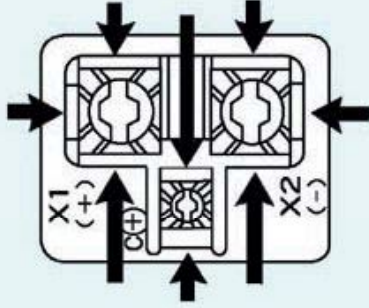
- 窓數가 10窓 以上에 있어서 連續點燈數가 窓數의 40% 以上일 境遇는 電球發熱量을 考慮, 窓數의 制限에 留意하여야 합니다.
- 트랜스式, 抵抗式의 경우 發熱量등에 있어 100% 點燈時는 10窓口 以下로 使用하여 주십시오.
- 판넬 取付時 集合表示燈 製品本體의 重量, 配線의 電線重量 등을 考慮하여 판넬 두께를 選定하여 주십시오.
- 抵抗式은 發熱을 考慮, 쿨링 裝置를 하여 주십시오.
- 全點燈試驗은 40分 以下로 하여 주십시오.
- 몸체로부터 LED Unit를 分離할 때 必히 電原을 끄고 分離하여 주십시오.
- If successive illuminating number is above 40 % display number in above 10 displays, care for limiting the number of display considering lightbulb generating amount.
- When illuminating 100%, in heat generating amount etc. of trans & resistance type use below 10 displays.
- In panel attachment, choose panel thickness considering weight of multi pilot lamps, product body, and electric wire of wiring.
- Apply cooling device considering heating in resistance type.
- Do over all illuminating test within below 40min.
- When separating LED Unit from body, be sure to turn off power source.

● LED Unit의 定格電壓狀의 主注意事項 - Rating voltage note of LED Unit

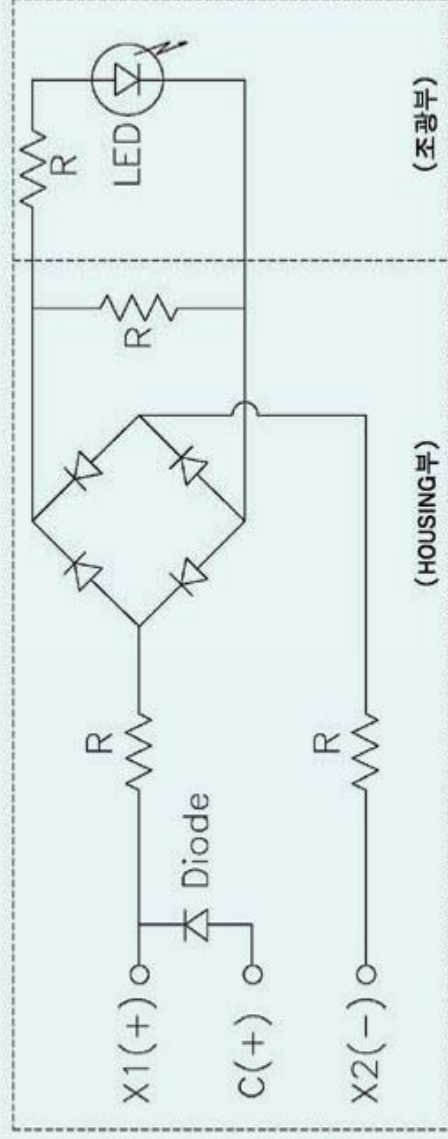
- LED Unit DC 定格電壓은 完全直流置量을 表示한 것입니다.
使用電壓範圍 : DC24V ± 10%
- LED Unit DC rating voltage indicates perfect DC value.
Applying voltage range : DC 24V ± 10%

• CHECK 단자부의 단자배선 - Terminal wiring of CHECK terminal part

- 端子 C(CHECK 端子) 및, 端子 X1⊕, 端子 X2(COMMON 端子)⊖의 極性으로 되어 있는 것에 注意하여 주십시오.
- It is consist of terminal C(check terminal) and terminal X1⊕, terminal X2(common terminal)⊖ Polarity.

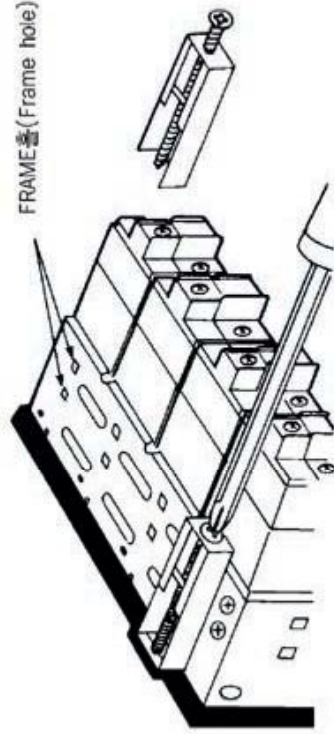


※ 화살표는 端子配線 方向을 表示하는 것입니다.
(Arrow is terminal wiring direction.)



• PANEL의 取付方法 - Attachment method of PANEL

- 集合의 境遇 판넬에 取付時는 本體를 판넬 前面에 挿入後 兩面에 있는 部屬의 取付金具를 FRAME 穴에 아래의 그림처럼 집어넣고 나사를 조여주십시오.
또한 取付金具의 部屬數는 窓數에 따라 다음과 같이 사용하시면 좋습니다.
- When attaching multi illuminating display into panel, insert body into the front panel, then push accessory jointing part into The FRAME hole as following figure and tighten screws.
The number of jointing part is as following according to the number of display.



• 取付 金具數 - the number of jointing part

段(grade) / 列(row)	1 - 2	3 - 8	9 - 15	16 - 20
1 - 2	2	4	6	8
3 - 6	4	6	8	10
7 - 10	6	8	10	12

(unit:ea)

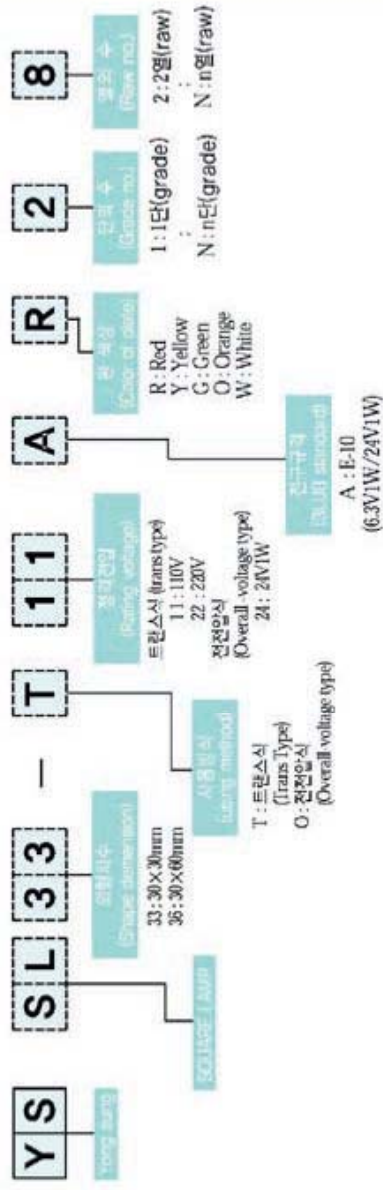
• 取付의 例 - Example of attachment

(■는 取付金具임)
(■ is jointing part.)

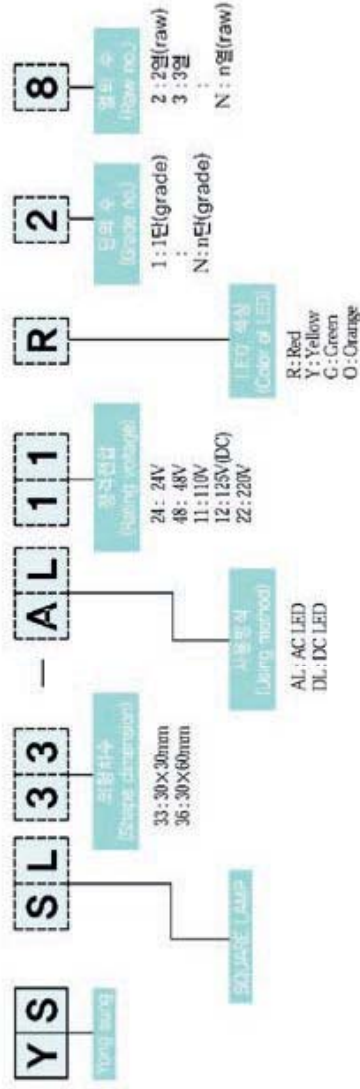
段(grade) / 列(row)	1 - 2	3 - 8	9 - 15	16 - 20
1 - 2				
3 - 6				
7 - 10				

6-4 정사각 표시등 (SL-33) Square Lamp (SL-33)

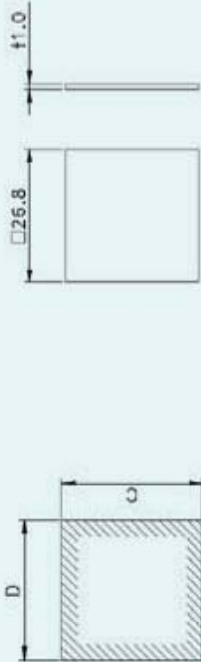
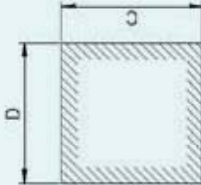
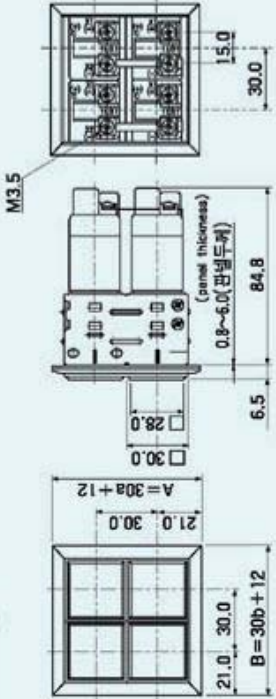
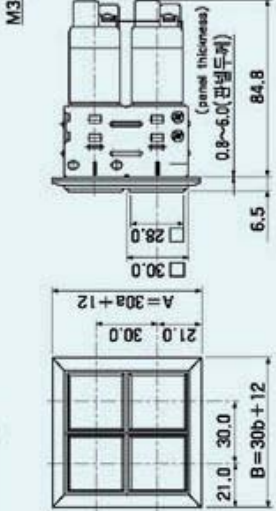
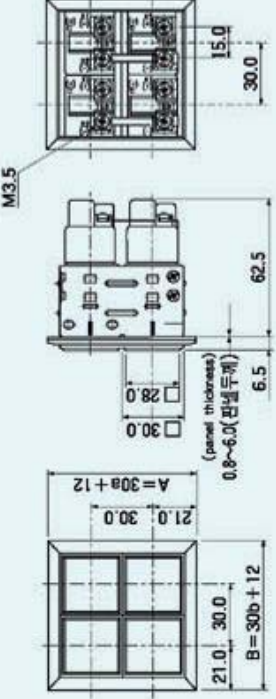
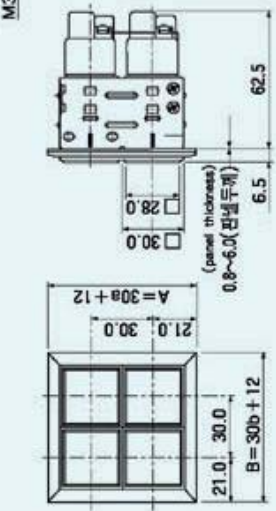
● 形式 區分圖 - Type classification diagram ... BULB Type



● 形式 區分圖 - Type classification diagram ... LED Type



● 外形 値數圖 및 PANEL 取付値數圖 - Shape/panel dimension drawing

列의 數 (raw number)		(unit : mm)										
段의 數 (grade number)	外形值數(shape dimension)	b	01	02	03	04	05	06	07	08	09	10
	PANEL 加工值數 (panel dimension)	B	42	72	102	132	162	192	222	252	282	312
		(D)	$35^{+0.5}_{-0.5}$	$65^{+0.5}_{-0.5}$	$95^{+0.5}_{-0.5}$	$125^{+0.5}_{-0.5}$	$155^{+0.5}_{-0.5}$	$185^{+0.5}_{-0.5}$	$215^{+0.5}_{-0.5}$	$245^{+0.5}_{-0.5}$	$275^{+0.5}_{-0.5}$	$305^{+0.5}_{-0.5}$
a	(C)	● PANEL 부착值數 (panel attachment dimension) : ● 조각면 SIZE 列(row) : $30n+5$ (n : number) 段(grade) : $30n+5$										
01	$35^{+0.5}_{-0.5}$											
02	$65^{+0.5}_{-0.5}$											
03	$95^{+0.5}_{-0.5}$	● 外形/值數圖 (shape/ dimension drawing) 트랜스식 (Trans Type)										
04	$125^{+0.5}_{-0.5}$											
05	$155^{+0.5}_{-0.5}$											
06	$185^{+0.5}_{-0.5}$	전전압식 (Overall-voltage Type)										
07	$215^{+0.5}_{-0.5}$											
08	$245^{+0.5}_{-0.5}$											
09	$275^{+0.5}_{-0.5}$	DL22 Type										
10	$305^{+0.5}_{-0.5}$											

仕 様 Specification

● 白熱球 Type - Lightbulb Type

電源入力方式 (power source)		全電壓式 (overall voltage type)	트랜스式 (trans type)
種 別 (type)		全面照光 (overall illuminating)	全面照光 (overall illuminating)
定格電壓 (1次電壓) rating voltage (primary voltage)		AC/DC 24V	AC 110V, 220V
内装電球 (built-in lightbulb)	定格電壓 (rating voltage)	24V1W	6.3V1W
	2次電壓 (secondary voltage)	24V	5.5V
BASE		E-10 (BASE Type)	
絶縁抵抗 (Insulation resistance)		above 100MΩ	
耐電壓 (Withstand voltage)		AC2,000V/min	AC2,500V/min
使用周囲温度 (Ambient temperature)		-25℃ ~ +40℃	
相對湿度 (Relative humidity)		45 ~ 85%	

● LED Type

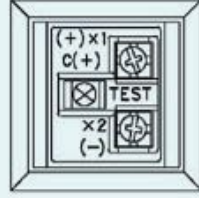
種 別 (type)	單色全面照光 (CHECK端子挿入) (single color overall illuminating<inserting CHECK terminal>)				
定格電壓 (1次電壓) rating voltage(primary voltage)	AC/DC24V	AC110V	DC110V	DC125V	AC/DC220V
内装 LED	定格電壓 (rating voltage)	DC24V			
	定格電流 (rating current)	below 20mA			
	發光色 (illuminating color)	Red, Green, Yellow, Orange			
絶縁抵抗 (Insulation resistance)		above 100MΩ (DC 500V. Meg)			
耐電壓 (Withstand voltage)		AC2,000V/min			
使用周囲温度 (Ambient temperature)		-25℃ ~ +40℃			
相對湿度 (Relative humidity)		45 ~ 85%			

※ AC110V, 220V용은 Check 단자가 없습니다. (Check terminal is not apply for AC110V, 220V.)

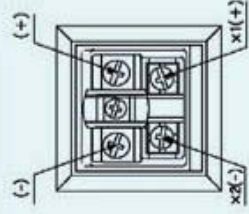
※ DC Check 단자 사용시는 X1 단자에 부가회로를 사용할 수 없습니다. (램프 체크시 역전압 발생)

(Additional circuit can not be used at X1 terminal when using DC terminal.) (Reverse voltage occurrence when lamp check.)

● 端子 極性 - Terminal Polarity



Trans/overall-voltage Type



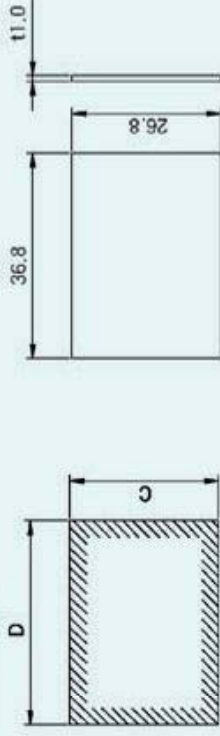
DC 220V LED Type

● 外形 値數圖 및 PANEL 取付値數圖 - Shape/panel dimension drawing

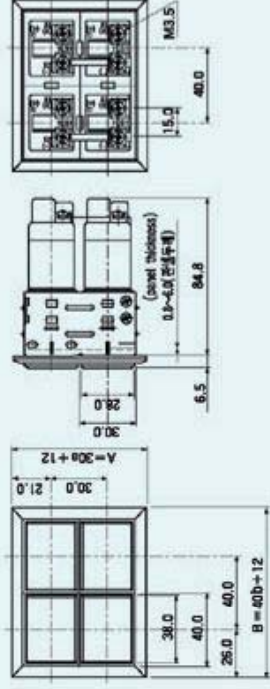
(unit : mm)

列의 數 (grade number)	列의 數 (raw number)	b	01	02	03	04	05	06	07	08	09	10
外形値數(shape dimension)	段의 數 (grade number)	B	52	92	132	172	212	252	292	332	372	412
	PANEL 加工値數 (panel dimension)	(D)	$45^{+0.5}_{-0}$	$85^{+0.5}_{-0}$	$125^{+0.5}_{-0}$	$165^{+0.5}_{-0}$	$205^{+0.5}_{-0}$	$245^{+0.5}_{-0}$	$285^{+0.5}_{-0}$	$325^{+0.5}_{-0}$	$365^{+0.5}_{-0}$	$405^{+0.5}_{-0}$

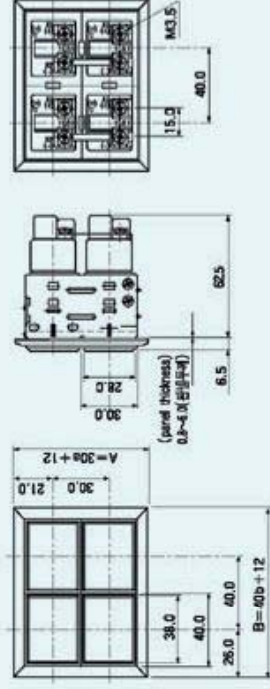
● PANEL 取付値數 (panel attachment dimension) : ● 조각면 SIZE
(size of marking plate)
列(row) : $40n+5$ (n : number)
段(grade) : $30n+5$ (n : number)



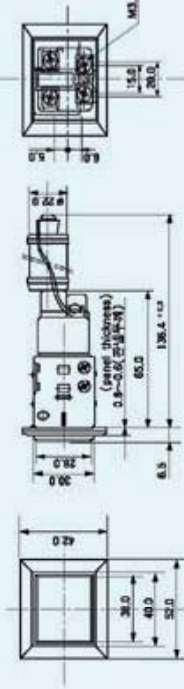
● 外形/値數圖 (shape/dimension drawing)
트랜스식 (Trans Type)



전전압식 (Overall-voltage Type)



DL22 Type



● 白熱球 Type - Lightbulb Type

電源入力方式 (power source)		全電壓式 (overall voltage type)	トランス式 (trans type)
種 別 (type)		全面照光 (overall illuminating)	全面照光 (overall illuminating)
定格電壓 (1次電壓) rating voltage (primary voltage)		AC/DC 24V	AC 110V, 220V
内装電球 (built-in lightbulb)	定格電壓 (rating voltage)	24V1W	6.3V1W
	2次電壓 (secondary voltage)	24V	5.5V
BASE		E-10 (BASE Type)	
絶縁抵抗 (Insulation resistance)		above 100MQ	
耐電壓 (Withstand voltage)		AC2,000V/min	AC2,500V/min
使用周囲温度 (Ambient temperature)		-25℃ ~ +40℃	
相對濕度 (Relative humidity)		45 ~ 85%	

● LED -Type

種 別 (type)	單色全面照光 (CHECK端子插入) (single color overall illuminating inserting CHECK terminal)			
定格電壓 (1次電壓) rating voltage (primary voltage)	AC/DC24V	AC110V	DC110V	DC125V AC/DC220V
內 裝 LED	DC24V			
	below 20mA			
	Red, Green, Yellow, Orange			
絕緣抵抗 (Insulation resistance)	above 100MΩ (DC 500V, Meg)			
耐電壓 (Withstand voltage)	AC2,000V/min			
使用周圍溫度 (Ambient temperature)	-25℃ ~ +40℃			
相對濕度 (Relative humidity)	45 ~ 85%			

※ AC110V, 220V용은 Check 단자가 없습니다. (Check terminal is not apply for AC110V, 220V.)

※ DC Check 단자 사용시는 X1 단자에 부가회로를 사용할 수 없습니다. (램프 체크시 역전압 발생)

(Additional curcuit can not be used at X1 terminal when using DC terminal.) (Reverse voltage occurrence when lamp check.)

● 端子 極性 - Terminal Polarity

Trans/overall-voltage Type

DC 220V LED Type

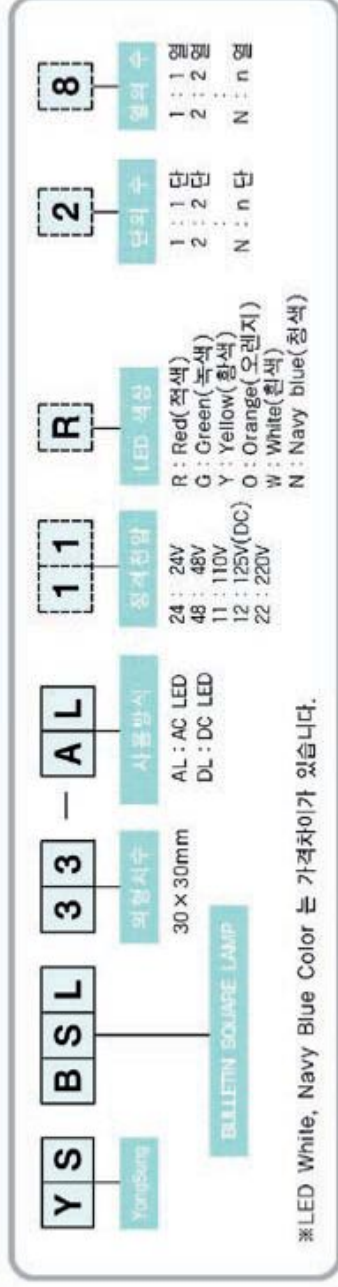
6-6

정사각표시등 (BSL-33)

Bulletin Square Lamp (BSL-33)

cPI^{us}

● 形式 區分圖 - BULLETIN SQUARE LAMP (정사각표시등)



● 特徴 - Features

- 정사각형(BSL-33) 직사각형(BRL-34)로 구분되어 있어 용도에 따라 사용하기에 편리하게 되어있습니다.
- LED램프이므로 백열구에 비해 전력소비가 크게 절감어 됩니다.
- LED 램프는 조도를 밝고 선명하도록 고회도 LED를 사용하여 예폭시몰딩 처리하였습니다.
- LED램프 교체시 극성방향이 사용하도록 설계되었습니다.
- LED 램프 COLOR는 Red, Green, Yellow, Orange, Blue, White 6색상으로 구분되어 있으며 특히 Green LED는 PG Green LED를 사용하여 선명하고 밝습니다.
- DC LED TYPE은 Check 단자를 적용하여 전면부의 전체 점등유무를 확인할 수 있도록 되어 있습니다. (Check 단자는 점등유무확인 목적이외 다른 목적으로 사용할 수 없습니다)
- It is convenient to use according to service with classifying of square (BSL-33) and rectangle(BRL-34).
- Power consumption of LED lamp is cut down highly than glow lamp.
- LED lamp is treated epoxy molding with using high brightness to bright and clear the illumination.
- It is designed to use without the direction of polarity when change LED lamp.
- Led lamp is classified 6 colors with Red, Green, Yellow, Orange, Blue, and White. Especially Green LED with PG green LED is brightness and clear.
- DC LED type is able to confirm total lighting to apply the check terminal block. (Check terminal block can not use by other purpose except lighting confirmation.)

● 仕様 - Specification

種別 (type)	單色全面照光 (single color overall illuminating)			
定格電壓 (1次電壓) rating voltage (primary voltage)	AC, DC24V	AC, DC 48V	AC, DC 110V	DC125V AC, DC220V
定格電壓 (rating voltage)	DC24V			
定格電流 (rating current)	below 20mA			
發光色 (illuminating color)	Red, Green, Yellow, Orange, White, Blue			
絶縁抵抗 (Insulation resistance)	above 100MΩ (DC 500V, Meg)			
耐電壓 (Withstand voltage)	1,500V/min			
使用周圍溫度 (Ambient temperature)	-25 ~ +40°C			
相對濕度 (Relative humidity)	45 ~ 85%			

● PANEL附着置數 - BULLETIN SQUARE LAMP (정사각표시등)

列(row) : 30n + 5
段(grade) : 30n + 5
(n : number)

※ Square Lamp(SL-33) P150 참조

● 形式 區分圖 - BULLETIN RECTANGLE LAMP (직사각표시등)



● 特徴 - Features

- 정사각형(BSL-33) 직사각형(BRL-34)로 구분되어 있어 용도에 따라 사용하기에 편리하게 되어있습니다.
- LED램프이므로 백열구에 비해 전력소비가 크게 절감됩니다.
- LED 램프는 조도를 밝고 선명하도록 고휘도 LED를 사용하여 예폭시물딩 처리하였습니다.
- LED램프 교체시 극성방향이 사용하도록 설계되었습니다.
- LED 램프 COLOR는 Red, Green, Yellow, Orange, Blue, White 6색상으로 구분되어 있으며 특히 Green LED는 PG Green LED를 사용하여 선명하고 밝습니다.
- DC LED TYPE은 Check 단자를 적용하여 전면부의 전체 점등유무를 확인할 수 있도록 되어 있습니다. (Check 단자는 점등유무확인 목적 이외 다른 목적으로 사용할 수 없습니다)
- It is convenient to use according to service with classifying of square (BSL-33) and rectangle(BRL-34).
- Power consumption of LED lamp is cut down highly than glow lamp.
- LED lamp is treated epoxy molding with using high brightness to bright and clear the illumination.
- It is designed to use without the direction of polarity when change LED lamp.
- Led lamp is classified 6 colors with Red, Green, Yellow, Orange, Blue, and White. Especially Green LED with PG green LED is brightness and clear.
- DC LED type is able to confirm total lighting to apply the check terminal block. (Check terminal block can not use by other purpose except lighting confirmation.)

●仕様 - Specification

種別 (type)	單色全面照光 (single color overall illuminating)			
	AC, DC24V	AC, DC 48V	AC, DC 110V	DC125V AC, DC220V
定格電壓 (1次電壓) rating voltage (primary voltage)	DC24V			
定格電壓 (rating voltage)	below 20mA			
定格電流 (rating current) (built-in LED)	Red, Green, Yellow, Orange, White, Blue			
發光色 (illuminating color)	above 100MΩ (DC 500V. Meg)			
絶縁抵抗 (Insulation resistance)	1,500V/min			
耐電壓 (Withstand voltage)	-25 ~ +40℃			
使用周圍溫度 (Ambient temperature)	45 ~ 85%			
相對濕度 (Relative humidity)				

● PANEL附着置數 - BULLETIN RECTANGLE LAMP (직사각표시등)

列(row) : $40n + 5$ (n : number)
 段(grade) : $30n + 5$

※ New Rectangle Lamp(NRL-34) P153 참조

6-8

사각 LED 표시등 (SL-48, SL-72)
Square LED Lamp (SL-48, SL-72)

• 特徴 - Features

- 3색 LED 방식(赤色, 綠色, 黃色)
 - 매우 쉬운 스냅인 방식
 - LED 램프는 전력소모도 절감되고 조도도 보다 밝은 고회도 LED 적용
 - 3 Color LED(Red, Green, Yellow)
 - Ultra simple snap-in mounting
 - LED Lamp is made up of LED which has high brightness and large reduced consumption of electric power.
- ### • 使用時의 注意事項 - Using note
- 端子の 極性に 注意 하십시오.(共通端子는 陰極임)
 - DC 定格電壓은 完全直流値를 表示한 것입니다.
 - Note polarity of terminal in wiring.(Common terminal is negative polarity.)
 - DC rating voltage indicates perfect DC value.

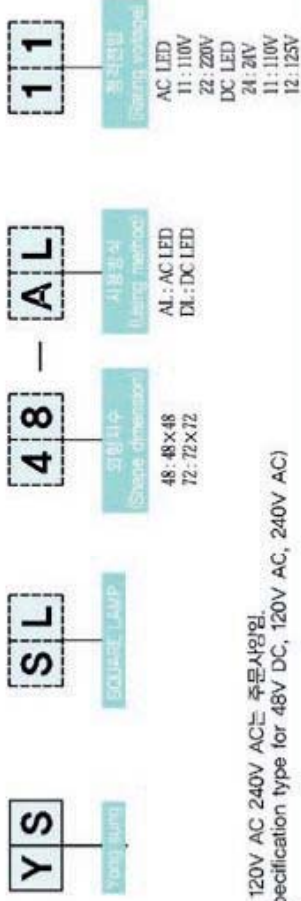
• 部品材質 - Part materials

部 品 (Part)	材 質 (Materials)
홀 다 (Holder)	아세탈 수지 (Acetal Resin)
케이스 (Case)	아세탈 수지 (Acetal Resin)
단 자 (Terminal)	黃 銅 (Brass)
볼 트 (Bolt)	炭素鋼 (Carbon steel)

• 性能 概要 - Performance summary

定格電壓 (1次電壓) Rating voltage (primary voltage)	AC 110V	AC 220V	DC 24V	DC 110V	DC 125V
發光色 (Illuminating color)	赤色, 綠色, 黃色 (Red, Green, Yellow)				
定格電流 (Rating current)	20mA 이하 (below 20mA)				
絶緣抵抗 (Insulation resistance)	100MQ 이상 (above 100MQ (DC 500V, Meg))				
耐電壓 (Withstand voltage)	AC 2,000V/min				
使用周圍溫度 (Ambient temperature)	-25℃ ~ +40℃				
相對濕度 (Relative humidity)	45 ~ 85%				

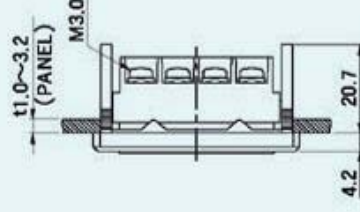
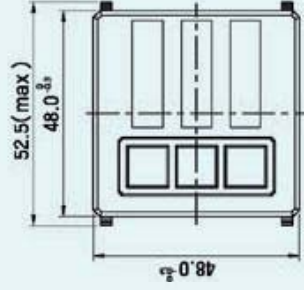
● 形式 區分圖 - Type classification diagram



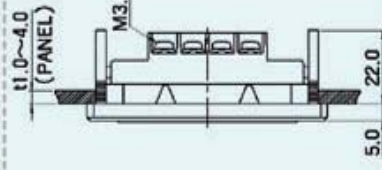
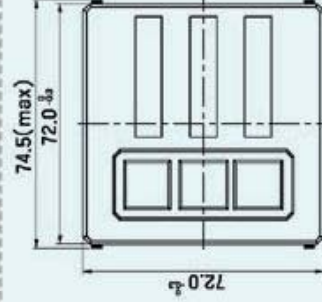
● 外形/値數圖 - Shape/Dimension Drawing

(unit : mm)

YS SL 48

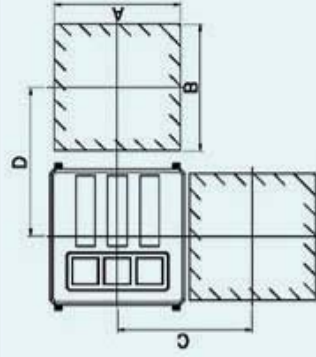


YS SL 72



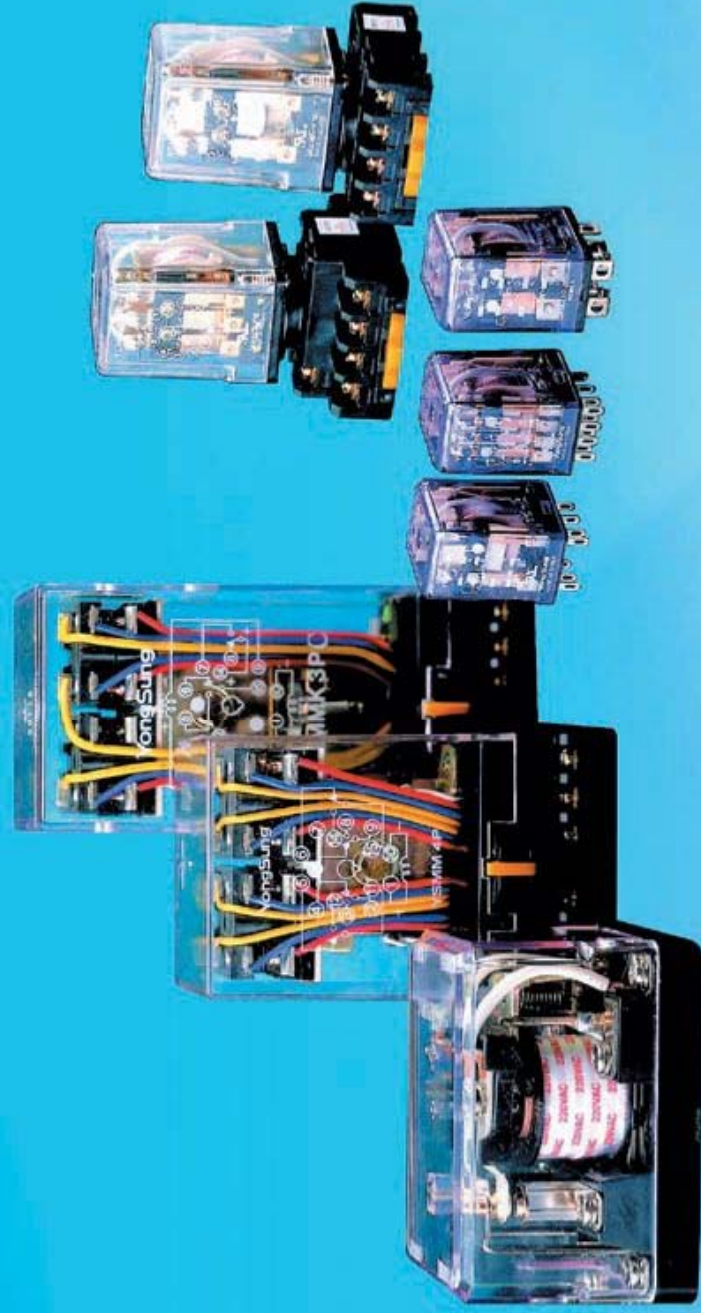
● Panel 鍺部 치수도 - Panel attachment dimension

(unit : mm)



● 치수구분표

	A	B	C	D
SL 48	$45^{+0.5}_0$	$45^{+0.5}_0$	48.0(Nmin)	53.0(Nmin)
SL 72	$67^{+0.5}_0$	$67^{+0.5}_0$	72.0(Nmin)	76.0(Nmin)



RELAYS

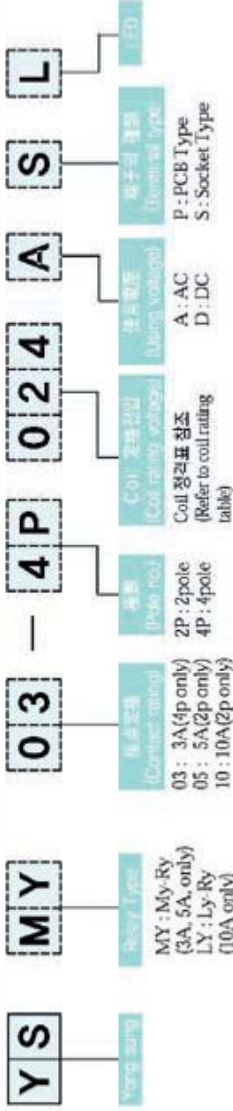
- 7-1 Mini Power Relay
- 7-2 Control Relay
- 7-3 Power Relay
- 7-4 Keep Relay

7

- 7-1 Mini Power Relay
7-2 Control Relay
7-3 Power Relay
7-4 Keep Relay

7-1

形式區分圖 - Type classification diagram



- 特徴 - Features

- With mini-size and lightness, it is suitable for complicated control circuit.
- Switching capacity can be increased by minimized size.
- For consuming small current, it is fit to semiconductor circuit.
- Variety of types makes it easier to choose the best-fit for each applications.

- 性能概要 - Performance summary

項目 (Item)	性能 (Performance)
接觸抵抗 (Contact resistance)	below 25mΩ (initial value)
絕緣抵抗 (Insulation resistance)	above 100MΩ (DC 500V, Meg)
耐電壓 (Withstand voltage)	AC 1,000V/min
壽命 (Lifetime)	AC 2,000V/min above 3,000,000times above 500,000times
動作時間 (Operating time)	below 20ms
復歸時間 (Return time)	below 20ms
耐振動 (Withstand vibration)	10~55Hz double amplitude 1.0mm
最大開閉頻度 (Max Switching frequency)	20 times/min
使用周圍溫度 (Ambient temperature)	20 times/min -25℃ ~ +40℃
相對濕度 (Relative humidity)	45 ~ 85%
重量 (Weight)	about 35g

● Coil 定格 - Coil rating

	定格電壓(V) Rating voltage	定格電流(mA) Rating current	COIL 抵抗(Ω) Coil resistance	消費電力(VA, W) (Power Consumption)	動作電壓(V) Operation voltage	復歸電壓(V) Return voltage	最大許容電壓(V) Max. allowable voltage
AC	24	196	122	2.7VA	below 80%	above 30%	110%
	110	16	3,520	1.7VA		above 10%	
	220	9.0	11,000	2.0VA			
DC	24	53	443	1.2W	below 80%		
	48	27.2	1,760	1.3W			
	110	11.7	9,400	1.4W			
	125	10	12,450	1.3W			
	220	7.1	31,000	1.6W			

※註 1. 定格電流의 許容範圍 (23℃일때) : ±15%

2. Coil 抵抗의 許容範圍 (23℃일때) : ±10%

3. LED Type은 회로에 따라 반導이 발생될 수 있으니 사용전 검토바랍니다.

※Note 1. Allowable range of rating current (at 23℃) : ±15%

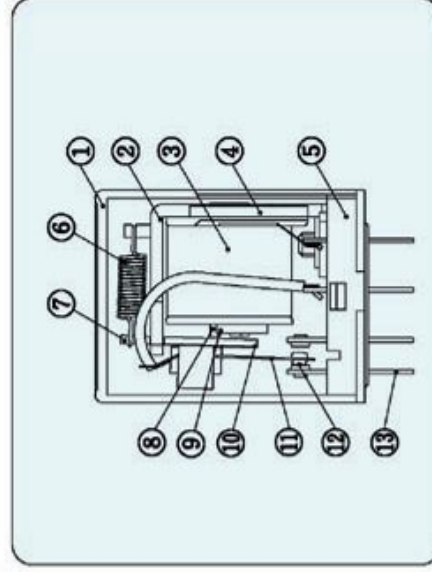
2. Allowable range of coil resistance (at 23℃) : ±10%

3. Since LED type can cause dimness according to circuits, we recommend that you examine it before use.

● 接点 定格 - Contact rating

區 分 (Classification)	極 數 (Pole No.)	接点許容電力(Contact Allowable Power)		電壓(V) voltage	定格負荷(Rating load)		定格通電電流(A) (Rating conductive current)
		抵抗負荷 (resistance load)	誘導負荷 (inductive load)		抵抗負荷 (resistance load) (COSφ=1)	誘導負荷 (inductive load) COSφ=0.4, L/R=7ms	
MY03	4	AC660VA	AC176VA	AC220V	3	0.8	3
		DC72W	DC36W	DC24V	3	1.5	
MY05	2	AC1100VA	AC440VA	AC220V	5	2	5
		DC120W	DC48W	DC24V	5	2	
LY10	2	AC1100VA	AC825VA	AC110V	10	7.5	10
		DC240W	DC120W	DC24V	10	5	

● 内部 構造圖 - Inside structure drawing



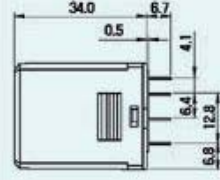
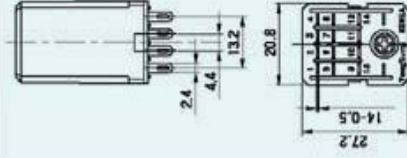
No.	部品名 (Part Names)	材質 (Materials)
1	Cover	Polycarbonate Resin
2	Frame	Carbon Steel
3	Coil	Polyurethane CopperWire
4	Bobbin	66Nylon+G/F 15% Resin
5	Base	PBT+G/F30% Resin
6	Return Spring	Stainless steel
7	Amature	Pure iron
8	Washer plate	Plate Copper
9	Shaft	Pure iron
10	Fiber	Paper
11	Moving Terminal	Phosphor bronze
12	Contact	Ag
13	Fixed Terminal	Brass

● 外形/値數圖 - Shape/Dimension Drawing

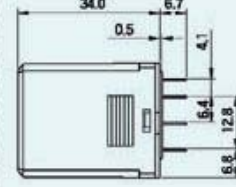
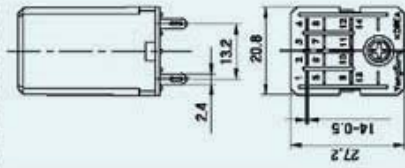
● 内部 結線圖 - Inside connection diagram

(unit:mm)

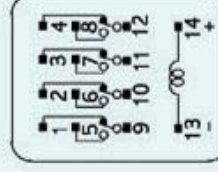
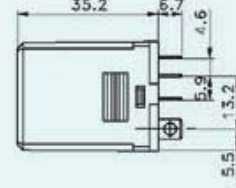
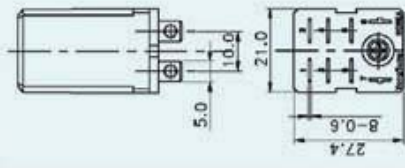
YSMY03-4P



YSMY05-2P

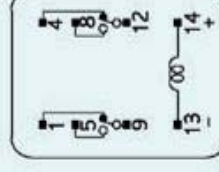


YSLY10-2P



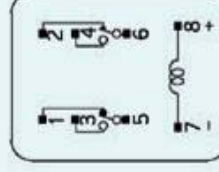
YSMY03-4P

적용소켓 : YSSKMY-4



YSMY05-2P

적용소켓 : YSSKMY-2



YSLY10-2P

적용소켓 : YSSKLY-2

Coil 定格 - Coil rating

	定格電壓(V) Rating voltage	定格電流(mA) Rating current	COIL 抵抗(Q) Coil resistance	消費電力(VA, W) Power Consumption	最大連續施加電壓 Max. continuous applied voltage	最小動作電壓 Min. operational Voltage	復歸電壓 Return Voltage
AC	24	120	68.1	2.8VA	110%	below 80%	above 30%
	110	26	1400	2.8VA			
	220	13.6	6985	2.9VA			
DC	24	90	275	2.1W	110%	below 80%	above 10%
	48	40	1224	1.9W			
	110	17	6935	1.85W			
	125	17.1	7300	2.1W			
	220	9.2	24,000	2.0W			

※註 1. 定格電流의 許容範圍 (23°C일때) : (mA) ±15%

2. Coil 抵抗의 許容範圍 (23°C일때) : (Q) ±10%

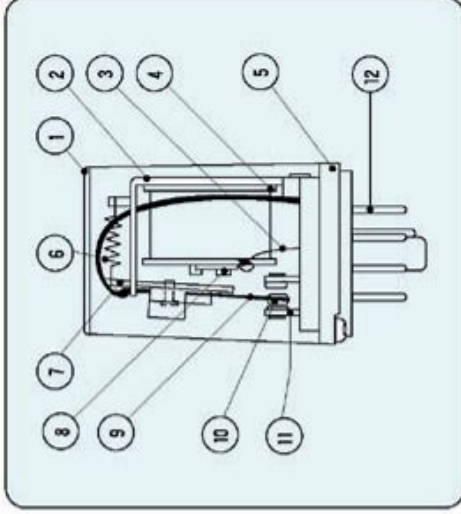
※Note 1. Allowable range of rating current (at 23°C) : (mA) ±15%

2. Allowable range of coil resistance (at 23°C) : (Q) ±10%

接点 定格 - contact rating

區 分 (Classification)	最大接点容量(Max. Contact Capacity)					定格通電電流(A) (Rating conductive current)
	接点許容電力(Contact Allowable Power)		電壓(V) voltage	定格負荷(Rating load)		
	抵抗負荷 (resistance load)	誘導負荷 (inductive load)		抵抗負荷 (resistance load) (COSφ=1)	誘導負荷 (Inductive load) (COSφ=0.4, L/R=7ms)	
MR07	AC1540VA	AC660VA	AC220V	7	3	7
	DC120W	DC96W	DC24V	5	4	
MR05	AC1100VA	AC440VA	AC220V	5	2	5
	DC72W	DC60W	DC24V	3	2.5	

内部 構造圖 - Inside structure drawing



No.	部品名 (Part names)	材質 (Materials)
1	Cover	Polycarbonate Resin
2	Frame	Carbon Steel
3	Coil	Copper Wire
4	Bobbin	Nylon 66+G/F 15% Resin
5	Plug	Phenol Resin
6	복귀 Spring (Return spring)	Stainless 鋼 (Stainless steel)
7	Amateure	Pure iron
8	Shaft	Pure iron
9	유동단자 (Swing terminal)	Phosphor bronze
10	접点 (Contact)	Ag
11	고정단자 (Fixed terminal)	Brass
12	리드단자 (Lead terminal)	Brass

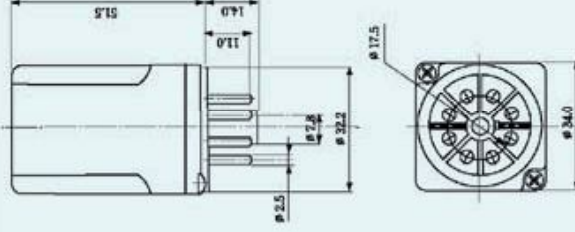
外形/値數圖 - Shape/Dimension Drawing

内部 結線圖 - Inside connection diagram

릴레이

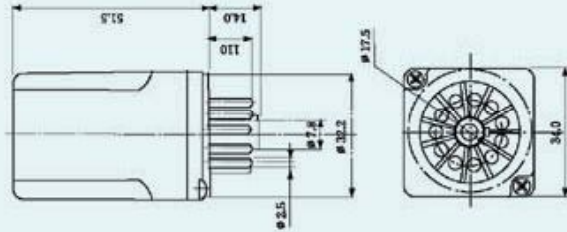
(unit : mm)

YSMR07-2P

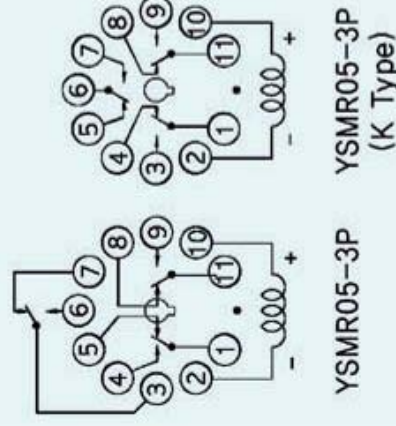
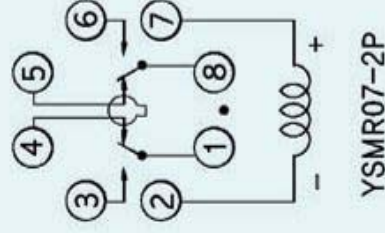


적용소켓 : YSSK-08

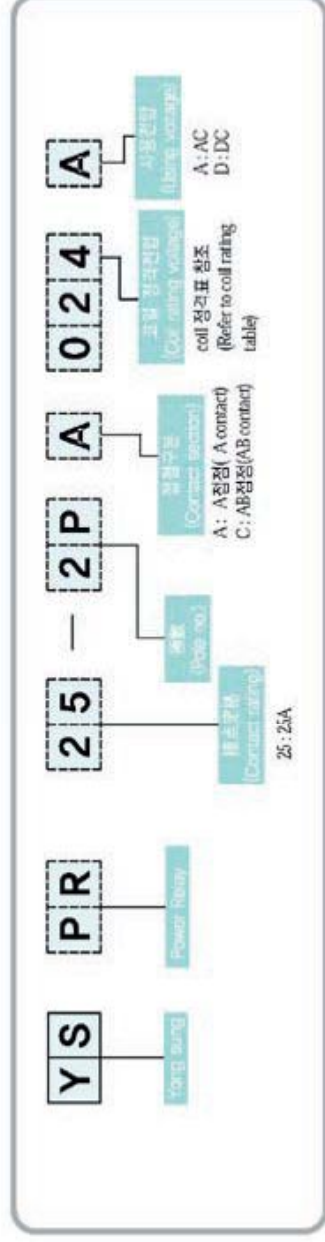
YSMR05-3P



적용소켓 : YSSK-11



• 形式 區分圖 - Type classification diagram



• 特徵 - Features

- 25A의 電流를 開閉할 수 있는 大容量 릴레이입니다.
- 冷蔵庫, 電氣溫水器, 乾燥裝置, 單相모타 起動用으로 널리 使用되고 있습니다.
- A relay with large capacity for possible switching of 25A.
- Widely used for refrigerator, electric water-warming device, dry machine, single - phase motor starting .

• 性能 概要 - Performance summary

項 目 (Item)	性 能 (Performance)
接觸抵抗 (Contact resistance)	below 25mΩ (initial value)
絕緣抵抗 (Insulation resistance)	above 100MΩ (DC 500V.Meg)
耐電壓 (Withstand voltage)	AC2,000V/min
壽命 (Lifetime)	機械的 (mechanical) 電氣的 (electrical)
動作時間 (Operating time)	above 5,000,000times (20times/min)
復歸時間 (Return time)	above 250,000times (20times/min)
耐振動 (Withstand vibration)	below 30ms
使用周圍溫度 (Ambient temperature)	below 30ms
相對濕度 (Relative humidity)	10~55Hz double amplitude 1.0mm
重量 (Weight)	-25℃ ~ +40℃
	45 ~ 85%
	about 300g

• Coil 定格 - Coil rating

定格電壓(Rating voltage)V	定格電流(Rating current)mA	Coil 抵抗(Coil resistance)Ω	消費電力(VA, W)(Power Consumption)
AC 24	390	13.3	2.8VA
AC 110	120	210	2.9VA
AC 220	70	97	3.0VA
DC 24	102	235	2.4 W
DC 110	24	4600	2.64W
DC 125	22.7	5500	2.83W

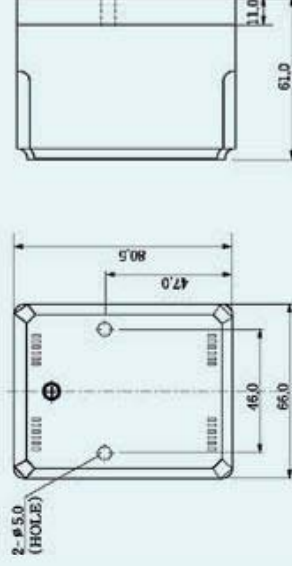
• 接点 定格 - Contact Rating

最大接点容量 (Max. Contact Capacity)					定格通電電流 (A) (Rating conductive current)
接点許容電力 (Contact Allowable Power)		電壓(V) voltage	定格負荷 (Rating load)		
抵抗負荷 (resistance load)	誘導負荷 (inductive load)		抵抗負荷 (resistance load) (COSφ=1)	誘導負荷 (Inductive load) (COSφ=0.4, L/R=7ms)	
AC5,500VA DC288W	AC3,300VA DC144W	AC220V	25	15	25
		DC 24V	12	6	

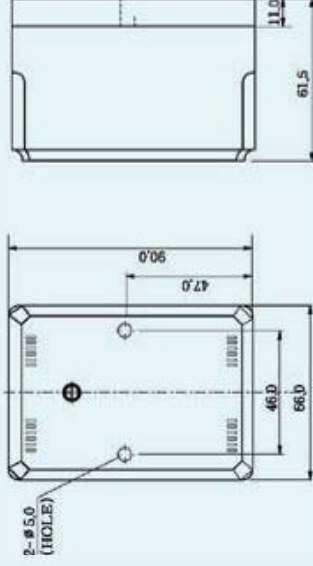
• 外形/値数圖 - Shape/Dimension Drawing

(unit : mm)

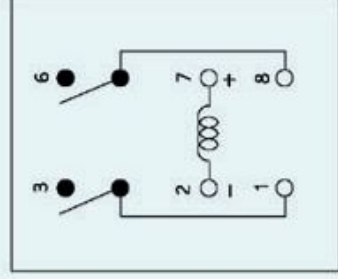
YSPR 25-2PA



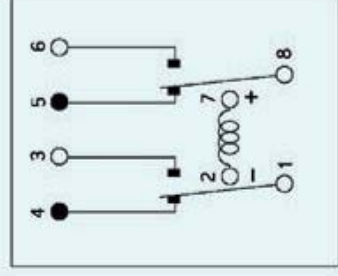
YSPR 25-2PC



• 内部 結線圖 - Inside connection diagram



2PA



2PC

• Coil 定格 - Coil rating

SET COIL

定格電壓(V) (Rating voltage)	項目 (Item)	定格電流(mA) (Rating current)		Coil 抵抗(Ω) (Coil resistance)		消費電力(VA, W) (Power Consumption)		SET電壓 (Set voltage)	最大許容 電壓(Max. allowable voltage)	復歸電壓 (return voltage)
	形式 (Type)	MMK形 (MMK type)	MM形 (MM type)	MMK形 (MMK type)	MM形 (MM type)	MMK形 (MMK type)	MM形 (MM type)	定格電壓에 대한 比率 (Ratio against rating voltage)	定格電壓에 대한 比率 (Ratio against rating voltage)	MM形 (MM type)
AC	24		265			—	6.36VA	MMK type	MMK type MM type 110% above 30%	
	110	14	80	106	1375	15.6VA	8.8VA	MM type below 80%		
	220	70	30	450	7333	15.4VA	6.6VA	MMK type below 80%		
DC	24	152	161	162	150	—	2.71W	MMK type below 80%		
	48	57	51.6	930	930	3.58W	3.87W	MM type below 80%		
	110	28	24.9	3548	4400	2.69W	2.47W	MM type below 70%		
	125	28.5	22.3	4560	5600	3.15W	2.72W			

RESET COIL

定格電壓(V) Rating voltage	項目 Item	定格電流(mA) (Rated current)(mA)		Coil抵抗(Ω) (Coil resistance)(Ω)		消費電力(VA, W) (Power Consumption)		RESET電壓 (Reset voltage)	最大許容電壓 (Max. allowable voltage)
								定格電壓에 대한 比率 Ration against rating voltage	
AC	110	58.7		420		6.45VA		below 80%	110%
	220	29		1525		6.38VA			
DC	24	179		140		4.19W			
	48	52.9		832		2.49W			
	110	36.4		3055		3.94W			
	125	33.6		3800		4.19W			

※注 : 1. 定格電流, Coil 抵抗은 Coil 溫度가 23℃일 때의 값으로서 許容公差는 AC定格電流 : +15%, -20%이며,
DC Coil 抵抗은 ±15%입니다.
2. 動作特性은 Coil 溫度가 23℃에서의 特性値입니다.

※Note : 1. As rating current and coil resistance are the value at 23℃ of coil temperature, its allowable tolerance is
AC rating current : +15% ~ -20% and DC coil resistance : ±15%
2. Operating characteristics is the value at 23℃ of coil temperature.

● 性能 概要 – Performance Summary

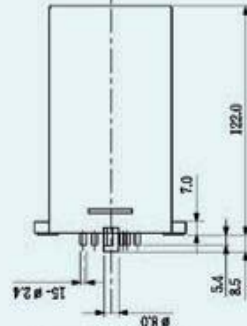
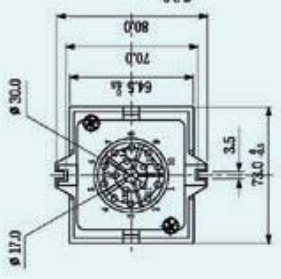
項 目 (Item)		性 能 (Performance)	
		MMK4P	MM4P
接觸抵抗 (Contact resistance)		below 25mΩ (initial value)	
耐電壓 (Withstand voltage)		AC2,000V/min	
絕緣抵抗 (Insulation resistance)		above 100MΩ (DC500V.Meg)	
SET	時 間 (time)	AC : below 30ms DC : below 60ms	-
	最小 PULSE 幅 (Min. PULSE width)	AC, DC 100ms	-
RESET	時 間(time)	below 30ms	-
	最小 PULSE 幅 (Min. PULSE width)	AC, DC below 100ms	-
動作時間 (Operating time)		-	below 50ms
復歸時間 (Return time)		-	below 50ms
耐振動 (Withstand Vibration)	耐 久 (endurance)	10~55Hz 復振幅 0.75mm (double amplitude)	10~55Hz 復振幅 1.5mm (double amplitude)
	誤動作 (malfunction)	10~35Hz 復振幅 1mm (double amplitude)	10~55Hz 復振幅 1mm (double amplitude)
耐衝擊 (Withstand Impact)	耐 久 (endurance)	500 m/s ² (about 50G)	1,000 m/s ² (about 100G)
	誤動作 (malfunction)	50 m/s ² (about 5G)	100 m/s ² (about 10G)
壽 命 (Lifetime)	機械的 (mechanical)	about 1,000,000 times	
	電氣的 (electrical)	above 500,000 times	
最大開閉頻度 (Max. switching Frequency)	機械的 (mechanical)	30 times/min	
	電氣的 (electrical)		
使用周圍溫度 (Ambient temperature)		-25°C ~ +40°C	
相對濕度 (Relative humidity)		45% ~ 85%	
重 量 (Weight)		about 470g	about 350g

● 外形/值數圖 – Shape/Dimension Drawing

(unit : mm)

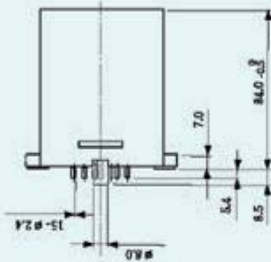
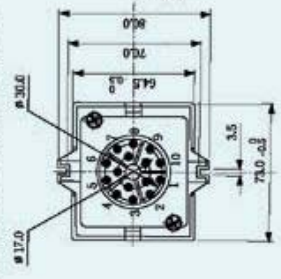
Y5MMK-4P

YSMMK-4P
(주)적용 socket(Applied socket) : YSSK14-K

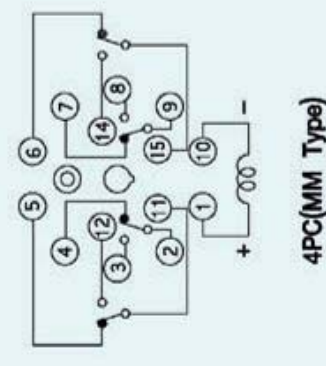
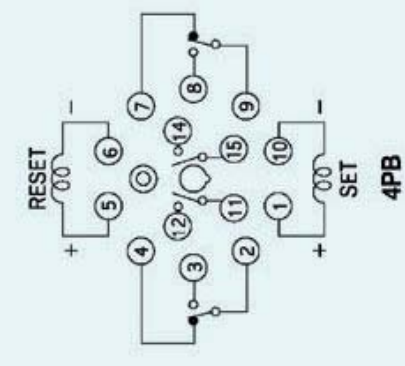
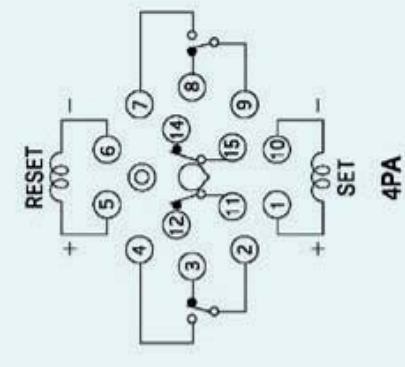


YSMM-4P

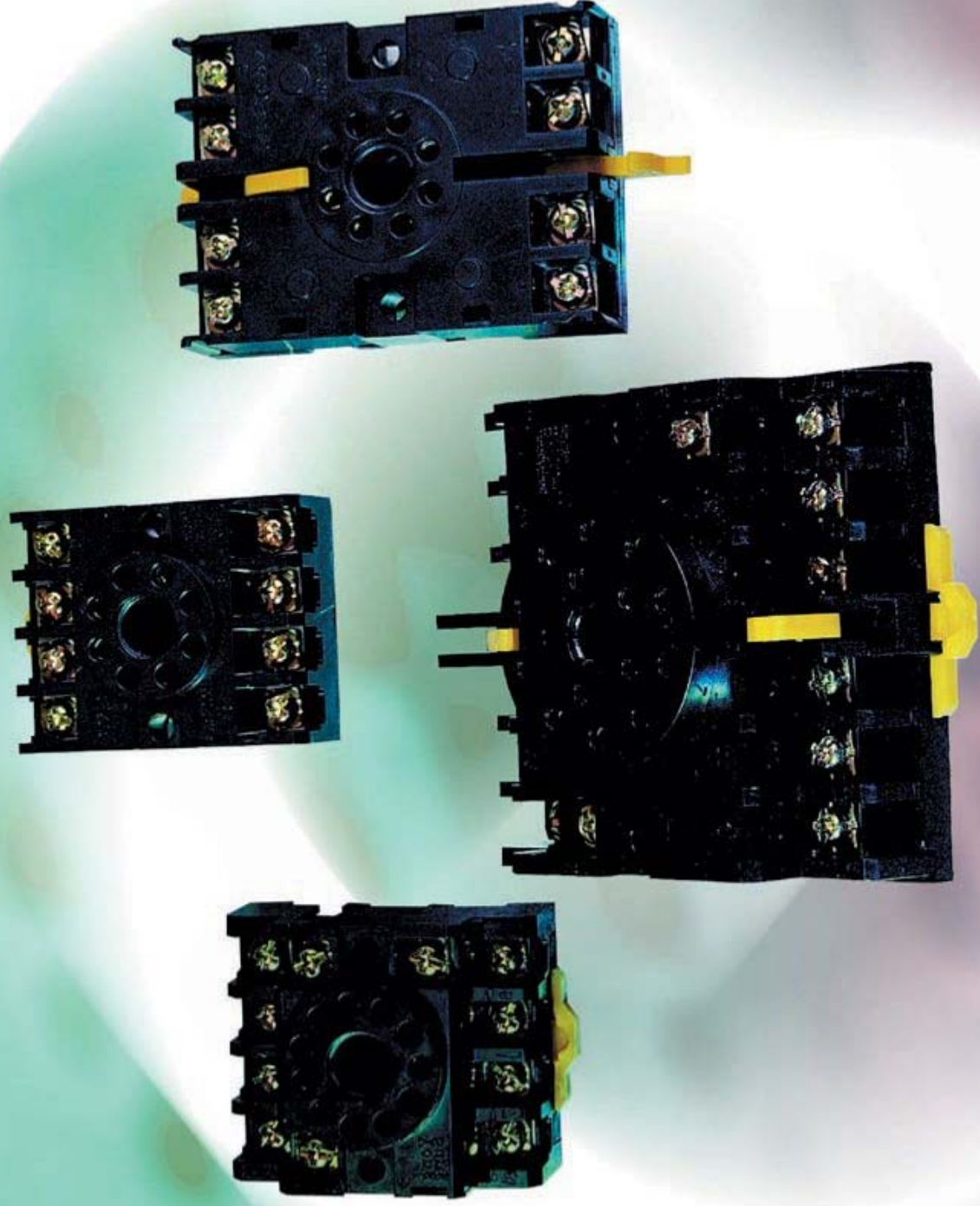
YSMM-4P
(適用) : YSSK14-K



● 內部結線圖 - Inside Connection diagram



SOCKETS

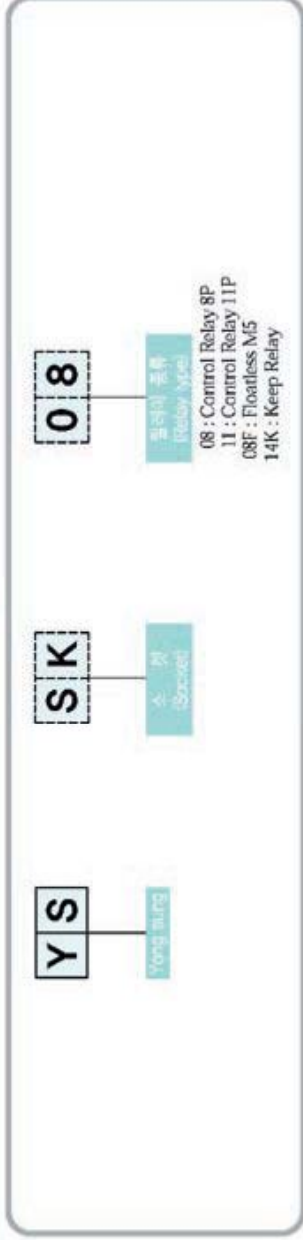


8 소켓 SOCKETS

• 特徴 - Features

- 몸체(Body)는 ABS 난연 Resin으로 成形하여 耐熱 및 絶緣에 强합니다.
- Plug 받아는 圓筒形을 이루고 製作되어 接觸信賴度가 높고 維持力이 保持됩니다.
- Body composed of ABS flame retardant ABS resin is very strong against heat resistance and insulation.
- Plug plate with a cylinder type has high contact reliability and ensured holding power.

• 形式 區分圖 - Type classification diagram



• 部品 材質 - Part materials

부 품 (Part)	材 質 (Materials)	
	SK08	SK11
몸 체 (Body)	ABS난연 (Frame retardant ABS Resin)	SK08-F
단 자 (Terminal)	인청동(phosphor bronze)	
볼 트 (Bolt)	MSWR3-Zn Plating	

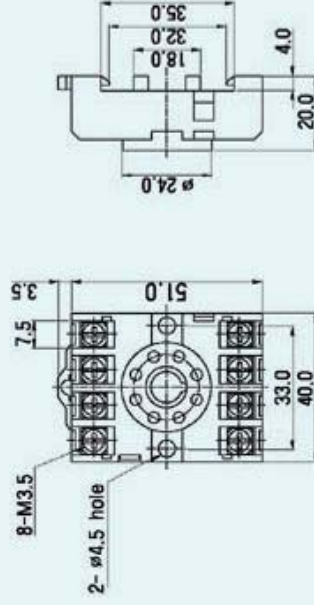
• 性能 概要 - Performance summary

項 目 (Item)	性 能 (Performance)
絶緣抵抗 (Insulation resistance)	above 100MQ (DC 500V. Meg)
耐電壓 (Withstand voltage)	AC2,000V/min(50~60Hz)
定格絶緣電壓 (Rating Insulation voltage)	AC/DC 250V

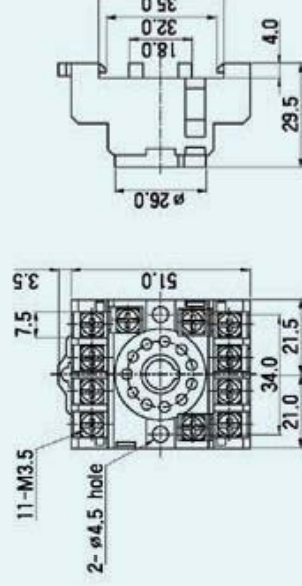
● 外形/値數圖 - Shape/Dimension Drawing

(unit : mm)

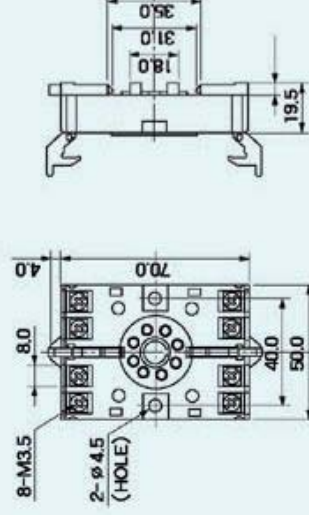
YSSK08



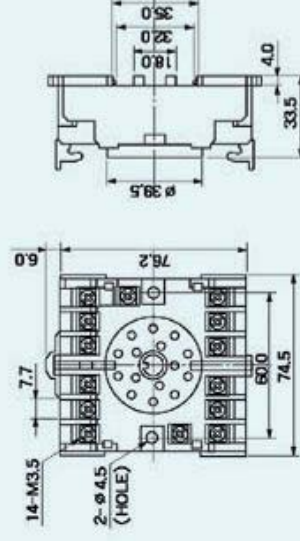
YSSK11



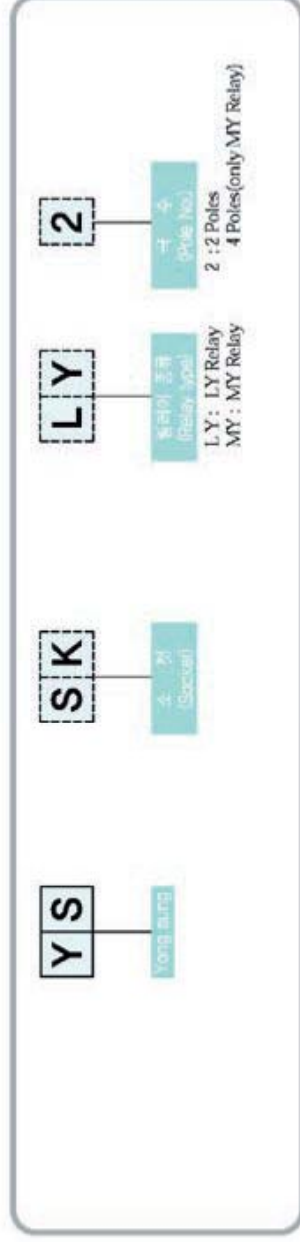
YSSK08-F(FLOATLESS M5用)



YSSK 14-K(KEEP RELAY 用)



● 形式 區分圖 - Type classification diagram



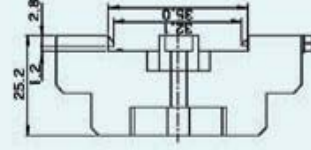
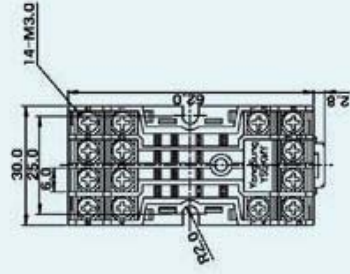
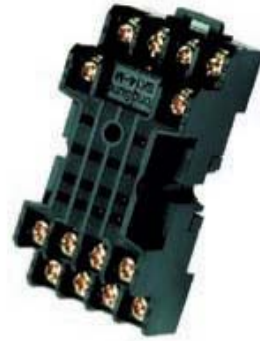
● 部品 材質 - Part materials

부 품 (Part)	材 質 (Materials)	
UPPER CASE	SK MY-2	SK LY-2
UNDER CASE	ABS난연 (Frame retardant ABS Resin)	
소켓단자 (Socket Terminal)	인청동 (phosphor bronze)-Ni Plating	
단 자 (Terminal)	탄소강(Carbon Steel)-Zn Plating	
볼 트 (Bolt)	탄소강(Carbon Steel)-Zn Plating	

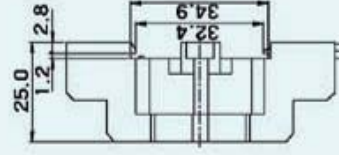
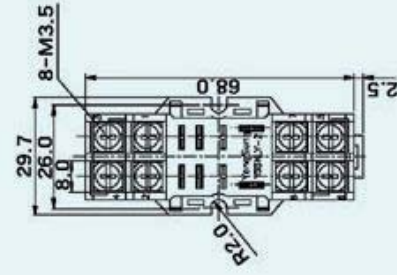
● 性能 概要 - Performance summary

項 目 (Item)	性 能 (Performance)
絶縁抵抗 (Insulation resistance)	above 100MΩ (DC 500V. Meg)
接觸抵抗 (Contact resistance)	below 25mΩ (initial value)
耐電壓 (Withstand voltage)	AC2,000V/min(50~60Hz)
定格絶縁電壓 (Rating Insulation voltage)	AC/DC 250V
使用周圍溫度 (Ambient temperature)	-25℃ ~ +40℃
相對濕度 (Relative humidity)	45 ~ 85%

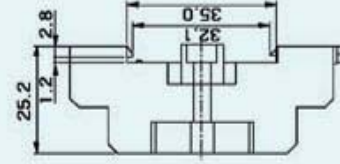
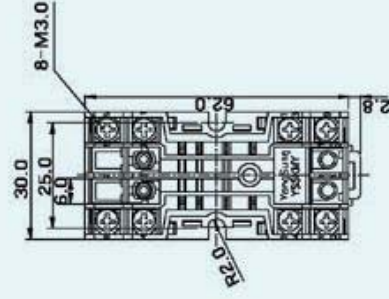
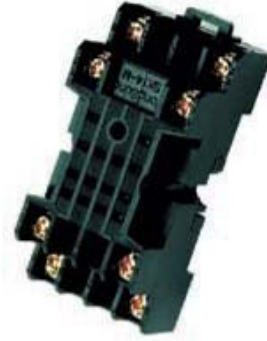
YSSK MY-4

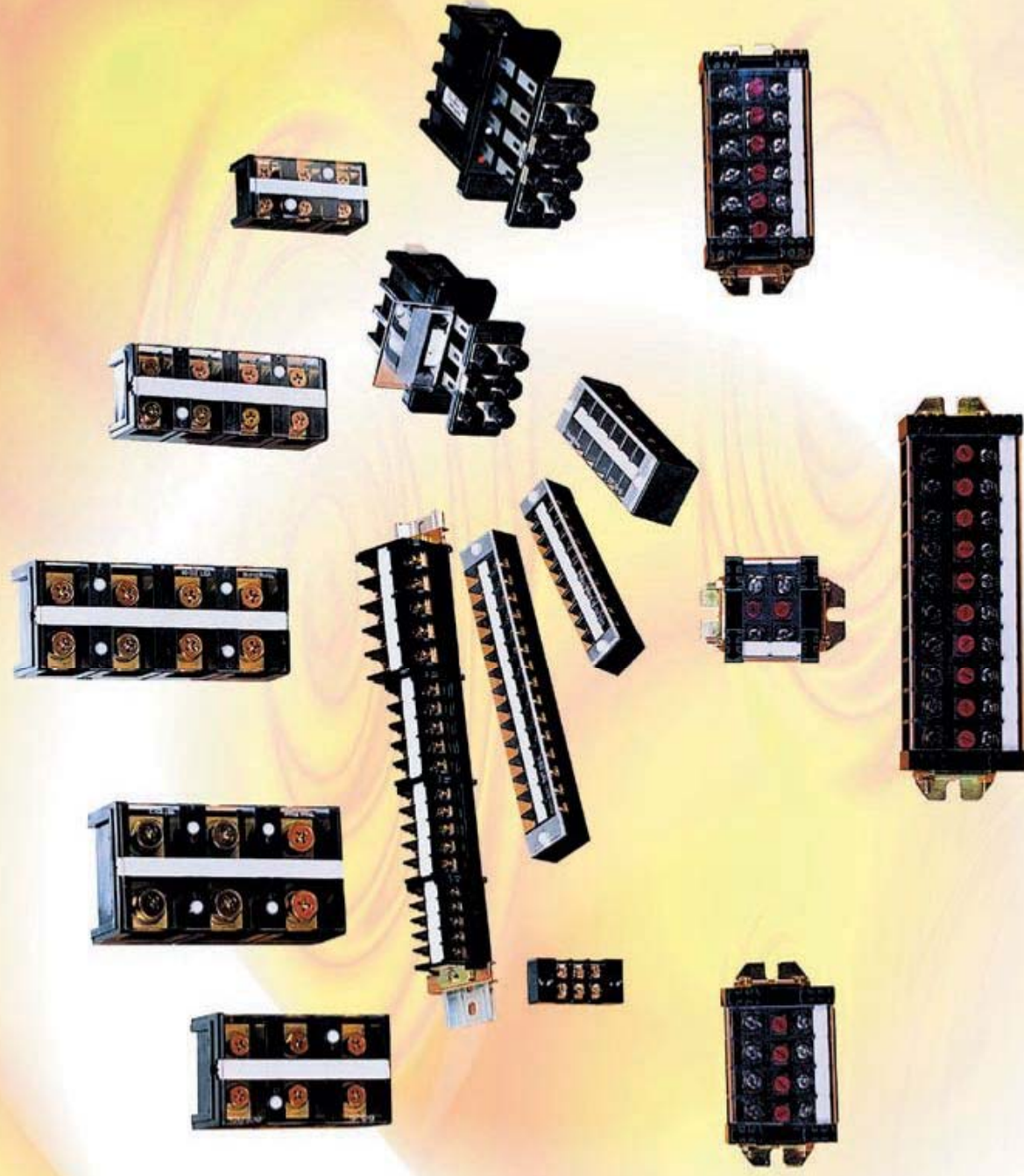


YSSK LY-2



YSSK MY-2





TERMINAL BLOCKS

- 9-1 Test Terminal Block
- 9-2 Common Terminal Block
- 9-3 Fixing Terminal Block
- 9-4 Assembly Terminal Block

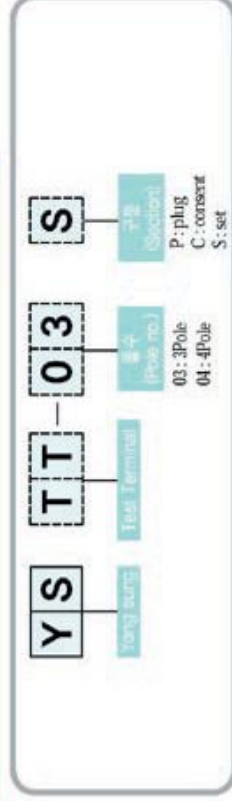
9 단자대류 TERMINAL BLOCKS

- 9-1 시험용 단자대
- 9-2 단락회로부 단자대
- 9-3 고정식 단자대
- 9-4 조립식 단자대

- 9-1 Test Terminal
- 9-2 Common Terminal block
- 9-3 Fixing Terminal block
- 9-4 Assembly Terminal block

9-1 시험용 단자대 Test Terminal Block

• 形式 區分圖 - Type classification diagram



• 特徴 - Features

- 端子는 Plug 插入時 回路가 열리지 않도록 接觸子를 設置한 安全한 構造로 되어 있습니다.
- 接觸子의 接觸은 Spring에 依한 情力形이므로 信頼性이 높습니다.
- 成形 材質은 ABS를 使用하였으므로 絶緣性, 耐衝擊性이 優秀합니다.
- 端子의 種類는 3P, 4P로 區分되어 있습니다.
- Terminal is of the safe construction installed auxiliary contactor preventing circuit opening when plug inserting.
- As contacting of contactor is coasting type by spring, reliability is high.
- With using ABS resin of molding material, insulation and impact resistance are excellent.
- Terminal types are divided into 3P, 4P.

• 性能 概要 - Performance summary

形式 (Type)	用途 (Application)	定格 (Rating)	性能 (Performance)
YSTT-03S	電流用 (for current) 電壓用 (for voltage)	AC250V 10A	絶緣 저항 (Insulation resistance) : above 100MΩ IDC 500V, Meg 내전압 (Withstand voltage) : AC 2,500V/min 온도상승 (Temperature rise) : below 30℃
YSTT-04S	→ 公용 (common use)		기계적 수명 (Mechanical lifetime) : above 100,000 times

• 外形/值數圖 - Shape/Dimension Drawing

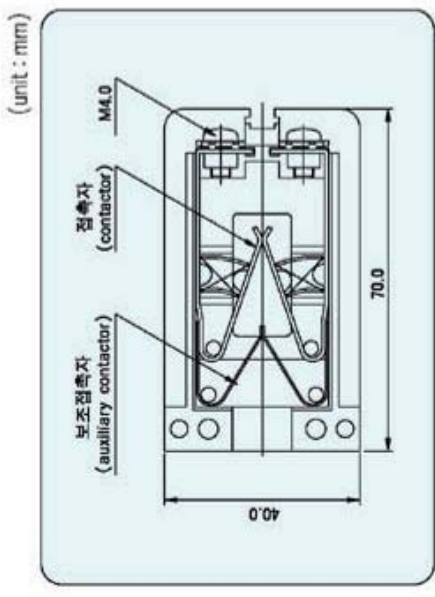
(unit : mm)

	3P	4P
A	54.8	72.8
B	88.0	106.8

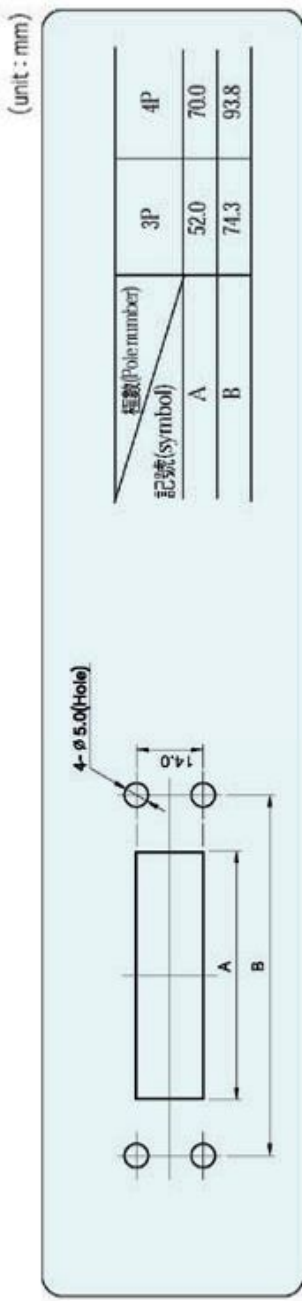
● 構造 説明 - Structure explanation

Plug을挿入하면補助接觸子が開放되어도接觸子は開放되지 않는構造로서, Plug가接觸子を開放하기前に補助接觸子が Plug와連結되므로回路가開放되는일이 없고平常時には補助接觸子が接觸子の接觸を保護해 주는役割을합니다.

As the structure which contactor is not opened even if auxiliary contactor opened when plugging in, circuit is never opened since auxiliary contactor is connected to plug before opening contactor by plug and, in normal time, auxiliary contactor plays a protective role of contactor's contacting.



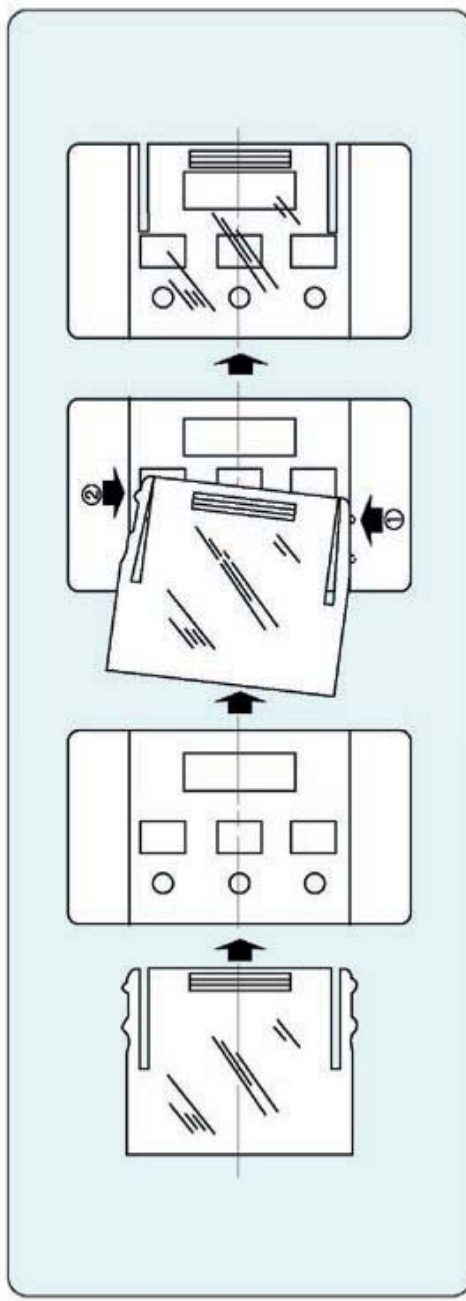
● PANEL 取付値數 - Panel attachment dimension



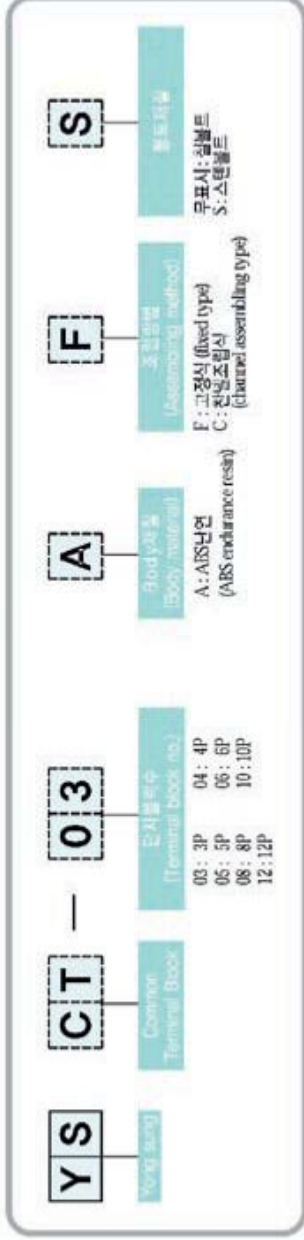
● Front Cover 組立方法 - How to assemble Front Cover

- ① 노출된 부분을 홈에 삽입한다.
- ② 화살표 부분을 누르면서 비스듬히 밀어넣는다.

- ① Insert the exposed part to groove.
- ② With pushing on the arrow part, push into diagonally.



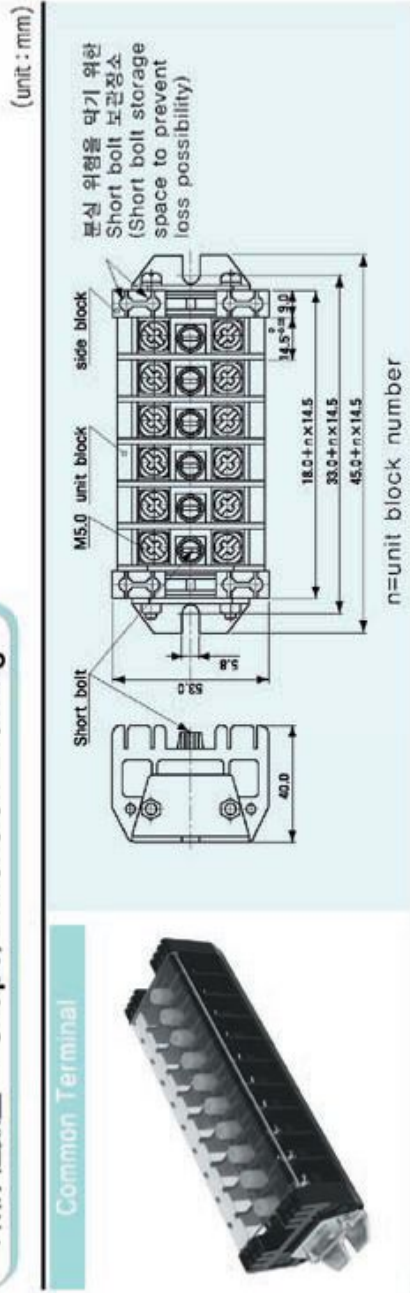
• 形式 區分圖 - Type classification diagram



• 特徵 - Features

- YS CT 端子台는 Short bolt使用에 의하여 CT回路의 短絡을 자유로이 行할 수 있으며 Shot bolt를 使用하지 않을 때에는 양쪽의 Side block에 保管할 수 있도록 便利한 構造로 되어 있습니다.
- 組立式으로 되어 있기 때문에 必要한 回路數에 따라 Unit block을 増減할 수 있어 經濟的입니다.
- 고정식과 채널 조립식으로 구성되어 있습니다.
- YS CT terminal block does short circuit of CT circuit freely by using short bolt and is of convenient structure which can keep short bolt in both side blocks when not using.
- Due to assembling type, it is economical as unit block can be increased/decreased acc. to circuit number required.
- Consist of fixed type and channel assembling type.

• 外形/值數圖 - Shape/Dimension Drawing

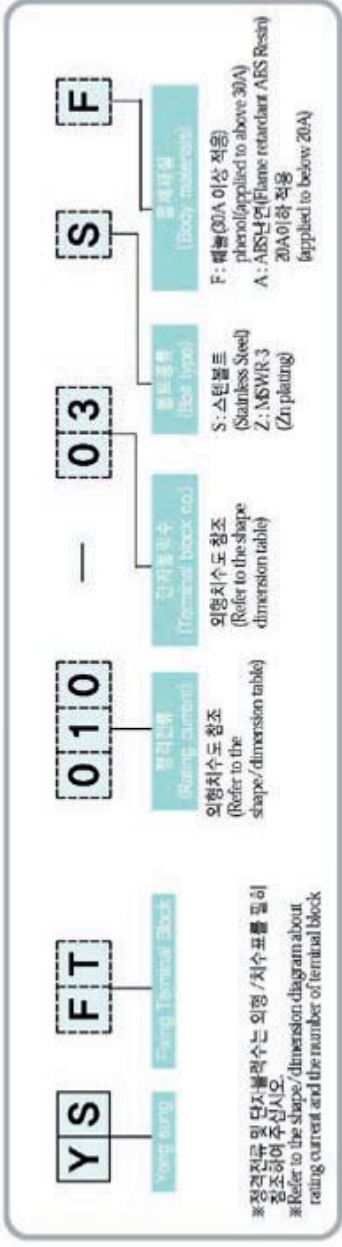


• 性能 概要 - Performance summary

項 目 (Item)	性 能 (Performance)
定格絶緣電壓 (Rating insulation voltage)	600V Max.
定格適合電線 (Rating suitable wire)	5.5mm ²
定格電流 (Rating Current)	30A
絶緣抵抗 (Insulation resistance)	above 100MΩ (DC 500V. Meg)
耐電壓 (Withstand voltage)	AC 2,500V/min
使用周圍溫度 (Ambient temperature)	-25℃ ~ +40℃
相對濕度 (Relative humidity)	45 ~ 85%

9-3 고정식 단자대 Fixing Terminal Block

• 形式 區分圖 - Type classification diagram

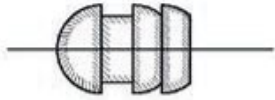


• 特徴 - Features

- 고정식 단자를 10A~300A까지 개발하여 제품의 질을 높이고 작업에 불편한 점을 개선하여 카바에도 훅크 핀을 부착하였고 투명도가 좋아 사용하기에 편리합니다.
- The development of fixing type terminals to 10A~300A increases the product quality and, hook pin is attached to cover in order to improve inconvenience at working and with good transparency it is convenient for use.

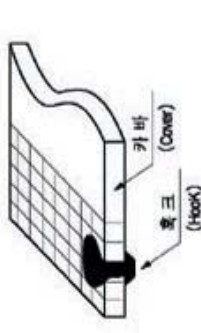


- 단자대 카바 (Cover of terminal block)
투명재질로 만들어져 단자대에 표시한 번호판 문자의 식별이 보다 쉬워졌습니다.
With transparent materials, the letter distinction on number plate becomes easier.

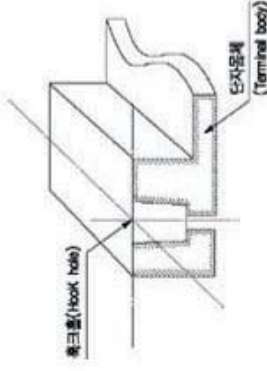


- 훅크 핀 (Hook pin)
카바 고정핀으로 훅크타입으로 카바를 열고 달기가 아주 편리할 뿐만 아니라 견고하게 부착되어 심한 진동에도 잘 견딜 수 있도록 용성 특유의 설계로 제작되었습니다.
As cover fixing pin, Yongsung makes with specific design so that this can be well endurable with firm mounting even if serious vibration is applied as well as cover opening/closing is very convenient due to hook type.

- 번호판 (Number plate)



훅크핀이 카바에 고정된 모양
(The figure of hook pin fixed on cover)

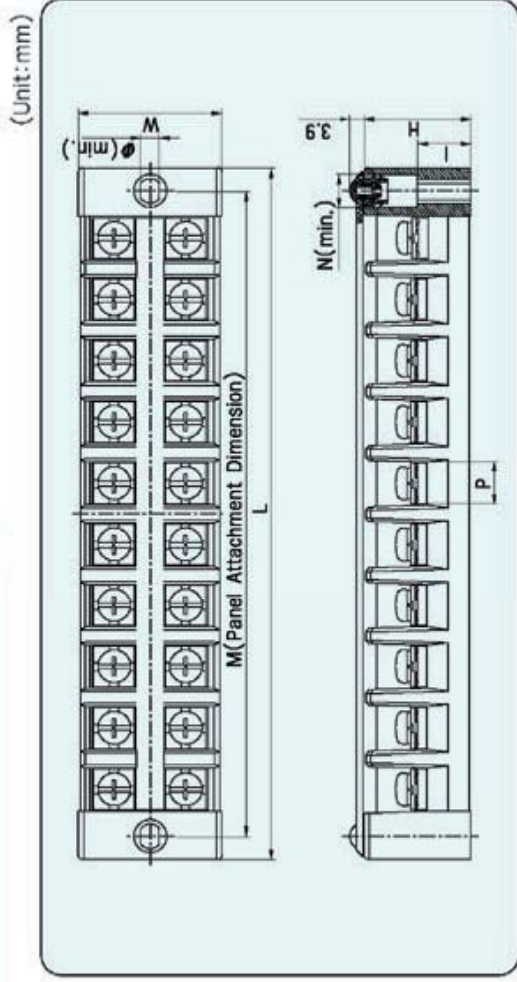


훅크핀이 카바에 고정되어 있으며 단자대 몸체에 훅크 핀 끼듯이 끼웁니다.
(As hook is fixed on cover, it is put into body of terminal block like inserting.)

● 部品材質 - Part materials

部 品 (Part)	材 質 (Materials)
몸 체 (Body)	열경화성 페놀수지, 난연ABS (Thermosetting Phenol resin, Flame retardant ABS resin)
端 子 (Terminal)	黃 銅 (Brass)
볼 트 (Bolt)	MSWR-3, STS (option)
카 바 (Cover)	AS 수지 (AS resin)

● 外形/值數表 - Shape/Dimension table



10A



(unit : mm)

15A



형식(TYPE)	N(min)	L	W	I	H	P	Ø (min.)	M	적용적합전선 (Suitable Wire)	단자볼트 (Terminal Bolt)	조임토크 (Torque)
YSFT010-02	Ø8.0	52	24	3.5	13	8.2	4.0	42	1.25mm ²	M3.5	8kgf·cm
YSFT010-03											

20A



형식(TYPE)	N(min)	L	W	I	H	P	Ø (min.)	M	적용적합전선 (Suitable Wire)	단자볼트 (Terminal Bolt)	조임토크 (Torque)
YSFT015-06	Ø8.0	87	24	5.0	19	8.7	4.0	76.5	2mm ²	M3.5	8kgf·cm
YSFT015-10		131						121.5			

형식(TYPE)	N(min)	L	W	I	H	P	Ø (min.)	M	적용적합전선 (Suitable Wire)	단자볼트 (Terminal Bolt)	조임토크 (Torque)
YSFT020-03	Ø8.0	56						45	2mm ²	M4.0	12kgf·cm
YSFT020-04		67						56			
YSFT020-06		89						78			
YSFT020-10		136	30.2	5.0	20	8.7	4.0	124.5			
YSFT020-12		162						150.5			
YSFT020-15	Ø8.0	200						188			
YSFT020-20		257						245			

● 外形/値數表 - Shape/Dimension table

(unit : mm)

30A



형식(TYPE)	N(min)	L	W	I	H	P	Ø	M	적용적합전선 (Suitable Wire)	단자볼트 (Terminal Bolt)	조임토크 (Torque)
YSFT030-03	Ø8.0	67	35	13	26	10.3	4.0	54.5	3.5mm ²	M4.5	15kgf·cm
YSFT030-04		79						68.0			
YSFT030-06		102.5						91.0			
YSFT030-10		156						144			

50A



형식(TYPE)	N(min)	L	W	I	H	P	Ø	M	적용적합전선 (Suitable Wire)	단자볼트 (Terminal Bolt)	조임토크 (Torque)
YSFT060-03	Ø7.5	84	41	20	32.5	15.5	5.0	27.5	14mm²	M6.0	25kgf·cm
YSFT060-04		111						55.0			

100A



형식(TYPE)	N(min)	L	W	I	H	P	Ø	M	적용적합전선 (Suitable Wire)	단자볼트 (Terminal Bolt)	조임토크 (Torque)
YSFT100-03	Ø11.5	105	55.5	23	39	23	5.0	35	38mm²	M8.0	60kgf·cm
YSFT100-04		137						70			

150A



형식(TYPE)	N(min)	L	W	I	H	P	Ø	M	적용적합전선 (Suitable Wire)	단자볼트 (Terminal Bolt)	조임토크 (Torque)
YSFT150-03	Ø11.5	116	67.5	26	44	26	7.0	38.5	60mm²	M8.0	60kgf·cm
YSFT150-04		154						77.5			

200A



형식(TYPE)	N(min)	L	W	I	H	P	Ø	M	적용적합전선 (Suitable Wire)	단자볼트 (Terminal Bolt)	조임토크 (Torque)
YSFT200-03	Ø11.5	134.5	73	29.5	47	29	6.5	45	100mm²	M10.0	100kgf·cm
YSFT200-04		186.5						90			

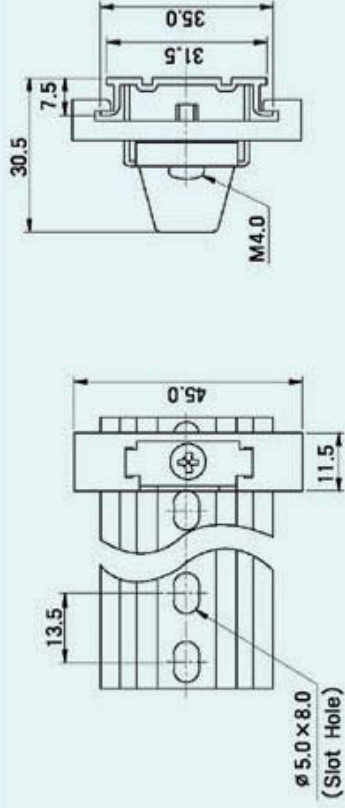
300A



형식(TYPE)	N(min)	L	W	I	H	P	Ø	M	적용적합전선 (Suitable Wire)	단자볼트 (Terminal Bolt)	조임토크 (Torque)
YSFT300-03	Ø12.5	155	83	33.5	52	33.7	8.0	51.5	200mm²	M12.0	120kgf·cm
YSFT300-04		207						103.5			

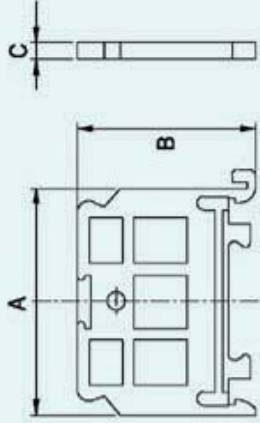
• 채널/스톱퍼 치수도 - Channel/Stopper dimension drawing

(unit: mm)



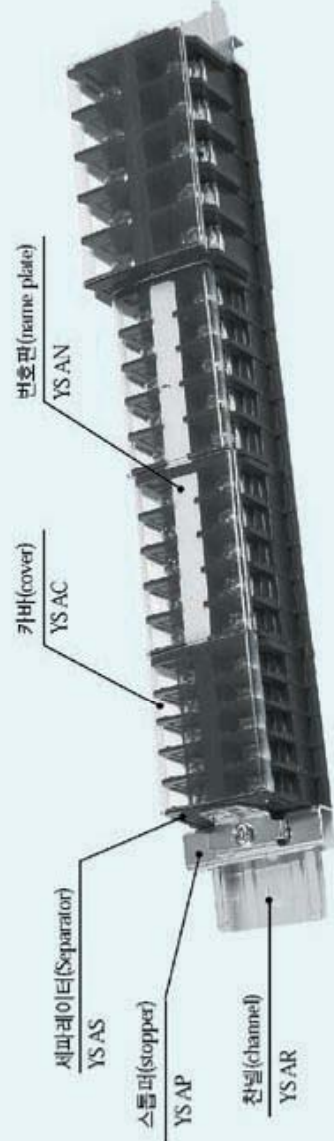
• 세파레이터 値數圖 - Separator dimension

(unit: mm)

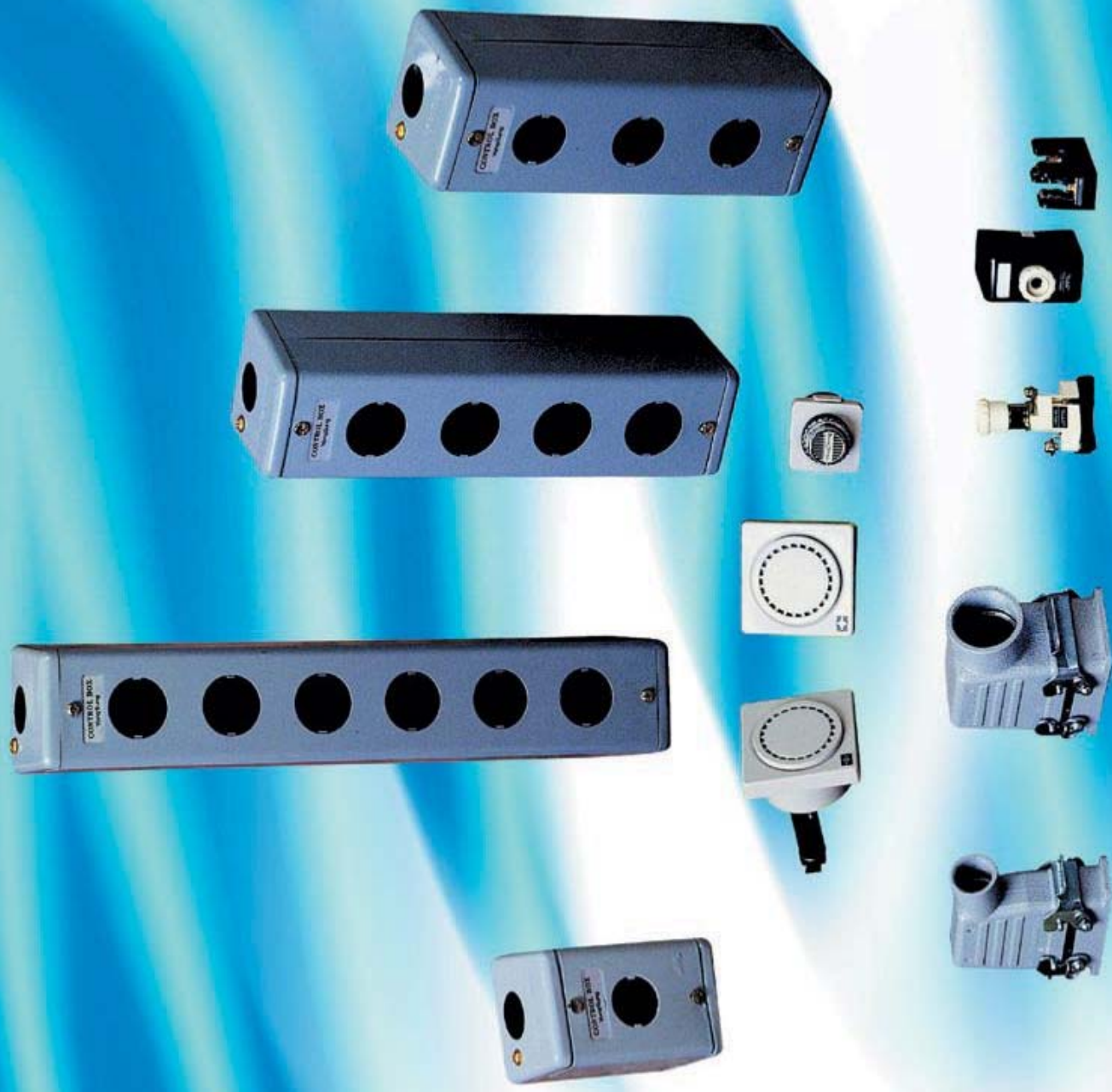


구분	15A	25A	35A	60A
A	38.0 ^{+0.1} ₀	38.0 ^{+0.1} ₀	38.0 ^{+0.1} ₀	45.0 ^{+0.1} ₀
B	30.0	30.0	32.0	42.0
C	3.0			

• 부속품 - Accessories



- (주) 1. 채널의 YSAR-1은 IM용, YSAR-2는 2M용입니다.
 2. 세파레이터는 YSAS-1: 15A, 25A공용, YSAS-2: 35A, YSAS-3: 60A용입니다.
 3. 키바의 YSAC-1: 15A~35A용, YSAC-2는 60A용입니다.
 4. 스톱퍼의 볼트 재질은 YSAP-1: MSWR-3, Y SAP-2: STS입니다.
 (note) 1. Channel YSAR-1 is used for IM, Y SAR-2 is for 2M.
 2. Separator YSAS-1: for 15A, 25A common use, YS AS-2: for 35A, YS AS-3: for 60A
 3. Cover YSAC-1: for 15A~35A, YSAC-2: for 60A
 4. Materials of stopper bolt is YSAP-1: MSWR-3, YSAP-2: STS.



OTHERS

- 10-1 Waterproof Control Box
- 10-2 Control Box
- 10-3 Square & Multi-Pole Connector
- 10-4 Fuse Holder
- 10-5 Buzzer

10 기타 품목 OTHERS

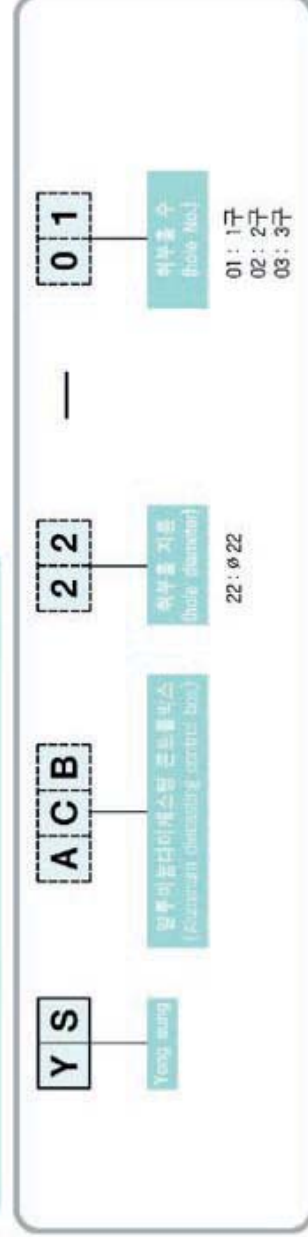
10-1 방수형 콘트롤박스
10-2 콘트롤 박스
10-3 사각다극 콘넥타
10-4 후즈 홀다
10-5 부저

10-1 Waterproof Control Box
10-2 Control Box
10-3 Square & Multi-pole Connector
10-4 Fuse Holder
10-5 Buzzer

10-1 방수형 콘트롤박스 Waterproof Control Box



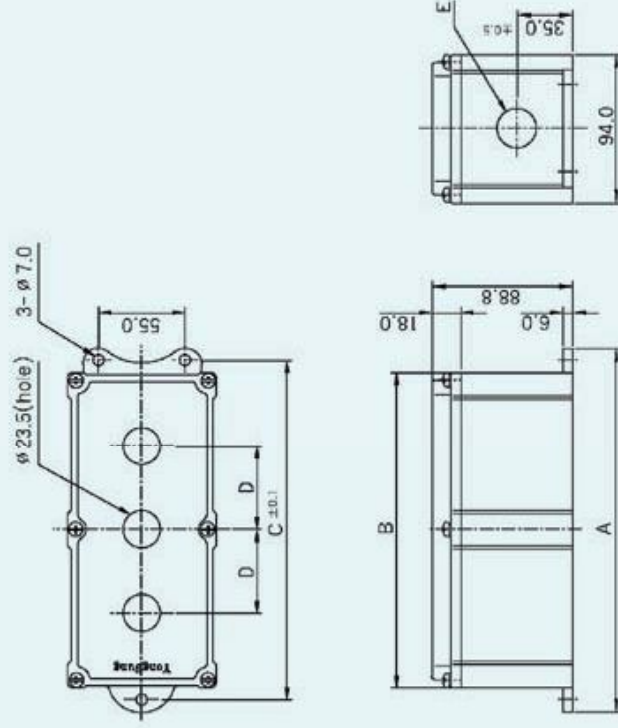
• 形式 區分圖 - Type classification diagram



• 特徴 - Features

- IP66 방수형으로 설계 및 검증되었습니다.
- 알루미늄 다이캐스팅 재질이므로 경량이며 견고합니다.
- 도장색상은 7.5BG로 되어 있습니다.
- 부착홀이 외부에 있으므로 외부할시 작업성이 편리하며 부착홀에 대하여 별도 방수처리가 필요없습니다.
- 염분 부식성을 고려하여 특수도장처리 하였습니다.
- 스위치 외부홀은 1구~3구까지 있습니다.
- 스위치 외부홀은 Ø22로 되어 있습니다.
- The box is designed and verified with IP66 waterproof type.
- The box made of aluminum die-casting is light and strong.
- Color of the box is Munsell No. 7.5BG.
- Attachment hole of the box is external so that work is convenient and no need separate waterproof on attachment hole.
- The box is with special paint against salt corrosion.
- Attachment hole of the box is from 1 to 3.
- Attachment hole of the box is Ø 22.

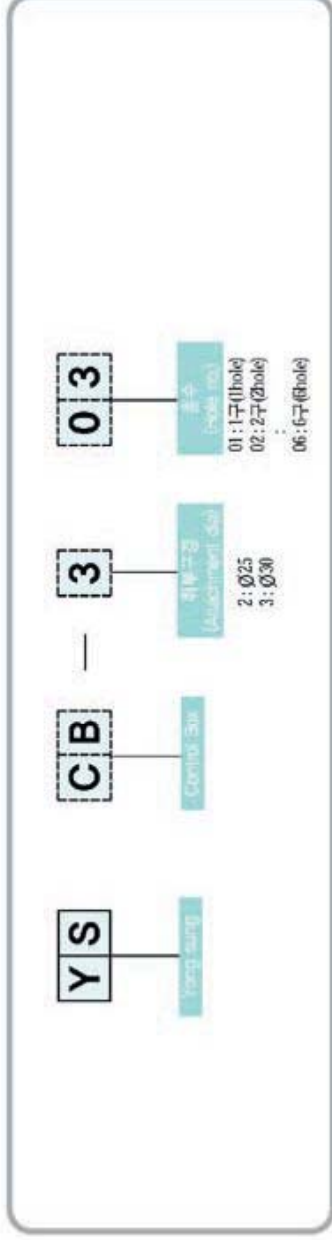
● 外形/值數圖 - Shape/Dimension Drawing



(unit : mm)

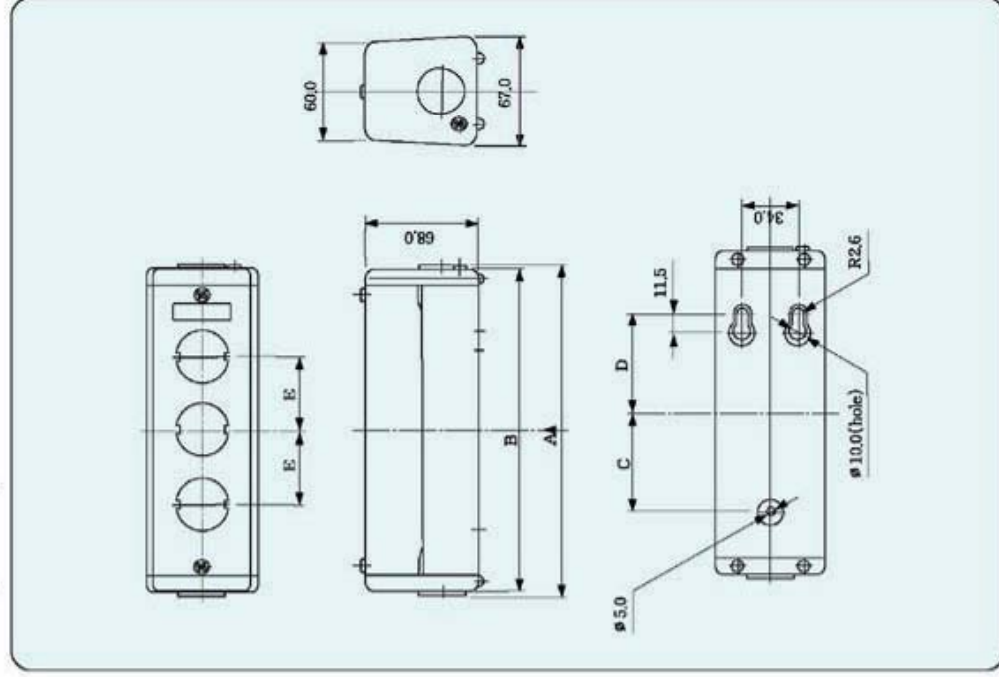
(Classification) 形式(Type)	A	B	C	D	E
YS ACB-2201	178.0	148.0	163.0	—	PF 3/4
YS ACB-2202	178.0	148.0	163.0	26.5	PF 3/4
YS ACB-2203	230.0	200.0	215.0	53.0	PF 1

● 形式 區分圖 - Type classification diagram



● 外形 値數圖 - Shape/Dimension drawing

(unit:mm)



● 仕様 - Specification

Ø25 TYPE

(unit:mm)

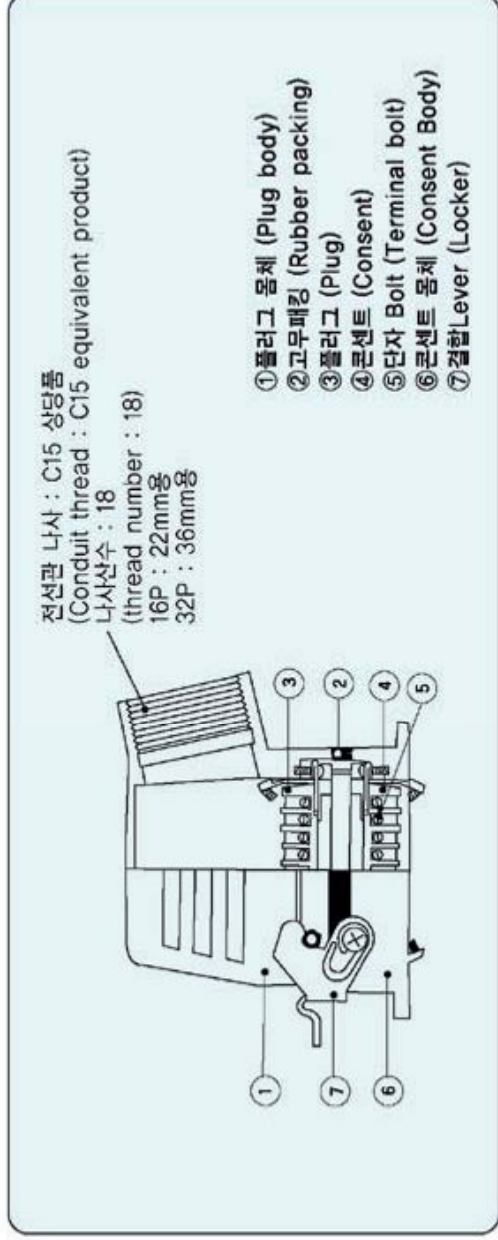
(Classification) 區分 形式(Type)	A	B	C	D	E
YS CB-201	101	95	19	13	-
YS CB-202	146	140	43	36	45
YS CB-203	196	190	66	60	50
YS CB-204	256	250	96.5	91	50
YS CB-205	306	300	123	116	50
YS CB-206	356	350	149	141	50

Ø30 TYPE

(unit:mm)

(Classification) 區分 形式(Type)	A	B	C	D	E
YS CB-301	101	95	19	13	-
YS CB-302	146	140	43	36	46
YS CB-303	196	190	66	60	50
YS CB-304	256	250	96	91	50
YS CB-305	306	300	123	116	50
YS CB-306	356	350	149	141	50

● 내부 구조圖 - Inside diagram



● 性能 概要 - Performance summary

接續數 (Connection number)	16Pin	32Pin
定格容量 (Rating capacity)	AC250V 15A	
絶縁抵抗 (Insulation resistance)	above 500MΩ (DC 500V, Meg)	
耐電壓 (Withstand voltage)	AC2,500V/min	
接觸抵抗 (Contact resistance)	below 15mΩ (initial value)	
適用電線 (Applied wire)	0.75mm ²	
使用周圍溫度 (Ambient temperature)	-25℃ ~ +40℃	
Cable Diameter	19.5mm	34.5mm

● 使用上の 注意事項 - Remark in use

- 電源側은 Consent에 接續하여 주십시오.
- 電線의 탈피치수는 7mm가 가장 적합합니다.
- 콘넥타의 開閉는 電流가 흐르지 않는 狀態에서 하십시오.
- 端子 Bolt의 조임 토크(Torque)는 5kgf·cm 以下로 조여 주십시오.
- Please join power source side to consent.
- Strip size of wire is optimum for 7mm.
- Please switch under no current state.
- Tightening torque of terminal bolt should be made to below 5kgf·cm.

● PANEL 取付値數 - Panel attachment dimension

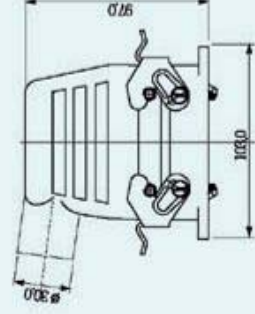
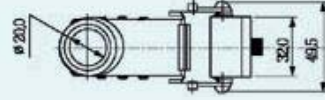


極數(Pole number) 記號(Symbol)	16pin	32pin
A	25	48
B	75	75
C	20	42
D	91	91

(unit:mm)

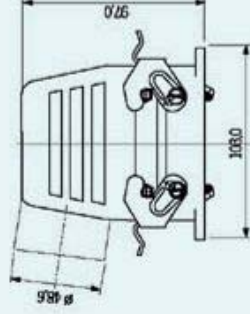
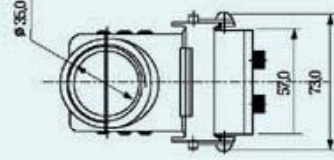
● 外形/値數圖 - Shape/Dimension Drawing

YSCN16



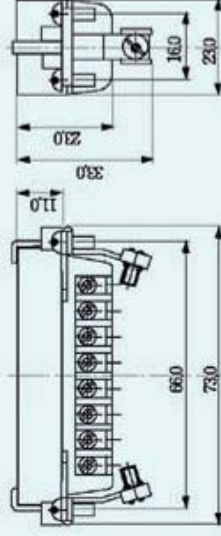
(unit:mm)

YSCN32

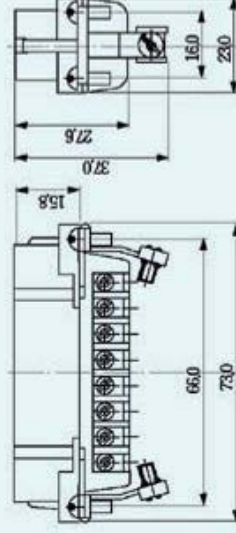


• INSERTS

Plug(1~16) Plug(17~32)

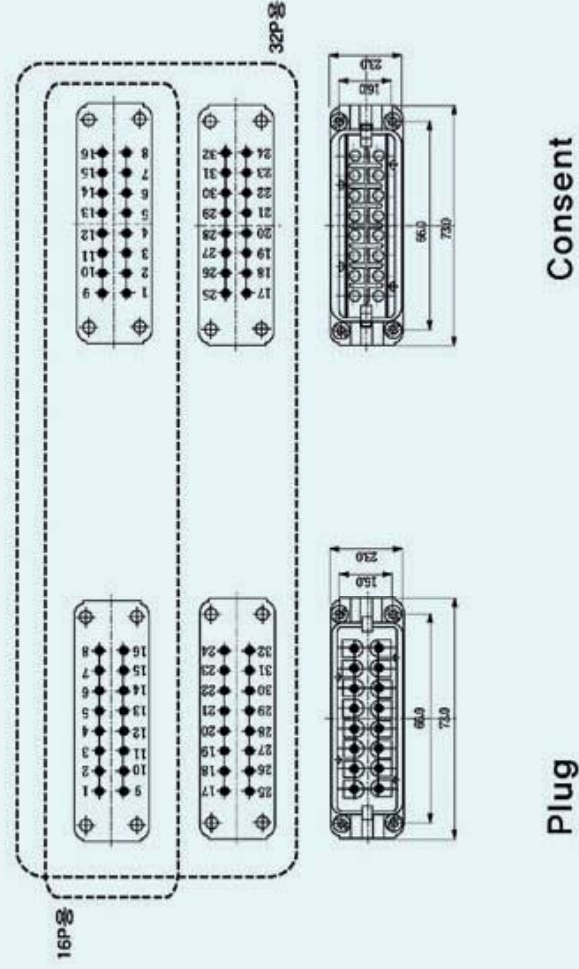


Consent(1~16) Consent(17~32)



(unit:mm)

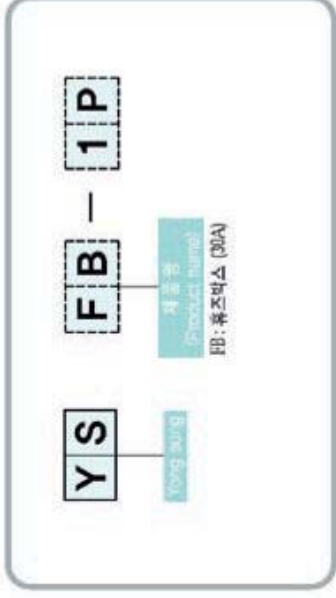
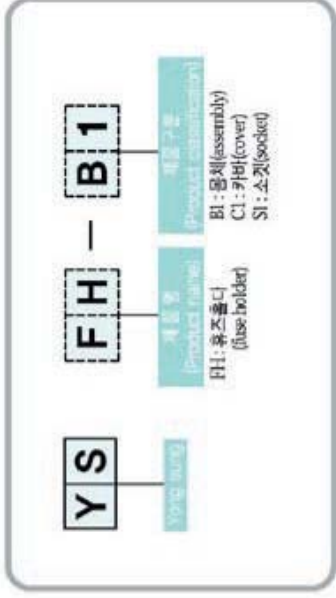
• 接点 構成 - Contact form



10-4

퓨즈 홀더
Fuse Holder

• 形式 區分圖 - Type classification diagram

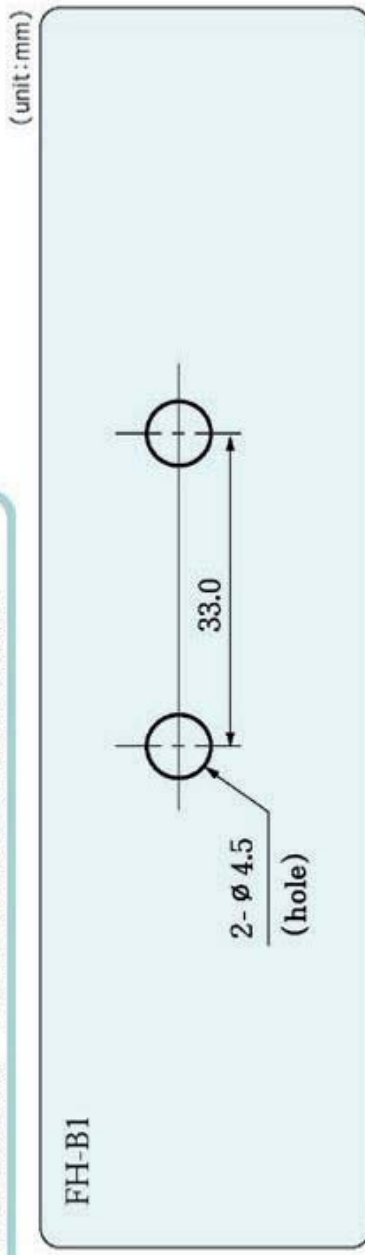


• 特徵 - Features

- 홀더 몸체의 재질은 66Nylon+G/F으로 절연성이 좋으며 충격과 열에도 강합니다. 작업성도 편리하고 파손의 우려가 없습니다.
- 동작시 위험을 방지하여 안전카바를 씌우게 되어 있으며, 회로번호를 구별할 수 있게 번호판을 부착하였습니다.
- 후즈 교환 삽입시 후즈가 따라 나옴으로써 안전성이 우수합니다.
- YSFB(30A)의 몸체 재질은 PBT 수지이며 절연성, 내열성이 우수합니다.
- 다량 사용시 채널부착 사용하므로써 편리합니다.
- The material 66Nylon+G/F of holder body has good insulating property, impact resistance and heat resistance. It has also easy handling and no breakage possibility.
- This is manufactured to put the safety cover preventing danger when operating, and number plate is attached to distinguish circuit number.
- Excellent security due to fuse follow-up at fuse exchange/insertion.
- As body material for YSFB 30A is PBT resin, insulation and heat resistance are excellent.
- Channel attachment use is possible at multi-use.

기 타 품 목

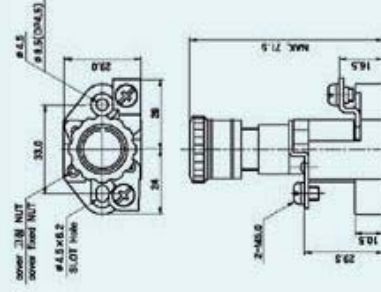
• 판넬 取付値數 - Panel attachment dimension



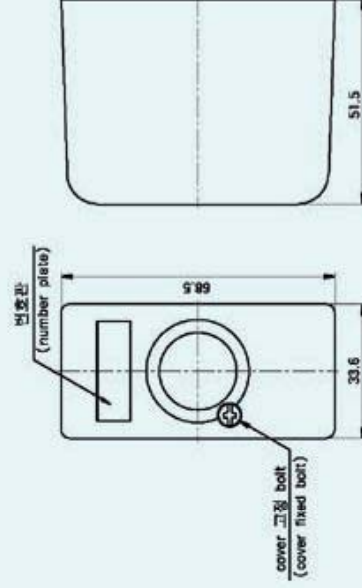
● 外形/値數圖 - Shape/Dimension Drawing

(unit: mm)

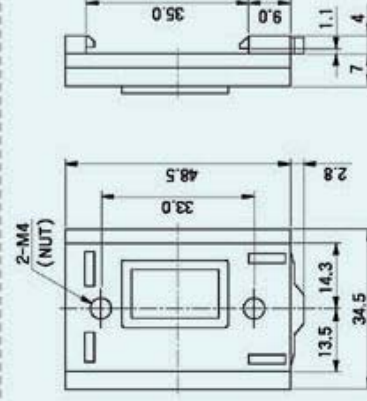
YSFH-B1



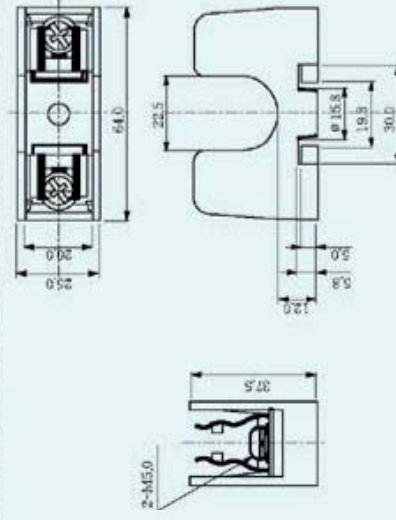
YSFH-C1(보호커버/protective cover)



YSFH-S1(Chamber for channel attachment)

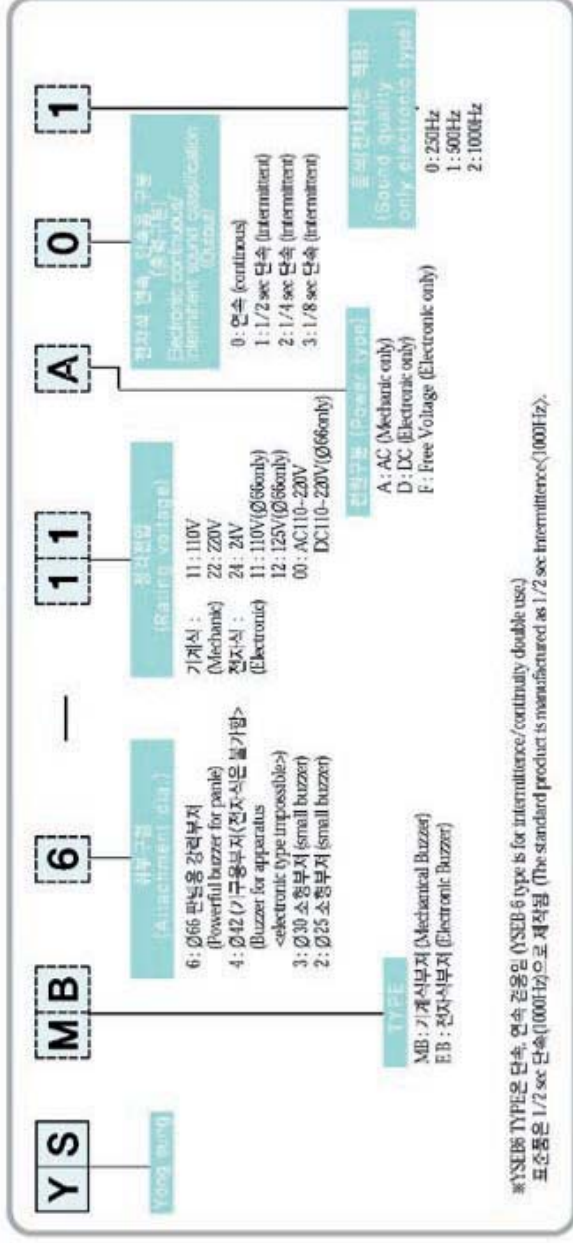


YSFB-1P



10-5 부지 Buzzer

• 形式 區分圖 - Type classification diagram



• 特徴 - Features

- 판넬용 소형부지로서 커다란 음량의音を 낼 수 있습니다.
- 소형이므로 취급하기가 용이합니다.
- 음량이 80 Phon 정도이므로 경보효과가 매우 좋습니다.
- 전자식의 경우 연속음, 단속음을 선택 사용할 수 있습니다.
- As a small buzzer for panel, large sound can be produced.
- With small size, maintenance is easy.
- With about 80 Phon of volume, alarm effect is very good.
- In case of electronic type, continuous or intermittent sound can be chosen.

• 用途 - Application

- 자동조작반신호용
- 산업용기계 비상신호용 경보용
- 음량조절형
- For auto operating control-signal
- For emergency signal alarm of industrial machines
- For volume control

• 定格 - Rating

機械式 Buzzer - Mechanical Type Buzzer

구분(Classification)	패널용 강력부저(Powerful buzzer for panel)		패널용 소형부저(Small buzzer for panel)	
형식(Type)	YSMB6-11A		YSMB2-11A YSMB3-11A	
항목(Item)	YSMB6-22A		YSMB2-22A YSMB3-22A	
정격전압 (Rating voltage)	AC 110V		AC 110V	
소비전력 (Power consumption)	8VA		4VA	
음량 (Volume of sound)	75 phon		65 phon	

電子式 Buzzer - Electronic Type Buzzer

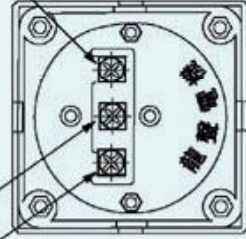
구분(Classification)	패널용 강력부저(Powerful buzzer for panel)			패널용 소형부저(Small buzzer for panel)	
형식(Type)	YSEB6-24D	YSEB6-11D	YSEB6-12D	YSEB6-00F	YSEB2-24D YSEB3-24D
항목(Item)	YSEB6-22D			YSEB2-22D YSEB3-22D	
정격전압 (Rating voltage)	DC24V			DC10~220V	
소비전력 (Power consumption)	4W			4W	
음량 (Volume of sound)	above 80 Phon			above 70 Phon	

• 結線 方法 (電子式) - Wire connection method (Electronic type)

단속음
(Intermittent sound)

Common

연속음
(continuous sound)

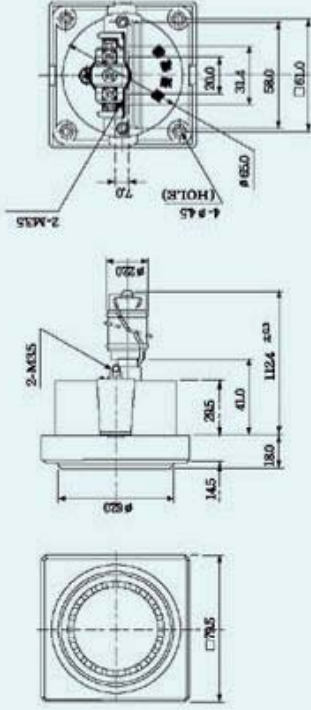


중간단자가 Common이며()극이고, 우측단자가 연속음, 좌측단자가 단속음입니다.
(Middle terminal is Common and() Pole, while right terminal is continuous sound and left terminal is intermittent sound.)

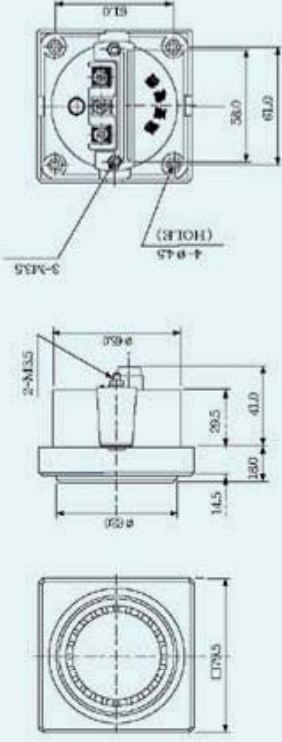
外形/値數圖 - Shape/Dimension Drawing

(unit: mm)

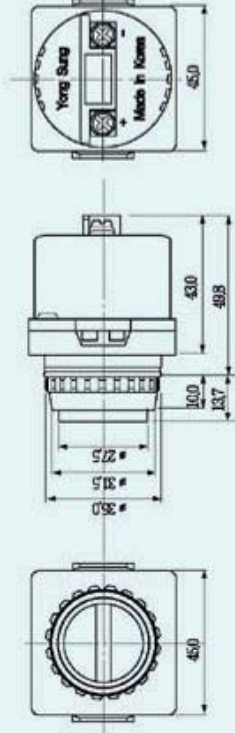
066(전자식)



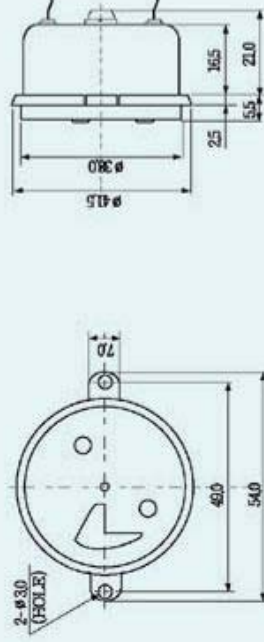
066(기계식/전자식 E86-00F)



030



042(기구용)

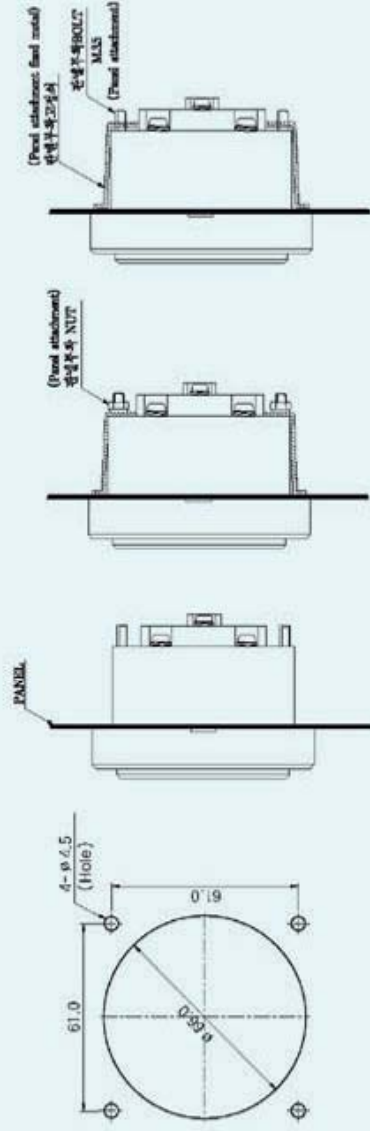


• 판넬 取付方法 - How to attach panel

- 판넬용 강력부저는 고정식을 사용하여 부착하는 방법과 Nut를 사용하여 부착하는 방법이 있습니다.
- Powerful buzzer can attach make use of fixed bracket or nut.

● 고정식 사용부착 방법 - How to attach fixed metal

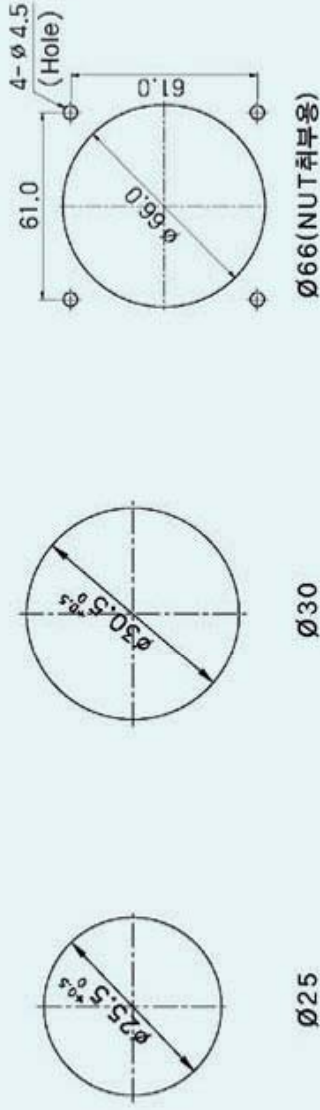
1. 판넬에 Ø66mm Hole 가공
(process hole of Ø66mm on panel)
 2. 판넬에 넣습니다.
(Put into panel.)
 3. 판넬부착고정식
(Panel attachment
fixed metal)
- 고정식을 부저에 붙은 고정용 볼트에 끼우고 너트를 조입니다.
(Put fixed metal into fixing bolt attachment to buzzer and tighten nut.)

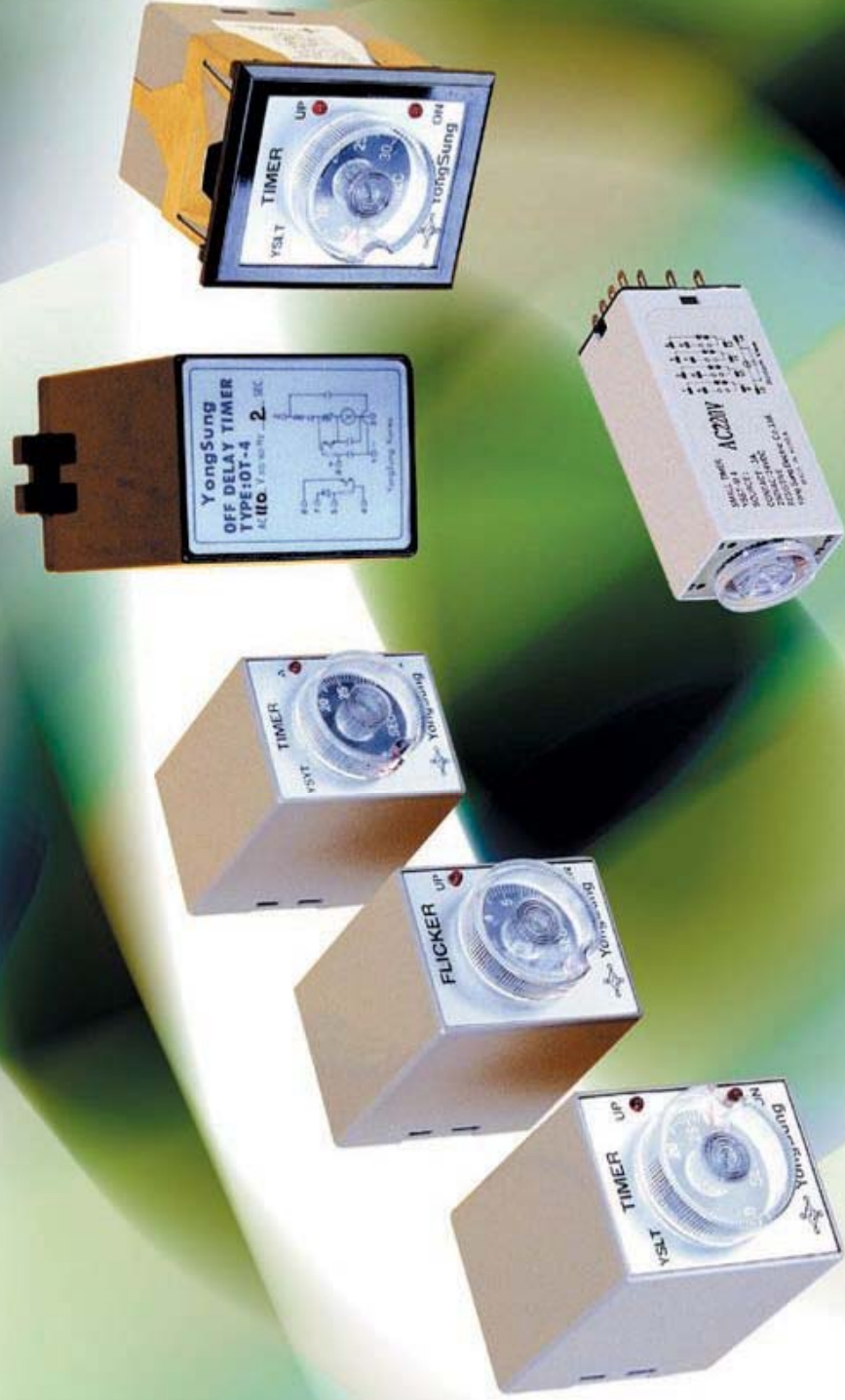


판넬에 부착된 제품
(Product attached to panel)

• 판넬 取付値數 - Panel attachment dimension

(unit: mm)





TIMERS

- 11-1 Timer
- 11-2 Y-Δ Timer
- 11-3 Flicker Timer
- 11-4 Small Timer

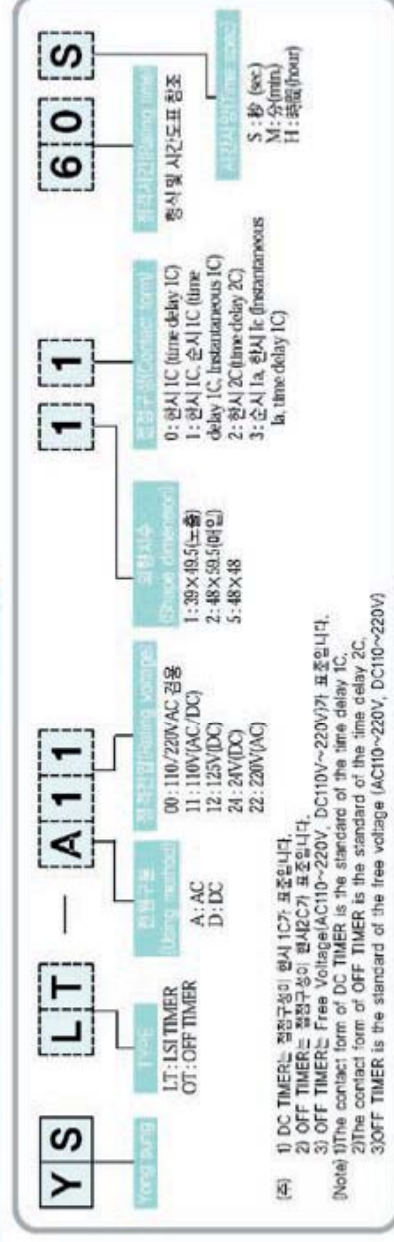
11 타이머류 TIMERS

11-1 타이머
11-2 Y-Δ 타이머
11-3 후리카 타이머
11-4 소형 타이머

11-1 Timer
11-2 Y-Δ Timer
11-3 Flicker Timer
11-4 Small Timer

11-1 타이머 Timer

• 形式 區分圖 - Type classification diagram



• 特徵 - Features

- Timer 専用 IC를 사용한 發振計數 周波數分割方式입니다.
- 0.1초~24시간의 廣範圍한 시간仕様입니다.
- 出力部는 高信頼性의 Power Relay를 使用하였습니다.
- Power ON. Time up 表示燈으로 確實한 動作 狀態가 표시됩니다.
- This is oscillating coefficient frequency dividing method using timer exclusive IC.
- Wide time specification of 0.1 sec.~24 hours.
- On output part, power relay of high reliability is applied.
- Definite operating state is expressed by pilot lamp of power on & time up lamp.

• 性能 概要 - Performance summary

項 目 (Item)	性 能 (Performance)
反復誤差 (Repetition error)	±0.5%
Set 誤差 (Set error)	below ±5%
Relay 接点定格 (Relay Contact rating)	AC220V 3A(Resistance Load)
機械的壽命 (Mechanical lifetime)	above 5,000,000 times
許容電壓變動範圍 (Allowable voltage variation range)	정격전압의 ±10%
電壓誤差 (Voltage error)	below ±0.5%
使用周圍溫度 (Ambient temperature)	-25℃~ +40℃
溫度誤差 (Temperature error)	below ±2%
使用周圍濕度 (Ambient humidity)	45 ~ 85% RH
耐電壓 (Withstand voltage)	電氣回路大地 (Electric circuit earth) 獨立回路相互間 (Between each circuits) 接點 間 (Between contact gaps) AC2,000V/min AC1,500V/min AC1,000V/min
絕緣抵抗 (Insulation resistance)	above 100MΩ (DC500V. Meg)
耐振動 (Withstand vibration)	16.7Hz double amplitude 4.0mm
耐衝擊 (Withstand impact)	30G
重量 (Weight)	about 150g

※(주)OFF TIMER Realy 定格電壓은 AC220V 0.6A(Resistance Load)입니다.

• 形式 및 時間仕様 - Type & Time spec.

形式 (Type) YSLT 露出形(公設付着用) Exposed type (for socket attachment)	時間仕様 (Time spec.)		操作電壓 (Operating voltage)	備 考 (Note)
	最大누금 (Max.scale)	最小누금 (Min.scale) (Control time range)		
YSLT-03S	3 sec	0.05 sec ~ 3 sec	AC110V/220V겸용 (For AC110V/220V) DC 24V DC 110V, DC 125V	- DC Timer는 60M까지임. (DC Timer time range is 60M Max)
YSLT-06S	6 sec	0.1 sec ~ 6 sec		
YSLT-12S	12 sec	0.2 sec ~ 12 sec		
YSLT-30S	30 sec	0.5 sec ~ 30 sec		
YSLT-60S	60 sec	1 sec ~ 60 sec		
YSLT-03M	3 min	3 sec ~ 3 min		
YSLT-06M	6 min	6 sec ~ 6 min		
YSLT-12M	12 min	12 sec ~ 12 min		
YSLT-30M	30 min	30 sec ~ 30 min		
YSLT-60M	60 min	60 sec ~ 60 min		
YSLT-03H	3 Hr	3 min ~ 3 Hr		
YSLT-06H	6 Hr	6 min ~ 6 Hr		
YSLT-12H	12 Hr	12 min ~ 12 Hr		
YSLT-24H	24 Hr	24 min ~ 24 Hr		

※OFF Timer는 瞬時 Relay가 內藏안됩니다. (Instantaneous relay is not built-in for OFF timer.)

※OFF Timer는 6M 以内로 주문바랍니다. (As for OFF Timer, please order within 6M.)

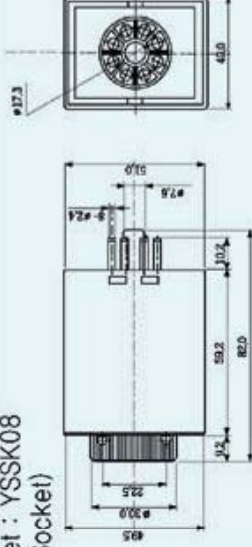
• 外形/値數圖 - Shape/Dimension Drawing

(unit : mm)

YS LT-1, YS OT-1



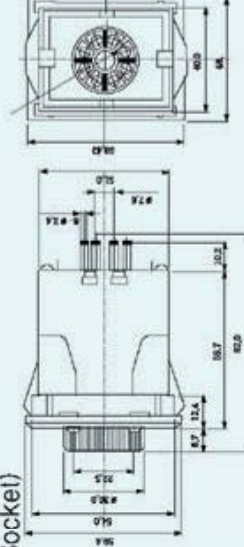
※ 적용 Socket : YSSK08
(Applied Socket)



YS LT-2, YS OT-2



※ 적용 Socket : YSSK08
(Applied Socket)

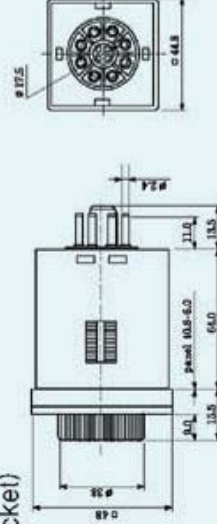


※노출형과 동일제품이니 매입형으로 사용시는 Bracket를 별도 구입 바랍니다.
(If you need the retracted type, purchase the bracket separately please.)

YS LT-5, YS OT-5



※ 적용 Socket : YSSK08
(Applied Socket)



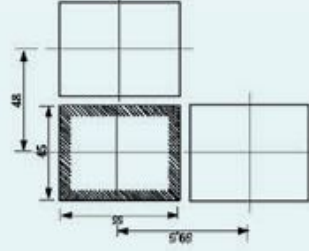
• 接續圖・動作 Pattern – Connection diagram・Operating pattern

형식 (Type)	접속도 (Connection diagram)	동작 (Operating pattern)
YSLT-A (AC 110V/220V free)		입력(input) (2-7) 순시(instantaneous) (1-3) 순시(전용)(Instantaneous) (1-4) 한시(time delay) (8-6) 한시(time delay) (8-5)
YSLT (AC 110V or 220V)		입력(input) (2-7) 한시접점(time delay a contact) (1-3)(8-6) 한시접점(time delay a contact) (1-4)(8-5)
YSOT		입력(input) (2-7) 한시접점(time delay a contact) (1-3)(8-6) 한시접점(time delay a contact) (1-4)(8-5)
YSLT-D (DC24V/110V/125V)		입력(input) (2-7) 한시접점(time delay a contact) (8-6) 한시접점(time delay a contact) (8-5)

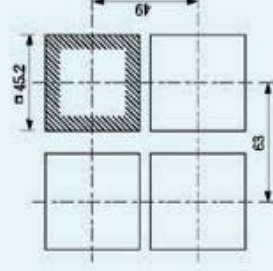
• PANNEL 加工値數(埋入形) – Pannel processing dimension(Retreated type)

(unit:mm)

LT-2, OT-2



LT-5, OT-5



- 性能概要 - Performance summary

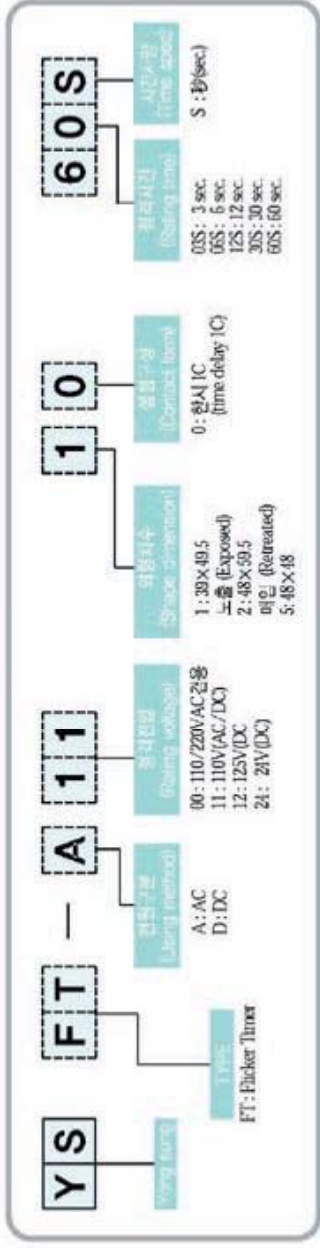
項 目 (Item)	性 能 (Performance)
反復誤差 (Repetition error)	±0.5%
Set 誤差 (Set error)	below ±5%
Realy 점점정각	AC 220V 3A (Resistance Load)
機械의壽命 (Mechanical lifetime)	above 5,000,000 times
許容電壓變動範圍 (Allowable voltage variation range)	정격전압의 ±10%
電壓誤差 (Voltage error)	below ±0.5%
使用周圍溫度 (Ambient temperature)	-25℃~ +40℃
溫度誤差 (Temperature error)	below ±2%
使用周圍濕度 (Ambient humidity)	45 ~ 85% RH
耐電壓 (Withstand voltage)	電氣回路大地(Electric circuit earth)
	獨立回路相互間(Between each circuits)
	接点 gap 間(Between contact gaps)
絕緣抵抗 (Insulation resistance)	AC2,000V/min AC1,500V/min AC1,000V/min
耐振動 (Withstand vibration)	above 100MQ (DC500V, Meg)
耐衝擊 (Withstand impact)	16.7Hz double amplitude 4.0mm 30G
重 量 (Weight)	about 110g

● 接續圖・動作 Pattern - Connection/diagram Operating pattern

형식 (Type)	접속도 (Connection diagram)	동작 (Operating pattern)
YSYT	※적용 Socket : YSSK08 (Applied Socket)	T1 T2 입력(Power) (2-7) 순시 접촉 (instantaneous contact) (1-3) Star contact (§ 5) Delta contact (§ 6) Star operation indicator Delta operation indicator T1:기변시간, T2:일변시간 - 0.1s, 0.25s, 0.5s 선택 (T1:variable time, T2:Change time - 0.1s, 0.25s, 0.5s)

11-3 플리커 타이머 Flicker Timer

• 形式 區分圖 - Type classification diagram



• 特徴 - Features

- IC를 사용하여 點減되는 時間이 一定합니다.
- 小形이면서 高信賴性입니다.
- 小形化로 消費電力이 적습니다.
- 동작 시간을 임의로 可變할 수 있습니다.
(註) on, off duty 비 50% 고정

- Switching time is constant by using IC.
- Compact size and high reliability.
- With small size, power consumption is little.
- ON/OFF time can freely variable.

Note) on/of duty rate is constant as 50%.

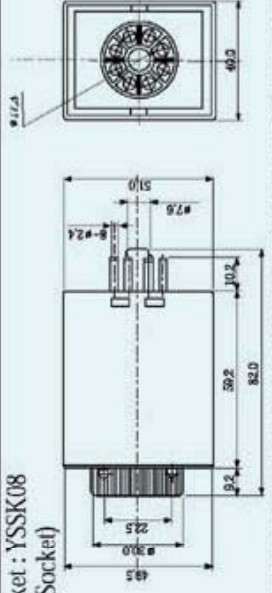
• 外形/值數圖 - Shape/Dimension Drawing

(unit : mm)

YS FT-1

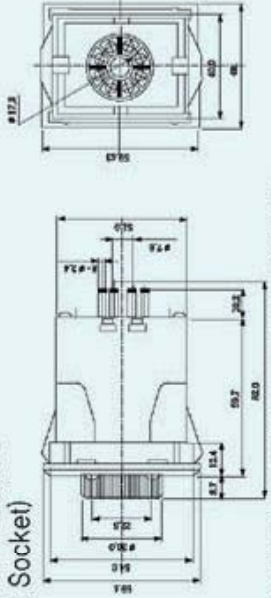


※ 적용 Socket : YSSK08
(Applied Socket)



YS FT-2

※ 적용 Socket : YSSK08
(Applied Socket)

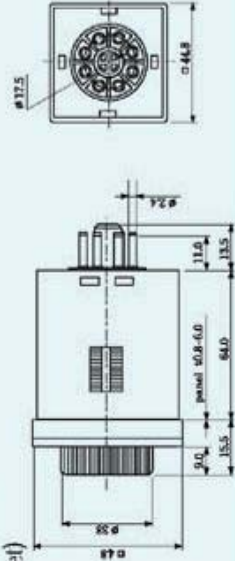


※ 노출형과 동원제품이나 머인형으로 사용시 Bracket을 별도 구입바랍니다.
(If you need retrated type, purchase the bracket separetly please)

YS FT-5



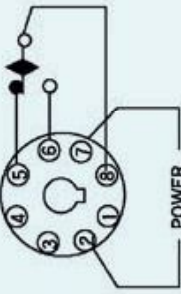
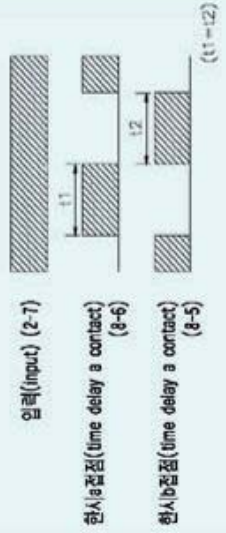
※ 적용 Socket : YSSK08
(Applied Socket)



● 성능 개요 - Performance summary

項 目 (Item)	性 能 (Performance)
定格電壓 (Rating voltage)	AC 110V 50/60Hz AC 220V 50/60Hz DC 24V/110V/125V
設定誤差 (Setting error)	below ±5%
電壓變動範圍 (Voltage variation range)	定格電壓 ±10%
時間可變範圍 (Time variation range)	on/off duty 50% 고정 on/off duty rate is constant as 50%.
消費電力 (Power consumption)	2.5VA
動作時間精度 (Operating time degree)	定格電壓時 約 ±0.5% (about ±0.5% in rating voltage)
出力 (Output)	RELAY 出力 1C(1a, 1b) (Relay output 1C(1a, 1b))
Relay接点定格 (Relay contact Rating)	AC 220V, 3A(抵抗負荷) (AC 220V, 3A(resistance load))
壽命 (Life time)	Electrical : above 100,000 times, Mechanical : above 5 million times
絶緣抵抗 (Insulation resistance)	500V, Meg에서 100MQ 以上 (about 100MQ at 500V, Meg)
使用周圍溫度 (Ambient temperature)	-25℃~ +40℃
相對濕度 (Relative humidity)	45 ~ 85%
重量 (Weight)	about 150g

● 接續圖 · 動作 Pattern - Connection diagram · Operating pattern

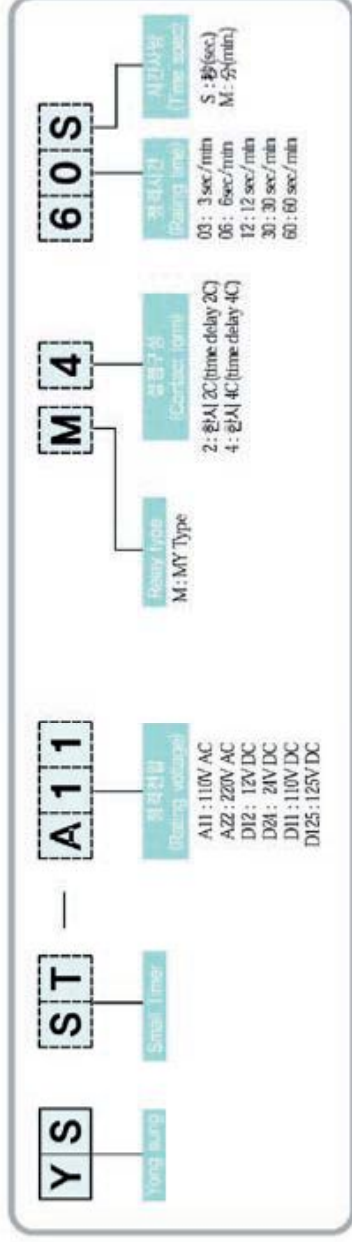
형식 (Type)	접속도 (Connection diagram)	동작 (Operating pattern)
YSFT		

※ FT-A00 사용시 ②-⑦핀 : AC 220V 전원

④-⑦핀 : AC 110V 전원 중 하나를 선택해서 결선해 주시기 바랍니다.

※ When using FT-A00 , choose and wire one of ②-⑦ pin : AC220V or ④-⑦ pin : AC110V.

• 形式 區分圖 - Type classification diagram



• 特徵 - Features

- 小形이면서 精度가 높다.
- 取付面積은 MY-Type과 同一
- Power ON. Time up 表示燈으로 確實한 動作 狀態가 표시됩니다.
- Small but with high precision.
- Attachment area is same as MY Type.
- Definite operating state is expressed by pilot lamp of Power ON · Time up.

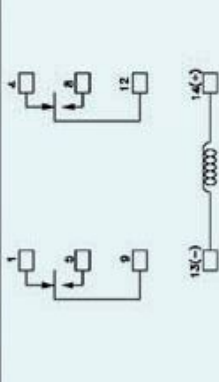
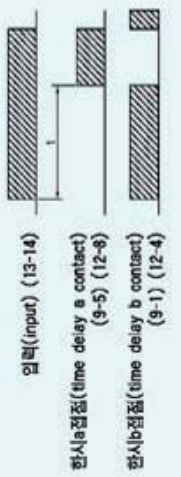
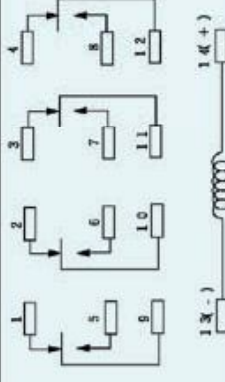
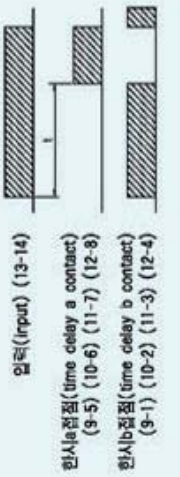
• 性能 概要 - Performance summary

項 目 (Item)		性 能 (Performance)
反復誤差 (Repetition error)		below $\pm 5\%$
Set 誤差 (Set error)		below $\pm 10\%$
機械的壽命 (Mechanical lifetime)		above 3,000,000 times
復歸時間 (Return time)		below 100ms
許容電壓變動範圍 (Allowable voltage variation range)		정격전압의 $\pm 10\%$
電壓誤差 (Voltage error)		below $\pm 0.2\%$
使用周圍溫度 (Ambient temperature)		$-25^{\circ}\text{C} \sim +40^{\circ}\text{C}$
溫度誤差 (Temperature error)		below $\pm 5\%$
相對濕度 (Relative humidity)		45 ~ 85%
耐電壓 (Withstand voltage)	電氣回路大地 (Electric circuit earth)	AC2,000V/min
	獨立回路相互間 (Between each circuits)	AC1,500V/min
	接点 gap 間 (Between contact gaps)	AC1,000V/min
絕緣抵抗 (Insulation resistance)		above 100M Ω
耐振動(耐久) (Withstand vibration)		16.7Hz double amplitude 4.0mm
耐衝擊(耐久) (Withstand impact)		30G
重量 (Weight)		about 44g

●種類 - Type

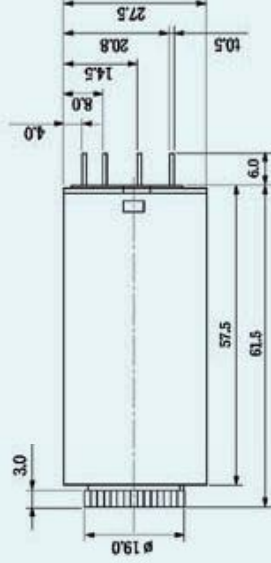
形式 (Type) PLUG-IN TYPE	動作構成 Operating Contact Pattern	接点構成 Contact form	定格接点 Rating conductive contact	定格電壓 Rating voltage	消費電力 Consumption power	制御時間範囲 Control time range
ST-M2	On-delay	2A2B	5A	DC 12V	AC 110V 1.9VA	0.1~3sec
				DC 24V	AC 220V 2.1VA	0.5~6sec
ST-M4		4A4B	3A	DC 110V	DC 12V 0.9W	1~12sec
				DC 125V	DC 24V 1.1W	2.5~30sec
				DC 110V	DC 110V 1.5W	5~60sec
				AC 110V	DC 125V 1.8W	7.5sec~3M
				AC 220V	DC 110V 1.5W	12sec~6M
					DC 125V 1.8W	12sec~12M
						30sec~30M
						30sec~60M

●接線図・動作 Pattern - Connection diagram・Operating pattern

形式 (Type)	接線図 (Connection diagram)	動作 (Operating pattern)
ST-M2 적용소켓: YSSKMY-2		
ST-M4 적용소켓: YSSKMY-4		

●外形/値數圖 - Shape/Dimension Drawing

(unit: mm)

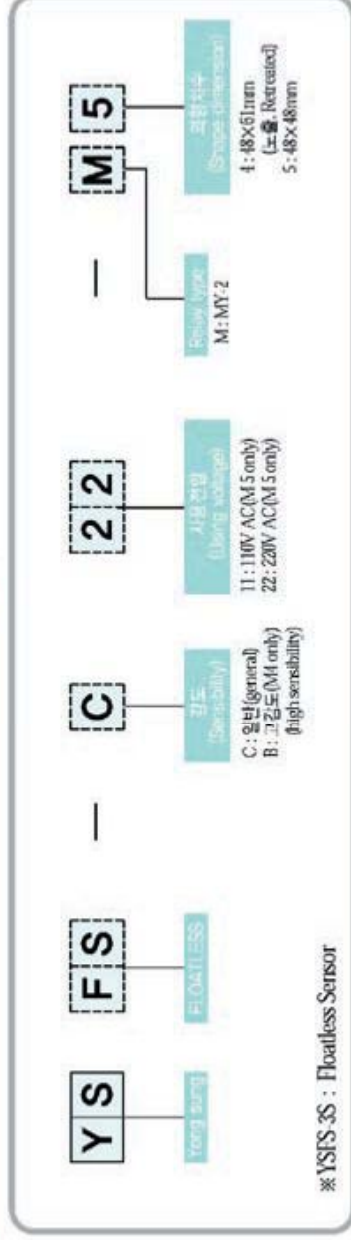




FLOATLESS

12 후로드레스 FLOATLESS

• 形式 區分圖 - Type classification diagram



• 特徴 - Features

- 소형이며 8PIN 소켓방식으로 공사보수점검이 용이합니다.
- 반도체 방식으로 수명이 반영구적입니다.
- 수위를 완전 자동조절하므로 관련된 기계의 고장을 방지합니다.
- With small and 8 Pin socket method, maintenance is easy.
- With semiconductor method, lifetime is semi-permanent.
- Completely automatic control of water level prevents the failure of related machines.

• 性能 概要 - Performance summary

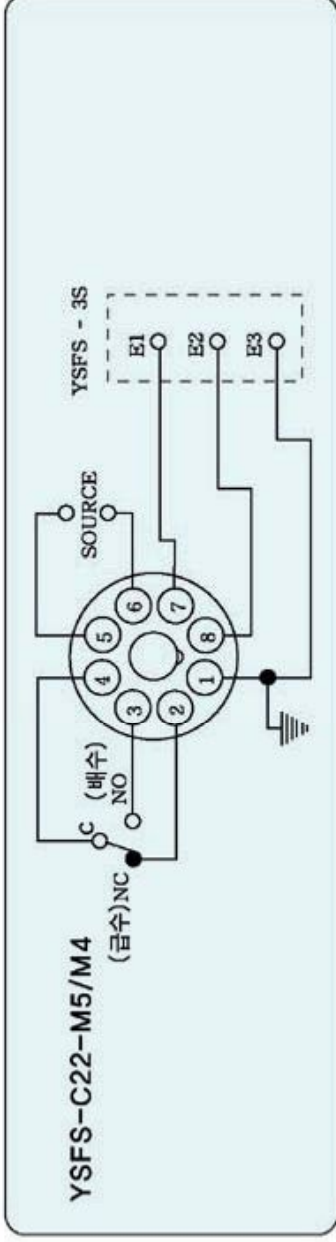
形 式 (Type)	일반 (M4, M5)	고감도 (M4)
定格電壓 (Rating Voltage)	AC 110V, AC220V 50/60Hz	
電壓變動範圍	定格電壓의 ±10%	
電極間電壓 (二次電壓) (Voltage between electrodes/2nd voltage)	AC 10V	AC 24V
消費電力 (Power consumption)	about 3.2VA	about 4VA
動作抵抗 (Operating resistance)	about 4KΩ	about 25KΩ
復歸抵抗 (Return resistance)	less than 15KΩ	less than 35KΩ
使用周圍溫度 (Ambient temperature)	-25℃ ~ +40℃	
絕緣抵抗 (Insulation resistance)	below 100MΩ (at DC 500V, Meg)	
Relay 出力接点定格 (Relay output contact Rating)	AC 220V, 5A (resistance load)	
Relay 壽命 (Relay lifetime)	Electrical : above 500,000 times, Mechanical : a bove 3,000,000 times	
相對濕度 (Relative humidity)	45 ~ 85%	

- ※ 電極棒은 每 6個月 程度마다 表面을 깨끗하게 닦아줘야 합니다.
- ※ 電極棒 表面에 絶緣性 皮膜이 形成되면 動作不良의 原因이 됩니다.
- ※ 電極固定 連結器(YSFS 3S)를 使用하여야 感知距離가 正確합니다.
- ※ The surface of electrode bar should be cleaned at least every 6 months.
- ※ Insulating film formation on surface of electrode bar causes malfunction.
- ※ Electrode fixing coupler(YSFS-3S) should be used in order to get the exact sense distance.

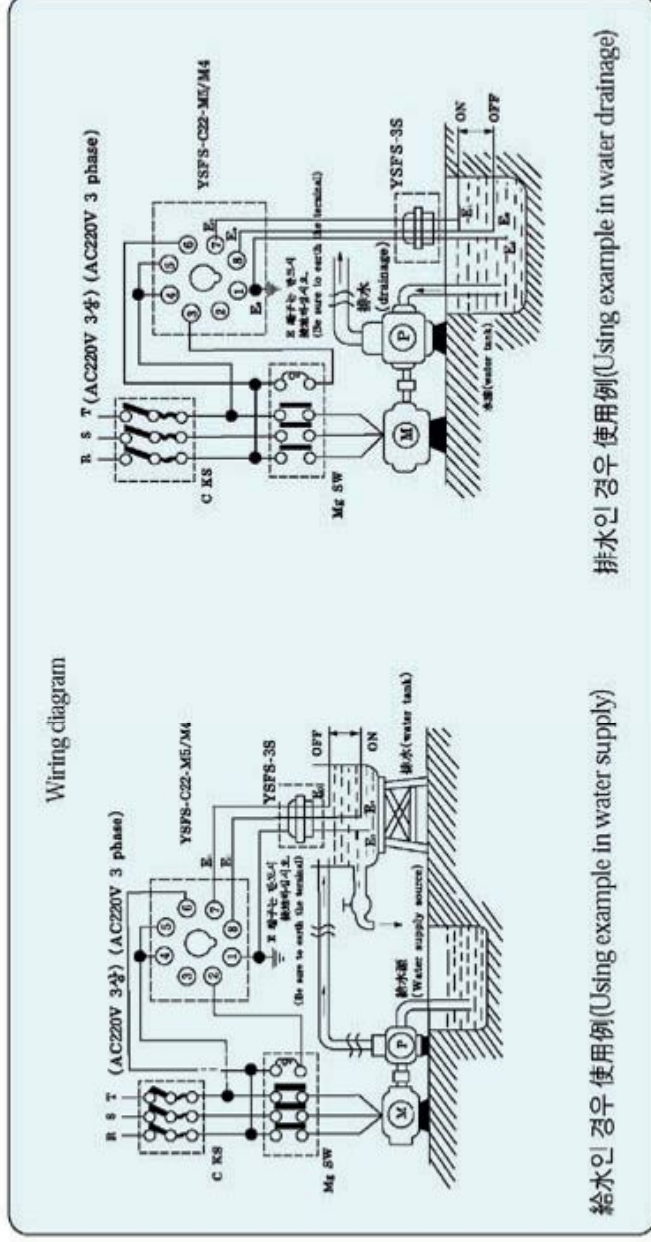
● 使用 方法 - How to use

- Relay Unit와 電極棒(Holder) 25KΩ 이상일시는 高感度を 採擇하십시오.
- 물탱크에 電極棒을 設置하고 후로드레스 S/W(Relay Unit)는 Panel에 設置하여 Magnet S/W와 連結합니다.
- Magnet S/W는 Pump Motor容量에 맞추어 選定하면 됩니다.
- 電極棒은 스테인레스봉이나 황동봉을 使用하며 4~5φ가 適合합니다.
- 電極棒의 길이는 上限, 下限位置를 選定하여 設定하십시오.
- When Relay Unit and electrode holder is above 25KΩ, select high sensitivity.
- Install electrode holder to water tank and Floatless Switch (Relay Unit) to panel respectively, and then connect to magnet switch.
- Select Magnet Switch according to pump motor capacity.
- Use stainless rod or brass rod and 4~5φ is suitable.
- As to the length of electrode abr, select max. and min. limits and set it.

● 접속도 - Connection diagram



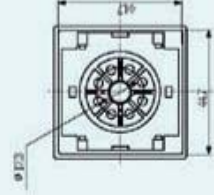
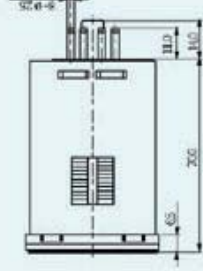
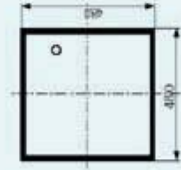
● 접속도 - Connection diagram



● 外形/値數圖 - Shape/Dimension Drawing

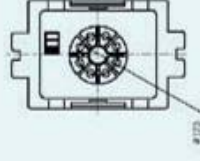
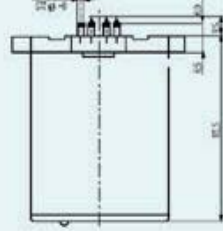
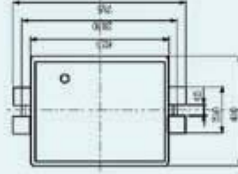
(unit: mm)

M5 Type



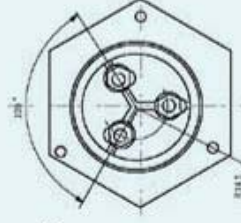
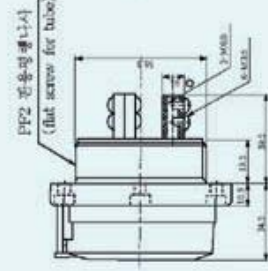
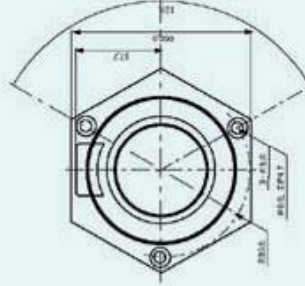
※ 적용 Socket : YSSK08-F
(Applied Socket)

M4 Type

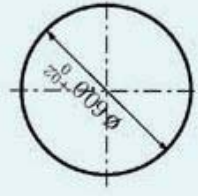


※ 적용 Socket : YSSK08-F
(Applied Socket)

3S Type



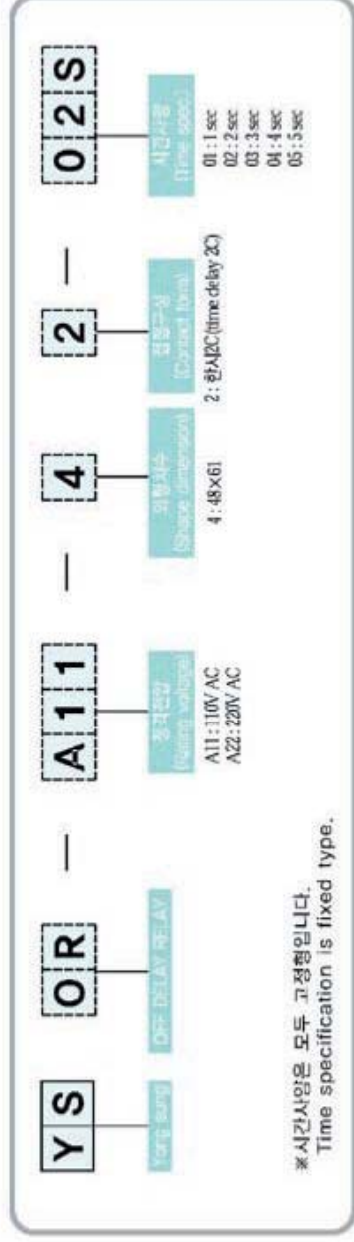
● 가공치수
(Processing dimension)



13 OR-4 개로시 지연 릴레이 OR-4 OPEN CIRCUIT DELAY RELAY

지연 릴레이
OR-4 개로시

• 形式 區分圖 - Type classification diagram



• OR-4개로시 지연 릴레이 - OR-4 Open circuit delay relay

- 플러그인 타입이므로 착탈이 용이하다.
- Plug-in type is easy for use.

• 定格 - Rating

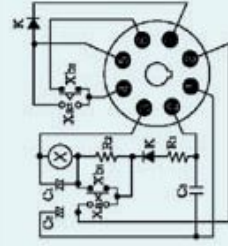
定格電壓 (rating voltage)	AC 110V, 220V (전용, only) 50/60Hz (공용, common)
許容電壓 및 變動範圍 (Permissible voltage & change range)	정격전압의 $\pm 10\%$
消費電力 (Power consumption)	about 3.3VA (at AC220V 60Hz)
制御出力 (Control output)	AC250V 3A 저항부하 (resistance load) (COS ϕ =1)
使用周圍溫度 (Ambient temperature)	-25℃ ~ +40℃
相對濕度 (Relative humidity)	45 ~ 85%

● 성능 개요 - Performance summary

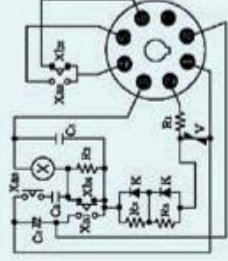
動作時間의 偏差 (Operating time deviation)	below ±5%
셋트誤差 (Set error)	-20, +50% 이하(정격전압, 주위온도 +20℃ 기준) (rating voltage, ambient temperature +20℃ basis)
復歸時間 (Return time)	전원투입시간(power apply time) below 0.2sec
電壓의 影響 (Voltage effect)	below ±35%
溫度의 影響 (Temperature effect)	below ±25%
絶緣抵抗 (Insulation resistance)	below 100MΩ (DC500V. Meg)
耐電壓 (Withstand voltage)	AC1, 500V/min
溫度上昇 (Temperature rise)	below 60℃
壽命 (Lifetime)	mechanical (mechanical) above 5,000,000times electrical (electrical) above 500,000times
消費電力 (Power consumption)	AC about 2.5VA DC about 1.4W
動作時間 (Operating time)	AC about 20ms DC about 30ms
復歸時間 (Return time)	below 20ms
耐振動 (Withstand vibration)	誤動作 (malfunction) 10~55Hz double amplitude 1.5mm 耐久 (endurance)
耐衝擊 (Withstand impact)	誤動作 (malfunction) 10~55Hz double amplitude 1.5mm 耐久 (endurance) 100m/s ² (about 10G) 500m/s ² (about 50G)
最大開閉頻度 (Max.Switching frequency)	20times/min 機械的 (mechanical)
使用周圍溫度 (Ambient temperature)	20times/min 電氣的 (electrical)
相對濕度 (Relative humidity)	-25℃ ~+40℃
重量 (Weight)	45 ~ 85%
	about 178g

● 동작/내부 접속도 - Operating/internal connection diagram

AC110V용
(for AC110V)



AC220V용
(for AC220V)



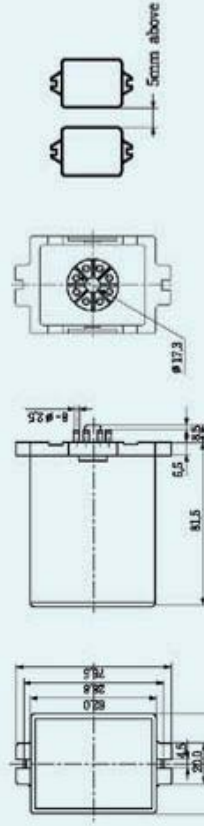
● 外形/值數圖 - Shape/Dimension Drawing

(unit : mm)

OR-4 전면취부(front side installation)



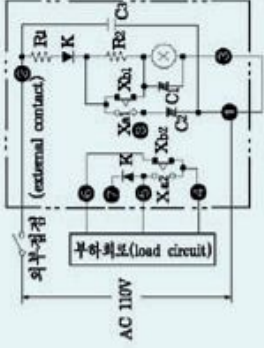
OR-4를 여러개 배열할 경우 5mm 이상의 간격을 띄워서 취부해 주십시오.
(In arranging multi OR-4 maintain above 5mm intervals between OR-4.)



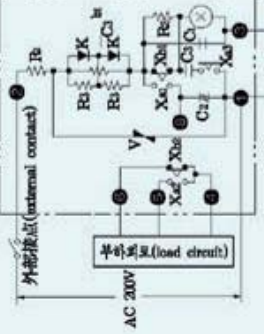
● 사용방법 - How to use

- OR-4의 접속방법에 따라 ① 개로시 지연릴레이 ② 순시정전시 자동 재기동릴레이, 2종류의 동작이 가능합니다.
 OR-4 can be operated in two type, open circuit delay relay and automatic restarting relay according to connection method.
 ① 개로시 지연릴레이로 사용할 때(When using as open circuit delay relay)
 ● 외부 접속회로 예 (example of external connection circuit)

전원전압 : AC110V용 (Voltage : for AC110V)



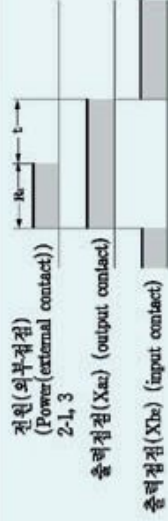
전원전압 : AC220V용 (Voltage : for AC220V)



점접단자 4, 5, 6은 전원단자 1, 3과 동전위가 되도록 접속하여 사용하십시오.

(The contact terminals 4, 5, 6 must be connected to have the same electric potential as power terminals 1, 3.)

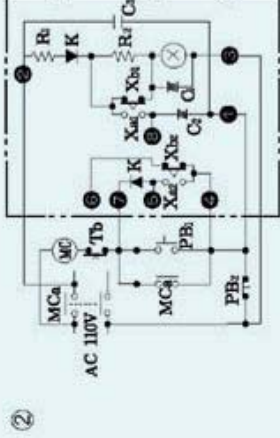
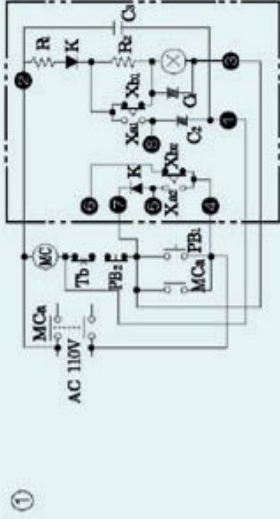
- 타임차트(전원 OFF DELAY의 경우 적합) (time chart-suitable for power of delay>)



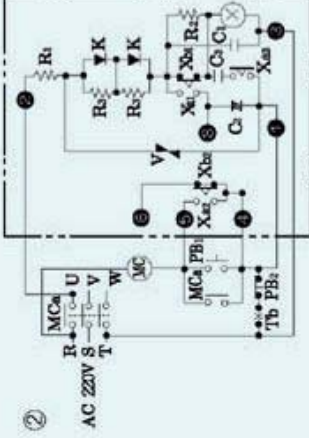
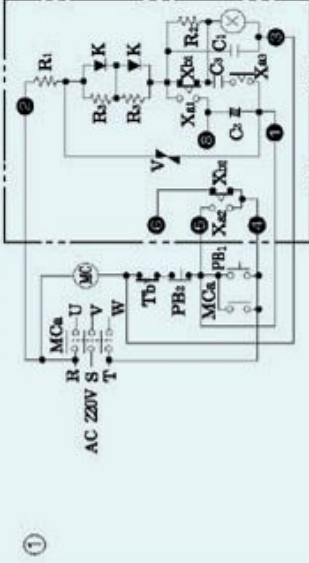
Rt : 전원투입시간(0.2초 이상)
 (power supply time<below 0.2sec>)
 t : 타이머 동작시간(OR-4시간 사양)
 (timer operation time<OR-4time standard>)

- ② 순시정전시 자동재기동 릴레이로 사용할 때(When using as automatic restarting relay at instantaneous shut-off)
 ● 외부접속회로 예(example of external connection circuit)

전원전압 : AC110V용 (Voltage : for AC110V)



전원전압 : AC220V용 (Voltage : for AC220V)



● 주 (Note)

MC : 마그네틱 콘택타 (magnet contactor)

PB₁ : 기동용 푸쉬보턴스위치 (push button switch for moving)

PB₂ : 정지용 푸쉬보턴스위치 (push button switch for stop)

TB : 서머릴레이 접점 (thermal relay contact)

원방조작을 할 때는 회로결선을 ②와 같이 해주십시오. 이때, 필히 MC가 확실히 동작하는지 확인하여 주십시오.
②의 회로에는 원방조작에 있어 선간용량의 영향을 저감시키는 일이 발생합니다.

약 10mm 이상의 거리일 경우 ②와 같이 접속하십시오.

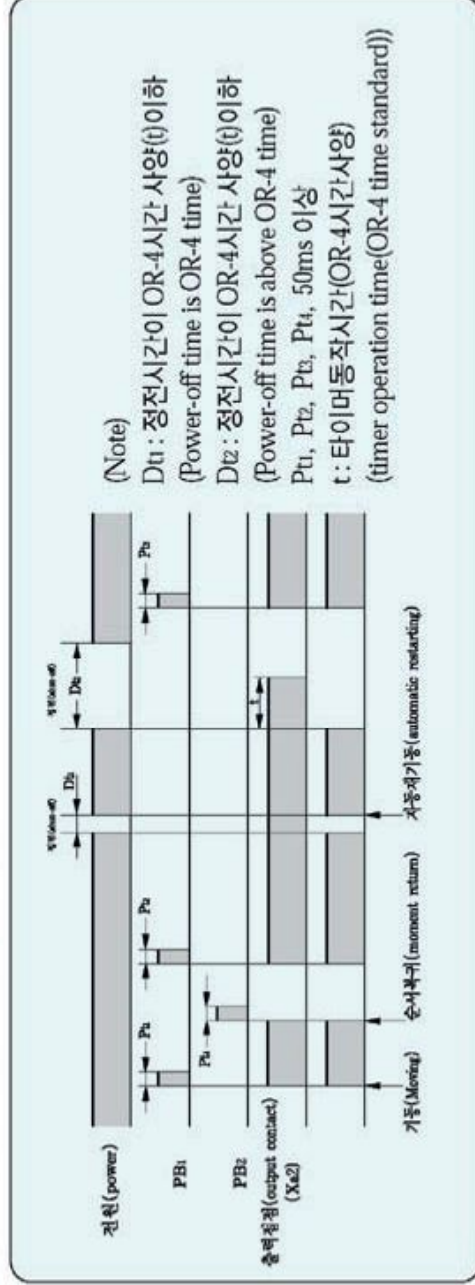
PB₁과 PB₂를 동시에 누르게 되면 내부 회로 노화의 원인이 되므로 피하여 주십시오.

When operate from long distance, make circuit connection as ② and verify that MC is operating. In long distance operation the effect of catcity between lines can be reduced at circuit ②.

If the distance is above 10mm connect like ②.

Avoid pressing PB₁ and PB₂ simultaneously, because so doing is the cause of internal circuit abrasion.

● 타임차트 (순시정전시 자동재기동의 경우) (time chart < in automatic restarting at moment power-off >)



● 동작설명 (회로도-1) Operation description (circuit diagram-1)

- 기동 (Moving)

PB₁을 누르면 콘택타 MC가 ON이 되고 MCa₂에 의해 자기유지 됩니다.

MC가 ON이 되면 MCa₁을 통해 전원단자 ②-③간에 전원전압이 인가되어 OR-4의 내장릴레이 X가 ON이 됩니다.

릴레이 X가 ON이 되면 Xa₁을 통해 시한용콘덴서 C₂가 충전됩니다. (C₁은 평활용 콘덴서, C₃ : 서지흡수용입니다.)

If PB₂ is pressed, contactor MC become ON due to power voltage between power terminals 2-3 through MCa₁.

If relay X become ON, time delay capacitor C₂ is charged through Xa₁ (C₁ is ripple filtercapacitor, C₃ : for AC110 is for surge absorption and for AC220V is for moment return.)

- 정전 (Power-off)

정전시 C₂ 충전전류는 C₂(+)-Xa₁-R₂-X-③-PB₂-①-C₂(-)의 회로에 의해 방전, 릴레이 X는 방전전류가 릴레이 유지전류 이하가 될 때까지 유지합니다. <회로도-1 참조>

If power-off is occur, C₂ charged current is discharged by circuit of C₂(+)-Xa₁-R₂-X-③-PB₂-①-C₂(-) and relay X is maintained until discharge current is below relay retaining current. <See circuit diagram-1.>

- 자동 재기동 (Automatic restarting)

정전이 OR-4의 시간사용(t) 이내에 회복되면 릴레이 X는 자기유지하고 있으므로 Xa2에 의해 MC는 자기재기동합니다.
If power return within OR-4 time standard, MC restart automatically by Xa2 because relay X is self-retained.

- 순시복귀 (PB2가 OFF할 때) (Moment return (when PB2 is OFF))

※ AC110V용 (for AC110V)

AC110V용과 AC220V용은 회로가 별도로 되어 있습니다.

PB₂ OFF에 의해 MC는 순시복귀되며, ②-③ 사이 ②-①사이의 전압은 제거됩니다.

그러나 C₂ 방전전류는 C₂(+)-Xa1-R₂-X-③-전원트랜스-MC-Tb-⑦-④-①-C₂(-) 전류를 통하게 됩니다.

그러므로 개로에서는 ⑦-④사이에 방전전류를 차단하기 위한 실리콘 다이오드가 있으며, 그로 인해 방전전류가 차단되어 릴레이 X를 순시에 복귀하는 제품이다.

바로 ⑦-④사이에 삽입된 실리콘 다이오드는 릴레이 X의 순시복귀용입니다.<회로도-1 참조>

For AC110V and for AC220V have separate circuit.

MC is moment returned by PB₂ OFF and voltage between ② and ③, ② and ① is removed, but, C₂ discharge current pass through C₂(+)-Xa1-R₂-X-③-Power trans -MC-Tb-⑦-④-①-C₂(-)

Therefore, in AC110V open circuit, there is silicon diode between ⑦ and ④ in order to cut discharge current and due to it relay X returned momentarily.

The silicon diode inserted between ⑦ and ④ is for moment return of relay X<See circuit diagram 1.>

※ AC220V용 (for AC220V)

AC220V용에서도 AC110V와 같이 동작시키려면 X에 방전전류가 흐르는 것을 막아야 하며 이 경우 순시복귀시키는 방법으로써 실리콘 다이오드 대신 Xa3의 접점을 통해 C₃를 삽입한 제품입니다. PB₂ OFF에 의해, R상-MC-Xa2-①-Xa3-X-③-T상의 회로에 의해, 릴레이 X에 교류를 통과시키고, 이 교류의 T상 ③극성, R상 ①극성의 시점에서 C₂방전전류와 이 전류가 일치될 때, 순간적으로 릴레이 복귀시키는 제품으로 되어 있습니다.<회로도-2 참조>

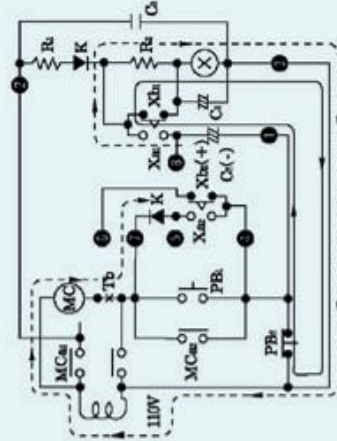
If you intend to operate for AC220V in te same way for AC110V, you must avoid discharge current toward X, and moment return is occur by inserting C₃ through contact of Xa3 instead of silicon diode.

Pass AC through relay X by PB₂ OFF, R phase-MC-Xa2-①-Xa3-X-③-T phase circuit and when C₂ discharge current and this AC is the same at the T phase ③polarity, R phase ①polarity, relay returned momentarily.<See circuit diagram 2.>

회로도-1 시한용콘덴서 C₂의 방전회로(AC110V용)

(circuit diagram-1)

discharge circuit of the delay capacitor C₂(for AC110V)



정전시 방전전류 (시한 동작중)

discharge current at shut-off (in time delay operation))

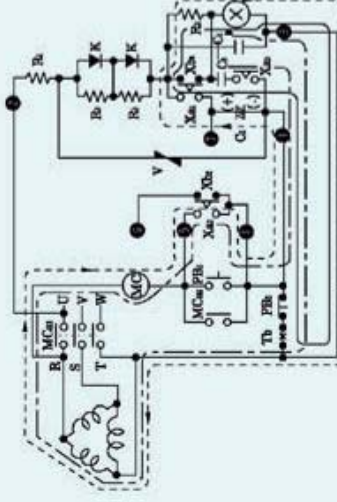
C₂ 방전전류 (PB₂ OFF 시)

C₂ discharge current (when PB₂ is OFF)

회로도-2 시한용콘덴서 C₂의 방전회로(AC220V용)

(circuit diagram-2)

discharge circuit of the delay capacitor C₂(for AC220V)



정전시 방전전류 (시한 동작중)

discharge current at shut-off (in time delay operation)

C₂ 방전전류 (PB₂ OFF 시)

C₂ discharge current (when PB₂ is OFF)

C₂ 유입전류 (교류) (PB₂ OFF 시)

C₂ input current (when PB₂ is OFF)

순시복귀시 PB₂를 누르면 등가적인 <회로도 3-4>회로가 형성되어 MC에 전류가 흐릅니다. 이때 MC양단의 전압(E)이 MC의 복귀전압 정격치 이하로 되어야 할 필요가 있습니다. MC양단의 전압을 낮추려면 코일 임피던스가 낮은 릴레이를 사용할 필요가 있습니다.

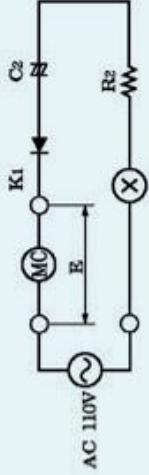
순간정전 복귀시에 반파정류전압에 의해 동작, 자기 유지되므로 반파정류전압으로 동작, 자기유지가 가능한 릴레이 콘택터를 사용할 필요가 있습니다.

If press PB₂ at moment return, current pass through MC with formed same value <circuit diagram 3-4> circuit. In this case, each side voltage(E) of MC need to be below return voltage rating value.

In moment shut-off return, since operated and self-retained by half-wave rectifying voltage, relay contactor which can be operated and selfretained by half-wave rectifying voltage need to be used.

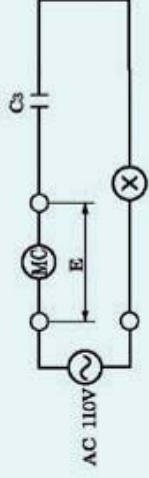
(AC110V)

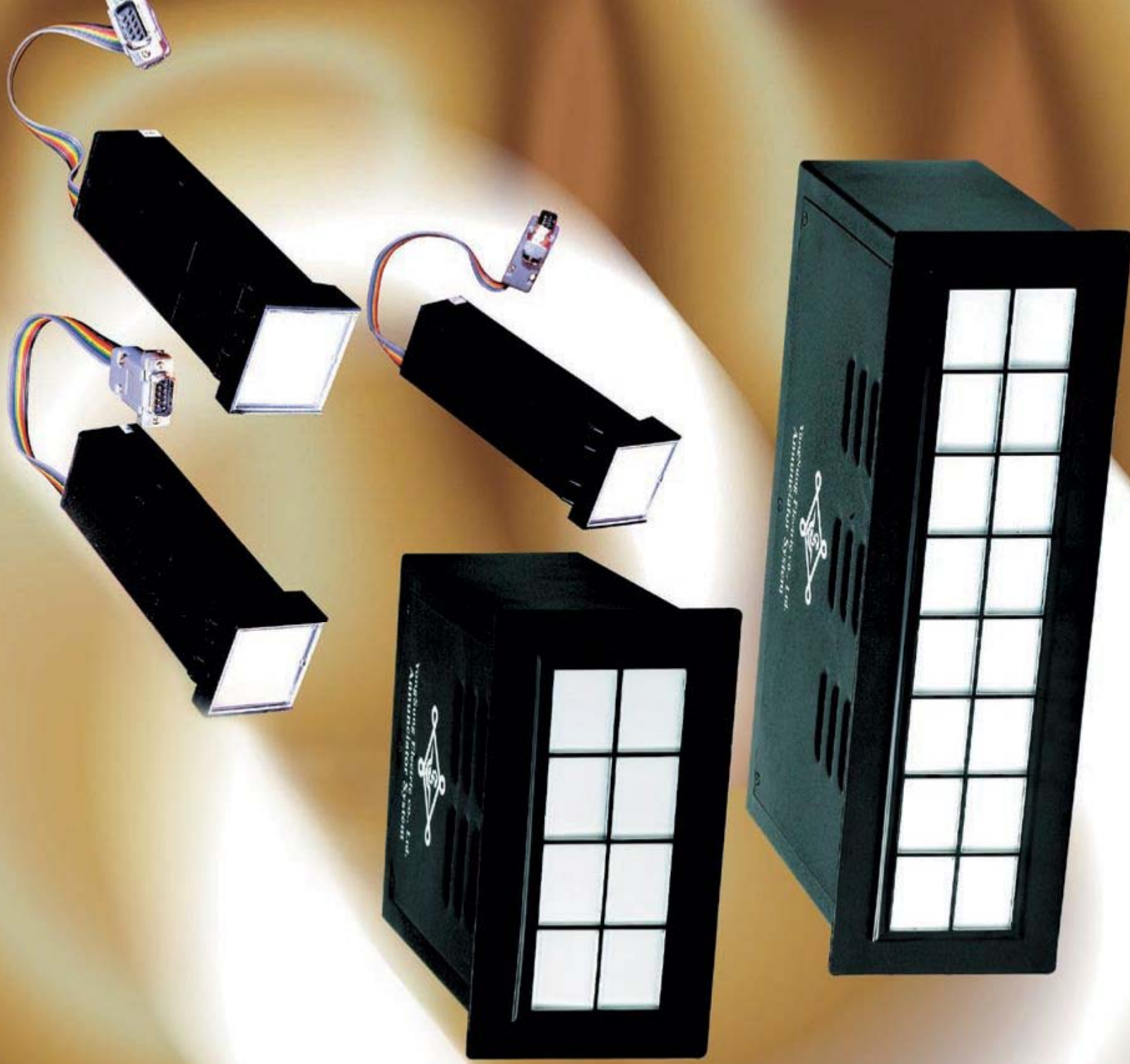
회로도-3 (circuit diagram-3)



(AC220V)

회로도-4 (circuit diagram-4)





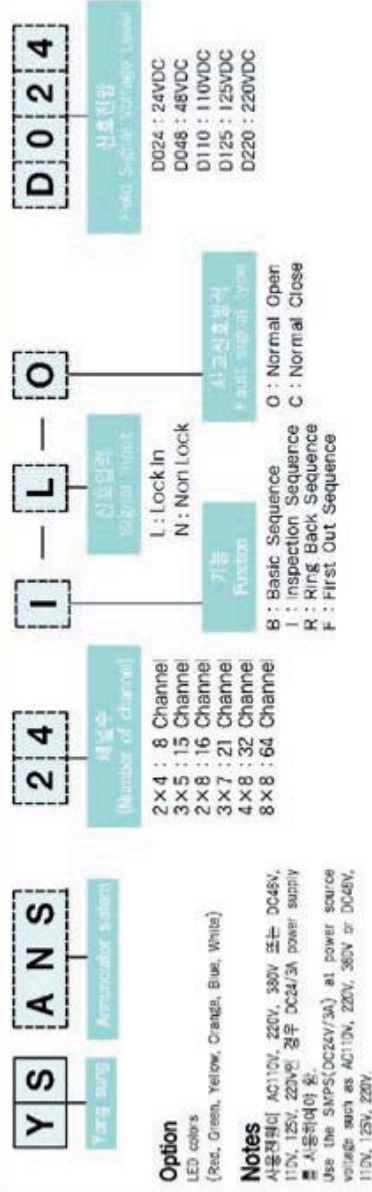
ILLUMINATED ANNUNCIATOR UNIT

14-1 집합형
14-2 조립형

14 조광표시 및 경보장치 ILLUMINATED ANNUNCIATOR UNIT

14-1 지함형 집합형 Integrated type

• 形式 區分圖 - Type classification diagram



• 特徴 - Features

- 마이크로프로세서 내장
- 최대 64채널 경보회로 구성
- 다양한 4가지 동작시퀀스
(default : Inspection Sequence)
- 채널별로 벨 혹은 부저 선택 가능
- 경보음의 자동 또는 수동해제
- 다양한 색상의 LED표시등
- NO/NC 선택사용
- Built in Microprocessor
- Selectable alarm circuit max. 64 CH
- 4 function Sequence (default : Inspection Sequence)
- Bell or Buzzer selectable by DIP switches on every channel
- Automatic or manual alarm stop
- LED lamp with various color
- selectable NO/NC input

• 性能 概要 - Performance summary

정격전압(Rating voltage)		DC 24V	
소비전력 (Power consumption)		YS ANS 8	About 10W
		YS ANS 15	About 12W
		YS ANS 16	About 13W
		YS ANS 21	About 20W
		YS ANS 32	About 30W
		YS ANS 64	About 60W
사고신호 (Fault signal)	Type	NO/NC	
	Duration time	Above 15msec	
	Field contact voltage	DC 24V, 48V, 110V, 220V (Fixed at factory)	
램프정격(Lamp rating)		DC 24V 20mA	
램프색상(Lamp color)		Red, Green, Yellow, Orange, Blue, White	
주위온도(Ambient temperature)		-25~40°C	
상대습도(Relative humidity)		45~85%	

● 特徴 - Features



이 집합형 아나운세터는 여러곳에 분산되어 있는 각종 설비 장치의 고장 및 운전상태를 감시하는 집합표시 및 경보를 발생시키는 장치로서 마이크로프로세서를 사용하여 소형화 시켜 취급이 편리하고 다양한 기능과 무접점식(Solid State)방식을 채택함으로써 카드화하여 신뢰성을 보장하며 기능변경 및 보수관리에 편리하게 설계되어 있다.

This annunciator is a intergrated display system and a concentrated alarm equipment to display and to alarm a trouble of equipment and operating status. It is miniaturized and well treated unit which used microprocessor. It is designed to make more function change and maintenance than a rack type because it is adapted to card inserting method using solid state type.

● 動作説明 - Operating Expanation

각 채널별로 벨 또는 부저를 디프스위치(Dip Switch)에 의해 설정하고, 램프테스트 기능을 통해 이를 확인할 수 있다. 각 채널별 고장신호시 벨 또는 부저에 경보출력을 내보내며, 이에 해당하는 집합형 표시등으로 정상(Normal)또는 플리커(Flicker)출력을 내보내 램프를 점멸시켜준다. 경보를 확인 후 경보회로를 수동 또는 자동으로 복귀시키면 경보음은 소거되지만 해당 표시램프는 점등이 계속 유지되며 뒤이은 고장신호에 따라 다시 경보음을 발생시킬 수 있다. 모든 사고원인을 제거한 후 리셋시킨다.

- 1) 해당 경보의 경중에 따라 측면하단에 위치한 dip switch 로 벨과 부저를 선택한다. 단, 창구색상은 벨은 RED, 부저는 GREEN 색상 사용을 권장함.
- 2) 연결회로도에 따라 결선하고 벨과 부저의 해당 LED점등상태를 램프테스트(lamp test)버튼으로 확인한다.
- 3) 램프의 정상유무를 확인한 후 동작시험(Op. test)버튼으로 시퀀스의 동작유무를 확인한다.
- 4) 정상상태에는 램프가 꺼져 있는 상태에서 이상신호가 발생되면 해당램프가 플리킹을 시작한다.

The ANS can select BELL and BUZZER by dip switch. It can be tested by lamp test button. Being the fault signal in each channel, The ANS sends alarm output toward bell or buzzer and then send flicker output to the display unit that correspond to each channel. After checking the alarm, if is selected auto alarm stop, the alarm is canceled passing 15 sec. but indication LED keeps being lighted. Reset after eliminating all fault signal sources.

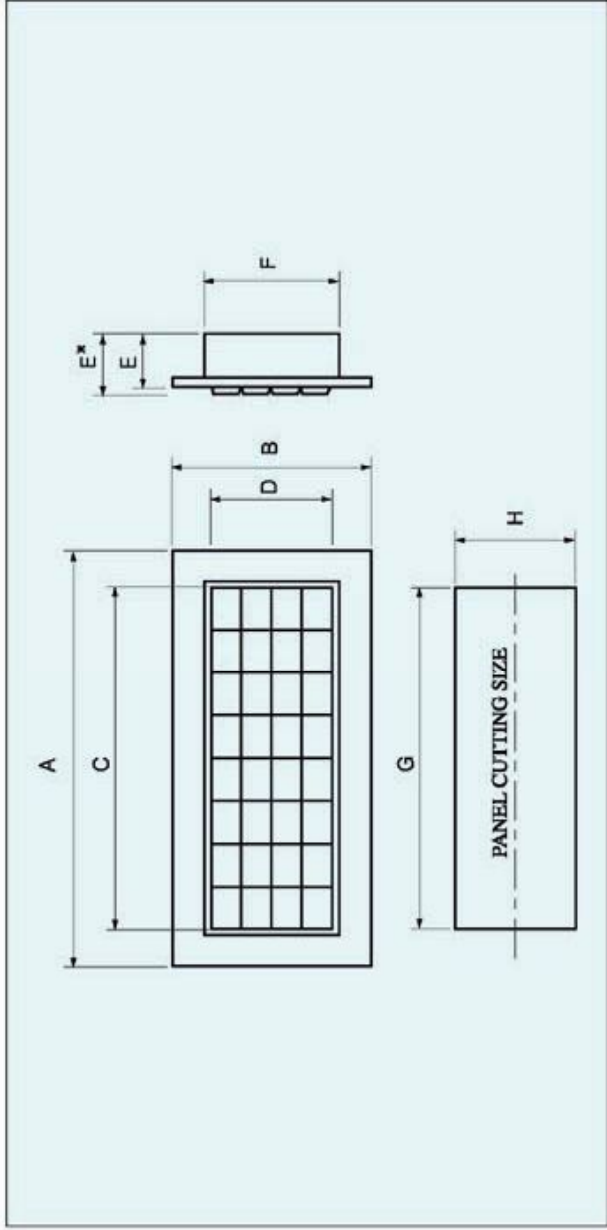
- 1) You can select bell or buzzer according to light or heavy fault at each channel. It is located in bottom side. We will recommend that the red LED correspond to BELL.
- 2) Connect the line according to a connection diagram then check LED lamp through lamp test button.
- 3) Check the sequence what user selected through operation test button.
- 4) Lamp is out off normal operating and if the abnormal signal appears, a corresponding lamp starts to flicking.

● LED色相 - Window

램프는 LED타입으로 6색상(Red/Green/Yellow/Orange/Blue/White)으로 구분되어 있으므로 UNIT 별로 다양하게 색상을 선택하여 사용할 수 있습니다.
또한 LED 램프 교체가 용이하며 Unit마다 상세하게 기기명 및 기기번호를 기입할 수 있도록 되어 있습니다.
Unit의 램프 사이즈는 30×40mm. (주문시 LED 색상을 반드시 표기하여 주십시오.)

The lamp is LED type which divided into 6 color(Red, Green, Yellow, Orange, Blue, White).
So, customer can choose various color of lamp and use what color they want.
Each unit can be writed product name and No. on the body.
The size of lamp is 30 × 40mm. (Please order of what LED color.)

● 集合表示燈 外形値數圖(Display Unit ShapeDimension Drawing)



Type	Dimension(Unit :mm)							
	A	B	C	D	E	E*	F	H
8CH(2×4)	210	110	160	60	192	197	90	92
15CH(3×5)	250	140	200	90	192	197	120	122
16CH(2×8)	370	110	320	60	192	197	90	92
21CH(3×7)	330	140	280	90	192	197	120	122
32CH(4×8)	370	170	320	120	192	197	150	152
64CH(8×8)	370	290	320	240	192	197	250	252

Notes Window size : 30mm × 40mm (approx.)

A : (n × 40) + 50 B : (n × 30) + 50 C : n × 40 D : n × 30 E : 192 E* : 197

F : (n × 30) + 30 G : A - 18 H : F + 2

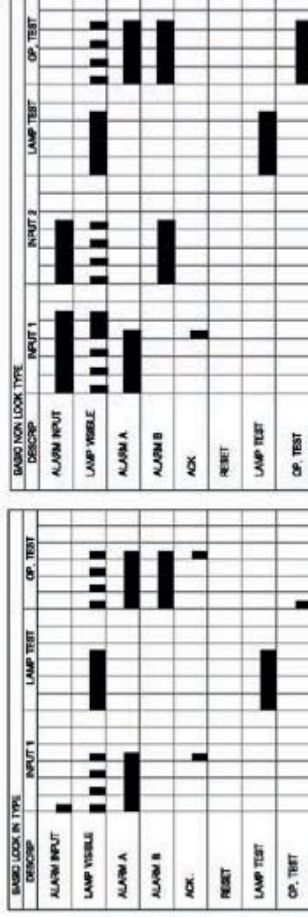
시퀀스 - Sequence

1. BASIC SEQUENCE

일반적으로 많이 사용되는 알람시스템입니다. 이상신호가 발생되면 해당램프가 플래킹(Flicking)을 시작하고 경보음을 발생시켜 이상상태를 운전자에게 알리게 됩니다. ACK. 버튼을 누르면 플래킹하던 램프와 경보음이 정지되고 복귀합니다.

Generally, It is used to a alarm system. When the abnormal signal is occurred, a LED lamp starts on flicking and alarm for the operator. When push acknowledge button, lamp and alarm is stopped and return to normal operating stage.

Timing diagram

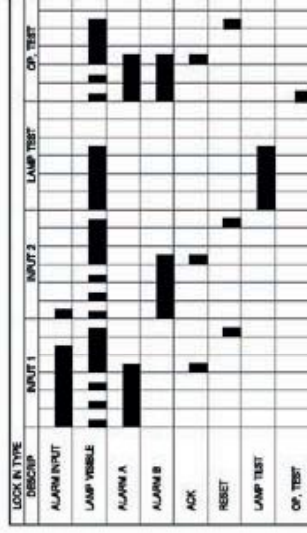


2. INSPECTION SEQUENCE

이 알람시스템은 경보입력신호의 기억기능을 첨부한 시스템으로 모든 작동 기능은 BASIC SEQUENCE와 동일합니다. 고장개소가 정상으로 환원된다 해도 이상개소를 표시할 수 있도록 되어 있으며, OPERATOR가 이상을 확인하고 ACK. 버튼을 누르면 플래킹하던 경보 램프가 점등상태로 바뀌고 경보음은 정지 됩니다. 경보입력이 해제된다 해도 경보 램프는 계속 점등되어 있어 고장 개소를 계속 표시하게 되며 리셋버튼을 누르므로 램프는 꺼지고 시스템은 복귀됩니다. 이 알람시스템은 LOCK IN형 전용으로 되어있습니다.

This alarm system is the same as basic sequence for an operating function with memorizing function of input alarm signal. In case of using of this system, even fault signal contact resource is returned to normal state, it is to be indicated lighting. If the operator push acknowledge button, an alarm is stopped and lamp is transferred from flicking to normal lamp. If reset button is pushed, lamp is out off and to be returned to normal operating state. This system is only typical for lock in type.

Timing diagram

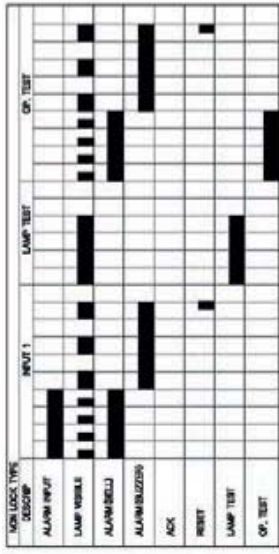
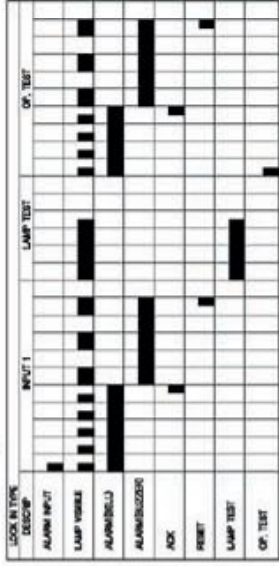


3. RING BACK SEQUENCE

이 경보시스템은 BASIC SEQUENCE와 동일한 작동이지만 경보가 시작될 때는 램프가 FAST 플리킹을 하며 1차 경보음을 냅니다. 이때 ACK. 버튼을 누르면 2차 경보음으로 바뀌며 램프는 SLOW플리킹으로 변합니다. 2차 경보음을 멈추기 위해서는 리셋버튼을 눌러야만 합니다. NON LOCK 입력인 경우에는 사고입력이 해제될 때 경보상황에서 정상상태로 환원동작을 알릴 수 있는 시스템입니다.

This alarm system of operating is the same as a basic sequence but lamp is fast flashing at alarm sounding. At this time, pushed acknowledge button, lamp is changed to slow flashing and sound is also changed to buzzer. If reset button is pushed, alarm sound is off and returned to normal state. This alarm system is a sequence used in case that we know abnormal state is dissolved at the non rock input and a system for informing that alarm state is restored to normal state.

Timing diagram

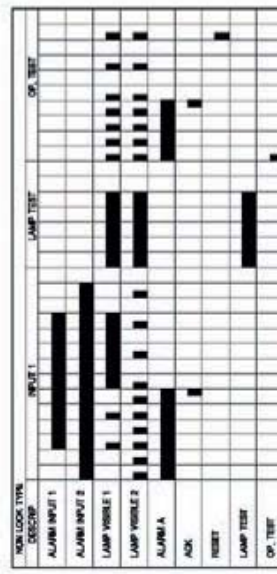
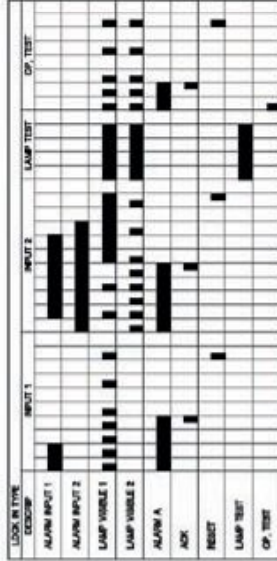


4. FIRST OUT SEQUENCE

최초의 경보(원인)와 그 이후의 경보 (결과)를 구별하는 시퀀스입니다. 처음 발생한 이상신호의 알람램프는 FAST플리킹을 하고 경보음이 파생되며 그 뒤 발생한 이상신호는 SLOW플리킹을 합니다. 이 때 ACK. 버튼을 누르면 경보음은 정지되고 FAST플리킹 하던 알람램프는 SLOW 플리킹 하고 나머지 알람램프들은 점등상태를 유지하며, 이상신호 해제시 소등됩니다. 이 때 리셋버튼을 누르면 정상으로 복귀 됩니다. 단, ACK. 버튼을 누른 후 리셋버튼을 누르기 전에 이상신호가 발생되면 알람램프는 SLOW플리킹으로 표시됩니다.

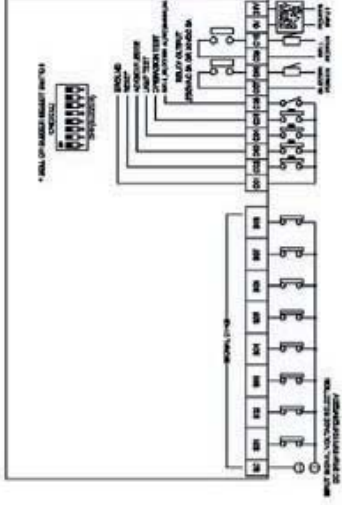
This alarm system is the sequence that distinguished between the first abnormal signal and subsequent signal. Alarm lamp of abnormal signal that appears first is fast flicking and alarm sound rings and that of abnormal signals that appears after that is slow flicking. At this time, if acknowledge button is pushed, alarm sound is stopped. Alarm lamp which is fast flicking is slow flicking, and other alarm lamps keep lighting state, but they are off when abnormal signal is cleared. At this time, if reset button is pushed, get normal state. However, after acknowledge button is pushed and before reset button is pushed if abnormal signal appears, alarm lamp is slow flicking.

Timing diagram

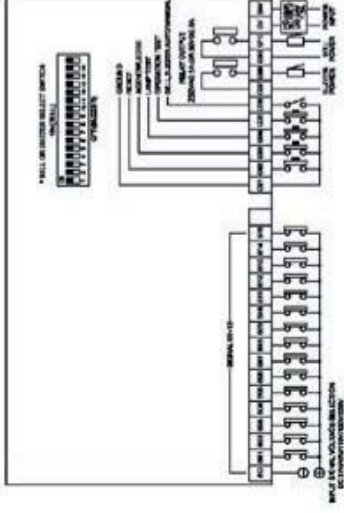


● 結線圖 - Connection Diagram

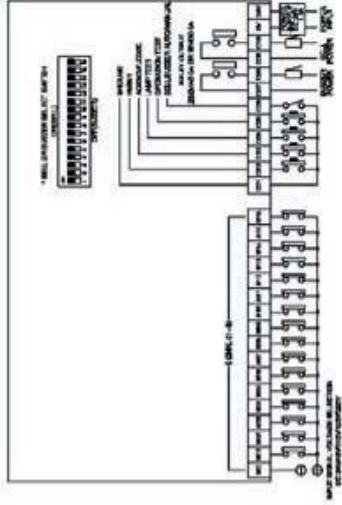
YS ANS 08 I-L-O D024



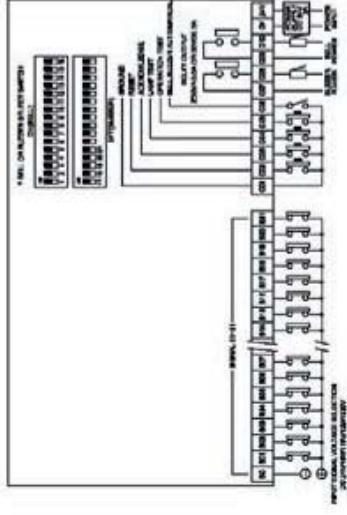
YS ANS 15 I-L-O D024



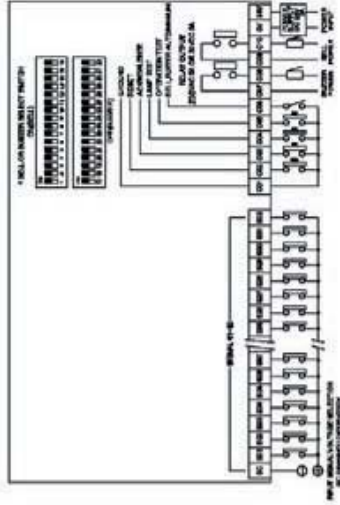
YS ANS 16 I-L-O D024



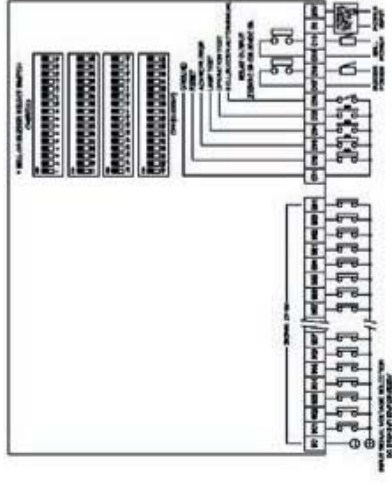
YS ANS 21 I-L-O D024



YS ANS 32 I-L-O D024



YS ANS 64 I-L-O D024



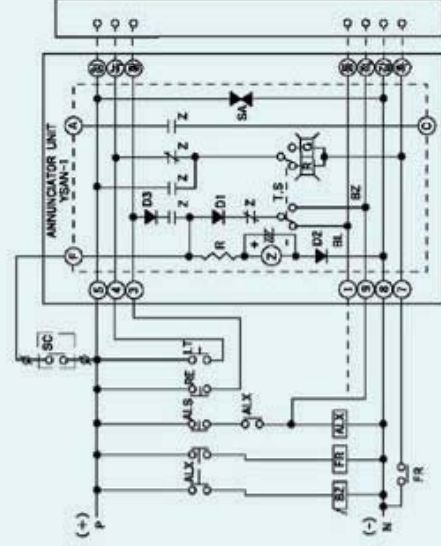
● 警報動作 狀態 - Alarm operating state

조건 (Condition)	표준상태 (Standard state)	비상발생 (Emergency occurrence)	비상계속 (Continuous emergency)	인지 (Acknowledgement)	경보복귀 (Alarm return)	장해제거 (Obstacle removal)	램프복귀 (Lamp return)
입력신호 (Input signal)							
경보신호 (Alarm signal)							
LED							

경보복귀
조광표시
및

● 内部 回路圖 - Inside circuit drawing

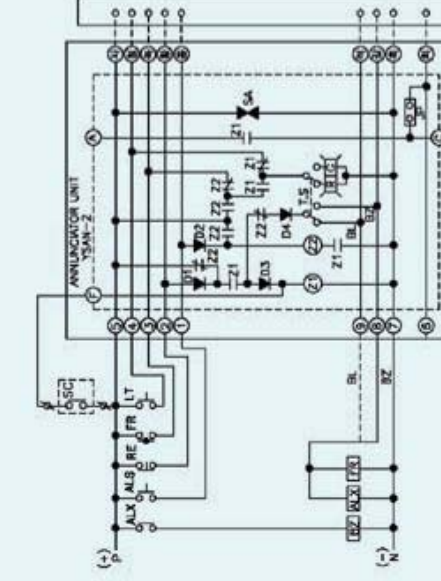
YSAN-1



NOTE

1. BZ : BUZZER
2. BL : BELL
3. ALX : ALARM AUX RELAY
4. ALS : ALARM STOP
5. RE : RESET
6. FR : FLICKER RELAY
7. LT : LAMP TEST
8. SC : SIGNAL CONTACTOR
9. (A)Ⓢ: REMOTE MONITORING CONTACTOR

YSAN-2



NOTE

1. BZ : BUZZER
2. BL : BELL
3. ALX : ALARM AUX RELAY
4. ALS : ALARM STOP
5. RE : RESET
6. FR : FLICKER RELAY
7. LT : LAMP TEST
8. SC : SIGNAL CONTACTOR
9. (A)Ⓢ: REMOTE MONITORING CONTACTOR
10. JP : COMMON OPTION

● 動作 説明 - Operating explanation

- 본 기기는 Bell, Buzzer 경보 회로와 같이 사용하십시오. 비상 발생 입력 신호는 F로 인가되어 RY를 구동시키고 선택스 위치로 BL(Bell)LED:적색, BZ(Buzzer) LED : 녹색을 선택하여 경보회로의 신호원으로 쓰이며 비상표시 창구에 점등 비상 발생 부분을 알려줍니다.
- 비상 상태 확인후 경보회로를 복귀시켜도 해당 표시 창구에는 점등이 계속 유지됩니다.
- 비상 발생 부분의 완전한 조치후 2번 단자가 자기 회로이므로 OFF신호를 인가 점등해제시키면 처음 상태로 복귀합니다.

註) YSAN1 TYPE은 경보출력시간이 20ms이므로, 지연 Relay가 별도로 필요합니다.

- Please use this device together with Bell, Buzzer alarm circuit, Emergency occurrence input signal drives RY by F product selects BL(Bell) LED : Red, BZ(Buzzer) LED : Green by selective switch and uses as signal source of alarm circuit and inform lighting emergency occurred part to emergency indication stage. lighting continues to be maintained in relevant Even after alarm circuit returns after confirming emergency stage. lighting continues to be maintained in relevant indication window. As terminal no. 2. is self-holding circuit after complete action on emergency occurred part if OFF signal is authorized lighting release, it retruns to initial stage.

Note) In YSAN 1 type, since alarm output time is 20ms, delay relay is necessary separately.

● 取付 方法 - Attachment method

- 삼입치수를 가로 43.5mm, 세로 33.5mm로 판넬 HOLE을 내 주십시오.
- UNIT는 전면 발광측의 카바를 벗긴후 렌즈를 빼내고 판넬에 밀착시킨 다음 위로 아래쪽으로 힘을 주어 눌러진 상태로 UNIT전면 앞쪽에 있는 볼트를 조여 주십시오.
- 취부 상태를 확인한 다음 이상이 없으면 렌즈를 끼우시고 카바를 끼워주시면 취부는 완료된 것입니다.
- Please make panel hole with the insertion dimensions of 43.5mm of width and 33.5mm of length.
- As for unit, please remove cover of front illuminating side, take lens out, stick to panel and then tighten bolts inside of unit front under the pushed state from top to downward.
- If no problem found after checking the attachment state, the attachment is completed with fitting lens and cover.



TEMPERATURE CONTROLLER

15-1 DF9 · DF7

15-2 DF6 · DD6

15-3 AN9 · AN7 · AD9 · AF7

15 온도제 TEMPERATURE CONTROLLER

15-1 DF9 · DF7
15-2 DF6 · DD6
15-3 AN9 · AN7 · AD9 · AF7

温度制御の 簡単な 常識 Brief Introduction of Temperature Controller

온도제어란 현재의 온도를 감시하여 설정한 온도와 비교하고 항상 같은 온도가 되도록 하는 Feed Back방식의 제어입니다. Temperature controller is the control of Feed Back method which check the current temperature, compare with the setting temperature and make the same temperature to be maintained all the time.

• 温度制御의 基本構成 - Basic structure of temperature controller

1. 測溫體
온도를 전기적 신호로 변환하여주는 열전대 또는 백금촉온체 등의 소자를 사용하며, 소자를 보호하고 사용하기 쉽도록 Pipe등 속에 넣어서 사용합니다.
2. 操作器
로(爐)나 Tank등을 가열 또는 냉각하는 기기로서 Heater 에 통전, 단전하는 전자개폐기. 연료를 공급 정지하는 Valve등을 말합니다.
3. 溫度調節器
촉온체의 신호를 받아서 목표<설정치>와 비교하여 조작기에 조절신호를 보내는 기기입니다.(그림1 참조)

1. Temperature measuring body

It uses elements such as thermoelectric band or platinum temperature measuring body etc, which transfer temperature to electric signal and, in order to protect them and make easy for use, also uses them with putting in pipe etc.

2. Operating device

As the device for heating or cooling furnace or tank, it includes electronic switching devices to transfer/cut electricity to heater and valves of fuel feeding stop etc.

3. Temperature controller

This is the device which receives the signal of temperature measuring body, compares with the target <set value> and transfers the control signal to operating device. (refer to fig. 1)

• 制御 方式 - Controlling method

1. 2位置制御方式

그림2 에서 보는 것과 같이 현재의 온도가 설정치보다 낮으면 출력이 ON되어 히터에 통전이 되고 설정치보다 높으면 출력이 OFF되어 단전하는 방식입니다. 조작량이 설정치를 경계로 하여 0%, 100%의 두가지 치로 동작하므로 2위치제어라고 합니다.

2. 比例制御方式

설정치에 대하여 일정한 비례대를 가지고, 그 비례대 안에서 조작량<조작출력량>이 편차에 비례하는 방식입니다. 현재의 온도가 비례대보다 낮으면 조작량은 100%, 비례대 안에서 편차에 비례하여 조작량이 천천히 적어져 설정치와 현재의 온도가 같으면 <편차가 없으면> 50%가 됩니다. 설정치를 넘어서도 계속 조작량이 적어져 현재의 온도가 비례대보다 높으면 조작량은 0%가 됩니다. (그림3 참조)

3. 時分割 比例와 比例週期

릴레이 출력은 그림 4 와 같이 비례대 안에서 주기적으로 ON OFF를 반복하며 ON시간은 편차에 비례합니다. 설정치에서는 ON OFF의 시간비가 1:1이며 조작량은 50%입니다. 이 ON, OFF의 주기를 비례주기라고 하며 이상과 같이 ON시간이 편차에 비례하면서 ON OFF를 반복하는 비례동작을 시분할비례 또는 시간비례라고 합니다.

4. OFF SET

비례제어동작에서 제어대상의 열용량, 히타의 가열용량 및 설정치 등의 불평형<Unbalance>으로 안정상태에 이르러서도 설정치와 일정한 오차가 생긴대로 유지되는 때가 많습니다. 이 오차는 비례동작뿐인 온도조절기에서 Reset Volume <MR>으로 수정할 수 있습니다.

5. 比例帶의 利用(Digital Type)

비례대를 좁게 할 수록 OFF Set가 적어집니다. 그러나 너무 좁으면 편차가 아래 위로 생기는 현상이 나타나고 또 처음 전원을 넣었을 때 Over Shoot가 생깁니다. 비례대를 조정하는 PB로 적당히 가변하여 사용합니다.

1. 2 position control method

As shown in fig. 2 it is the method which transferring electricity to heater with the output "on" if the current temperature is lower than the set one while cutting the electricity with the output "off" when higher than the set. As the operating amount is actuated by two values of 0%, 100% under the boundary of set value, it is called "2 position control method".

2. Proportional control method

With constant proportional band against the set value, it is the method which the operating amount <operating output amount> proportionates to this deviation in the proportional band. If the current temperature is lower than the proportional band the operating amount will be 100%, while if comparing with deviation in the band the amount becomes slowly smaller to be same <no deviation> between the current temperature and set value, it will be 50%. If the current temperature is higher than the band as operating amount continues to be smaller even over the set value, the operating amount will be 0%. (refer to fig. 3)

3. Time dividing proportion and Proportional Period

Relay output repeats ON/OFF periodically in the proportion of ON/OFF is 1:1 and operation amount, 50%. This ON/OFF period is called proportional period and the ON/OFF repeating proportional operation, while ON time proportionates to deviation like the above is called time diving proportion or time proportion, refer to fig.4

4. OFF Set

In proportional control operation, there are many cases to maintain the set value and the certain error as they are, even in reaching at stable state due to heat capacity of control object, unbalanced heating capacity and set value etc, of heater. This error can be corrected by Reset Volume <MR> in temperature controller which has only proportional operation.

5. Use of proportional band<Digital type>

The more narrow proportional band is, OFF Set becomes smaller. But if too narrow, up and down deviations are occur and also Over Shoot is appeared in the first power source "ON". It is advisable to use P.B. controlling proportional band with moderately variable.

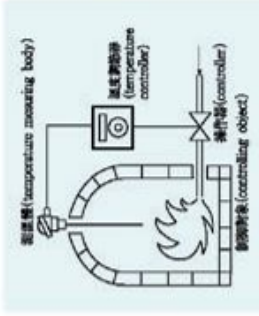


그림-1 (Fig.1)

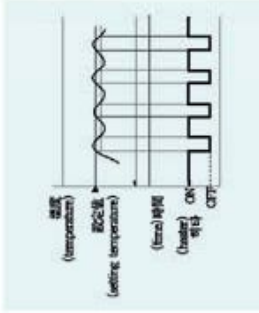


그림-2 (Fig.2)

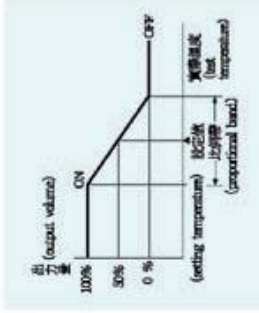


그림-3 (Fig.3)

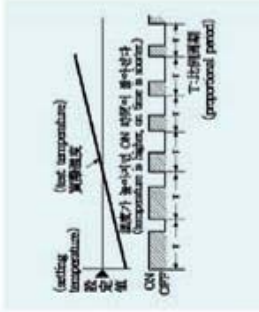
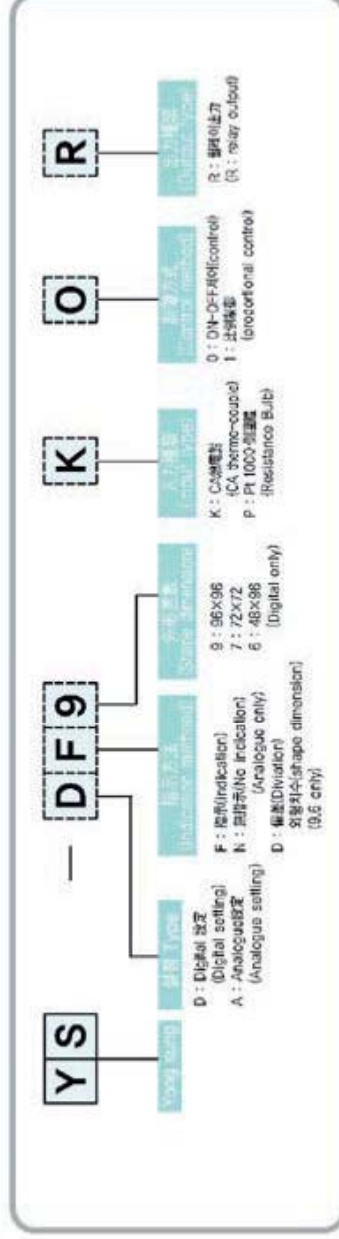


그림-4 (Fig.4)

● 形式 區分圖 - Type classification diagram



15-1 DF9・DF7 Series

● 定格 - Rating

電源電壓 (Power source voltage)	AC90~240V 50~60Hz
消費電力 (Power consumption)	about 5VA
入力 (Input)	熱電對(Burn-out回路付), 白金測溫體 (Pt 100Q) thermo-couple(Burn-out circuit) Resistance Bulb (Pt 100Q)
制御方式 (Control method)	ON/OFF制御, 時間比例制御 (ON/OFF control, Time proportional control)
設定方式 (Setting method)	Digital 방식 (Digital type)
指示方式 (Indication method)	Red LED 7 segment
變換方式 (A/D Conversion method)	Double integral type
制御出力 (Control output)	릴레이 (250V 3A 抵抗負荷) Relay (250V 3A resistance load)
使用周圍溫度 (Ambient temperature)	0℃ ~ +50℃
使用周圍濕度 (Ambient humidity)	35 ~ 85% RH
相對濕度 (Relative humidity)	45 ~ 85%

● 性能 概要(Performance summary)

設定精度 (Setting precision degree)	1℃ (0.1℃)
精度 (Precision degree)	±0.5%FS+1 Digit
分辨率 (Resolution degree)	1℃ (0.1℃)
比例帶 (Proportional band)	1~10% 可變 (1~10% variable)
比例週期 (Proportional Range)	about 25sec
Reset 範圍 (Reset range)	±1.5%
冷接點補償範圍 (Cool contact compensating range)	0 ~ 50℃
絕緣抵抗 (Insulation resistance)	above 20MQ (DC 500V, Meg)
耐電壓 (Withstand voltage)	AC2,000V 60Hz 1分間 (但, 導電部端子と 非金屬間) AC 2,000V 60Hz 1min. (only between conductive terminal and non-metal)
壽命 (Lifetime)	機械的 100萬回以上, 電氣的 10萬回以上 (mech : above 1,000,000 times, elect : above 100,000 times)

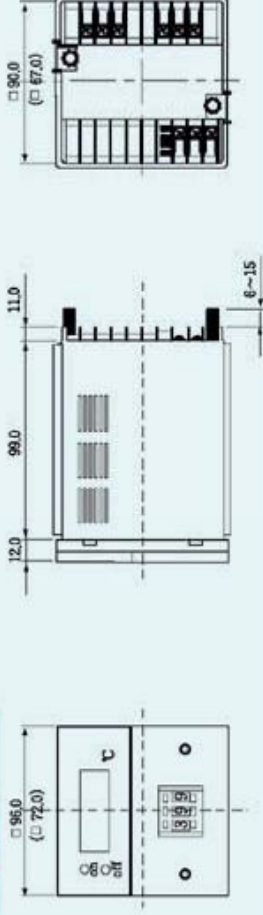
● 標準 눈금 - Standard scale

溫度範圍 °C (Temp. range °C)	分解度 (resolution)	入力種類 (input type)
0~99.9	0.1°C	Pt
0~199.9	0.1°C	Pt
0~399	1°C	K, Pt
0~999	1°C	K
0~1199	1°C	K

● 外形/値數圖 - Shape/Dimension Drawing

(unit : mm)

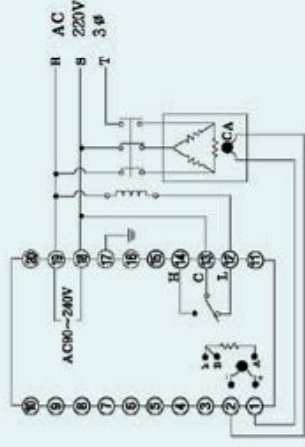
YS DF9(YS DF7)



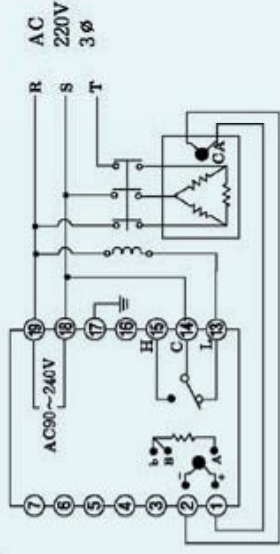
온도계

● 結線圖 - connection diagram

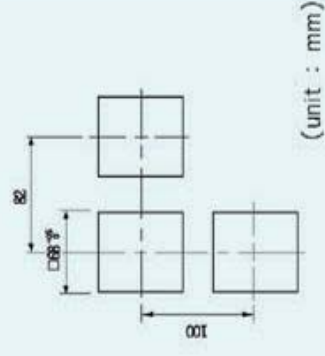
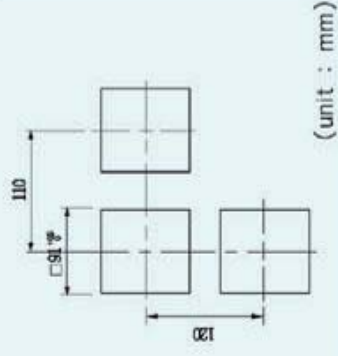
YS DF9



YS DF7



● PANNEL 加功値數
Pannel Processing dimension



● 定格 - Rating

性能 (Performance)	TYPE	DF 6	DD 6
電源電壓 (Power source voltage)		AC90~240V 50~60Hz	AC110/220V 50/60Hz
消費電力 (Power consumption)		about 5VA	
入力 (Input)		熱電對 (Burn-out 回路付), 白金測溫體 (Pt 100Q) thermo-couple(Burn-out circuit) Resistance Bulb (Pt 100Q)	
制御方式 (Control method)		ON/OFF制御, 時間比例制御 (ON/OFF control, Time proportional control)	
設定方法 (Setting method)		Digital 방식 (Digital type)	
指示方式 (Indication method)		Red LED 7 segment	偏差指示計 (Deviation indicator)
變換方式 (A/D Conversion method)		(Double integral type)	
制御出力 (Control output)		릴레이 (250V 3A 抵抗負荷)	Realy (250V 3A resistance load)
使用周囲温度 (Ambient temperature)		0℃ ~ +50℃	
相對濕度 (Relative humidity)		45 ~ 85%	

● 性能 概要 - Performance summary

設定精度 (Setting precision degree)	1℃ (0.1℃)
精度 (Precision degree)	±0.5% FS+1 Digit
分解度 (Resolution)	1℃ (0.1℃)
比例週期 (Proportional Range)	about 25sec
Reset 範圍 (Reset range)	3% FS
冷接点補償範圍 (Cool contact compensating range)	0 ~ 50℃
絕緣抵抗 (Insulation resistance)	above 20MQ (DC 500V, Meg)
耐電壓 (Withstand voltage)	AC2,000V 60Hz 1分間 (但, 導電部單子和 非金屬間) AC2,000V 60Hz 1min, (only between conductive terminal and non-metal)
壽命 (Lifetime)	機械的 10萬回以上, 電氣的 10萬回以上 (mech : above 1,000,000 times, elect : above 100,000 times)

● 標準 寸금 - Standard scale

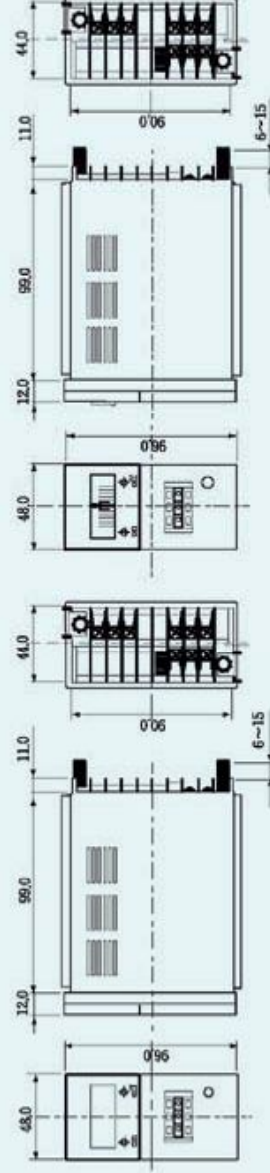
溫度範圍 ℃ (Temp. range ℃)	分解度 (resolution)	入力種類 (input type)
0~99.9	0.1℃	Pt
0~199	1℃	K, Pt
0~399	1℃	K, Pt
0~999	1℃	K

外形/値數圖 - Shape/Dimension Drawing

(unit : mm)

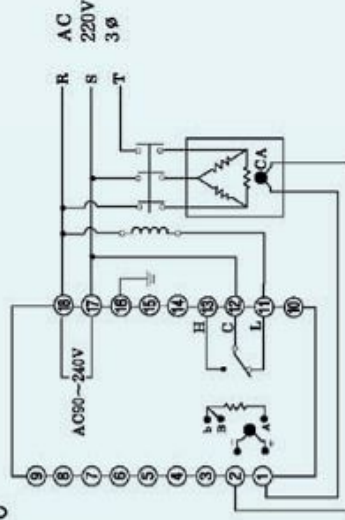
YS DF6

YS DD6

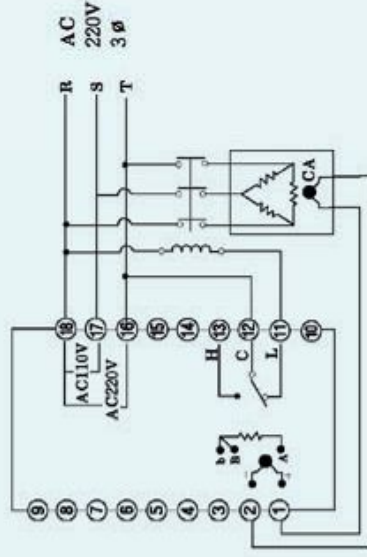


結線圖 - connection diagram

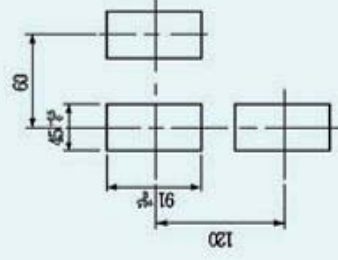
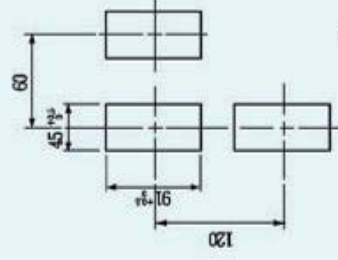
YS DF6



YS DD6



PANEL 加功值數 Panel Processing dimension



● 定格 - Rating

電源電壓 (Power source voltage)	AC110/220V 50~60Hz
消費電力 (Power consumption)	定格전압 ±10%
許容電壓變動範圍 (Allowable variable voltage)	about 2VA
入 力 (Input)	熱電對 (Burn-out 回路付), 白金測溫體 (Pt 100Ω) thermo-couple (Burn-out circuit) Resistance Bulb (Pt 100Ω)
制御方式 (Control method)	ON/OFF制御, 比例制御 (ON/OFF control, proportional control)
設定方式 (Setting method)	Analogue 방식 (Analogue type)
指示方式 (Indication method)	메타지시(F), 편차(D)방식 (Meter Indication(F), Deviation(D) method)
制御出力 (Control output)	릴레이 1c AC250V 3A (抵抗負荷) Relay 1c 250V 3A (resistance load)
使用周囲温度 (Ambient temperature)	0℃ ~ +50℃
相對濕度 (Ambient humidity)	45 ~ 85%

● 性能 概要 - Performance summary

設定精度 (Setting precision degree)	below ±1% FS
指示精度 (Indication Precision degree)	below ±1.5% FS
比例帶 (Proportional band)	3% FS 固定 (3% FS fixed)
比例週期 (Proportional Range)	about 25 sec.
偏差指示範圍 (Deviation indication range)	±50℃ (5.0℃)
冷接点補償範圍 (Cool contact compensating range)	0 ~ 50℃
Reset 範圍 (Reset range)	±3%FS (지시, 편차식만) (indicationm deviation type only)
絕緣抵抗 (Insulation resistance)	above 20MQ (DC 500V. Meg)
耐電壓 (Withstand voltage)	AC 2,000V 60Hz 1分間 (但, 導電部端子와 非金屬間) AC 2,000V 60Hz 1min. (only between conductive terminal and non-metal)
壽命 (Lifetime)	機械的 100萬回以上, 電氣的 10萬回以上 (mech : above 1,000,000 times, elect : above 100,000 times)

● 標準 눈금 - Standard scale

溫度範圍 °C (Temp. range °C)	눈금 (one scale)	入力種類 (input type)
0~100	1℃	Pt
0~200	2℃	K, Pt
0~300	5℃	K, Pt
0~400	5℃	K, Pt
0~600	10℃	K
0~800	10℃	K
0~1000	10℃	K
0~1200	10℃	K



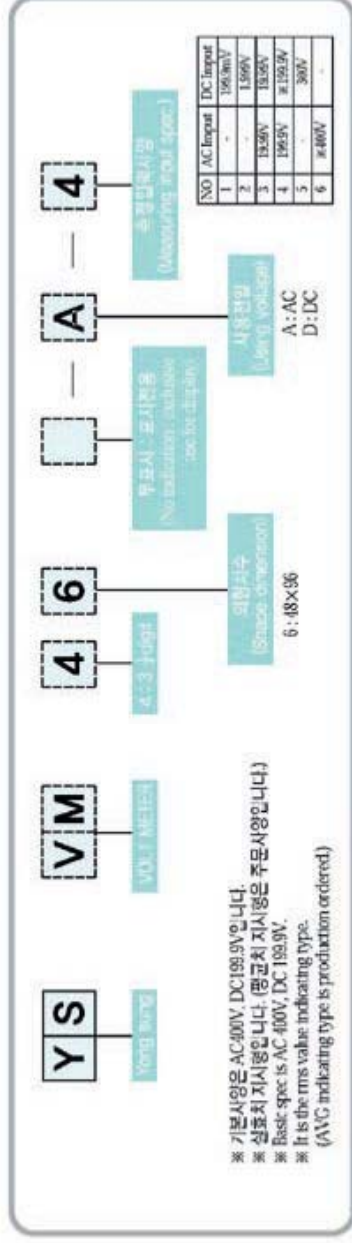
METERS

- 16-1 AC, DC Volt Meter
- 16-2 AC, DC Ampere Meter

16 메타류 METERS

16-1 AC, DC 전압계
AC, DC Volt Meter

• 形式 區分圖 - Type classification diagram



• 特徴 - Features

- 최대 표시가 1999
- AUTO ZERO 기능
- 7 Segment LED Display
- DIN 규격에 의한 Case size
- 표시전용
- Max display is 1999
- AUTO ZERO function
- 7 Segment LED Display
- Case size by Din standard
- Exclusive use for display

• 定格 - Rating

모델명 (Model name)	VM46-A-□ VM46-D-□
측정기능 (Measuring function)	AC, DC 전압측정 (Measuring of AC, DC Voltage)
정격전압 (Rating voltage)	AC 110/220V 50/60Hz
허용전압변동범위 (Permissible voltage variation range)	정격전압의 ±10% (±10% of rating voltage)
소비전력 (Power consumption)	4VA
지시방식 (Indication mode)	7 segment LED display
지시정도 (Indication grade)	AC : F S+0.5% rdg±1 digit DC : F S+0.5% rdg±1 digit
샘플링주기 (Sampling frequency)	400ms
동작방식 (Response speed)	2중 적분방식 (double integration method)
응답속도 (Response speed)	약 2초 (0에서 Max.까지) approx. 2 sec (from 0 to Max.)
최대허용입력(Max. Permissible input)	각 레인지별 사양의 150% (150% of spec. by each range)
표시회수 (Display times)	2.5 times/sec

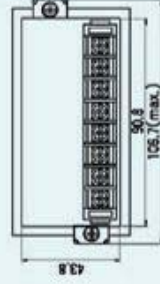
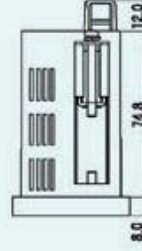
● 성능 개요 - Performance summary

絶緣抵抗 (Insulation resistance)		above 100MΩ (DC 500V Meg)
耐電壓 (Withstand voltage)		AC 2,000V/min
耐노이즈 (Withstand noise)		노이즈 시뮬레이터에 의한 방형파 노이즈 (펄스폭 1μs) ±1KV (surge wave noise by noise simulator (Pulse width 1μs) ±1KV)
振動 (Vibration)	耐振動 (Withstand vibration)	10~55Hz(주기 1분간), 복진폭 0.75mm, XYZ 각방향 1시간 (10~55Hz(for 1 min of a cycle), double amplitude 0.75mm XYZ 1hr for each direction)
	誤動作 (Malfunction)	10~55Hz(주기 1분간), 복진폭 0.5mm, XYZ 각방향 10분 (10~55Hz(for 1 min of a cycle), double amplitude 0.5mm XYZ 10min for each direction)
衝擊 (Impact)	耐衝擊 (Withstand impact)	300m/s ² (about 30G)
	誤動作 (Malfunction)	100m/s ² (about 10G)
使用周圍溫度 (Ambient temperature)		-25℃ ~ +40℃
相對濕度 (Relative humidity)		45 ~ 85%

● 外形/値數圖 - Shape/Dimension Drawing

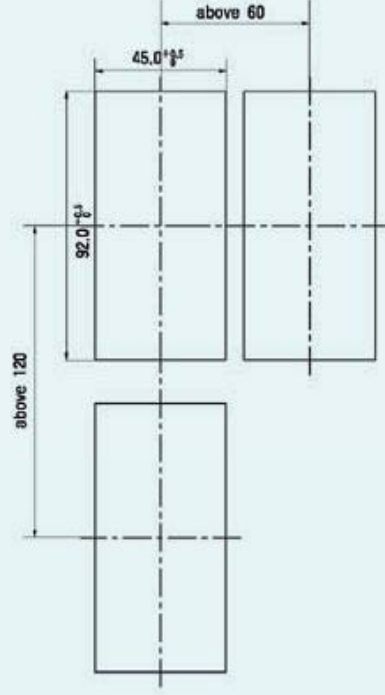
(unit : mm)

YS VM46

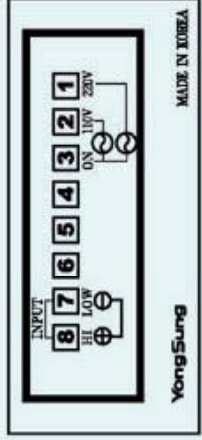


● 판넬 取付 値數圖 - Panel attachment dimension drawing

(unit : mm)



• 접속도 - Connection diagram

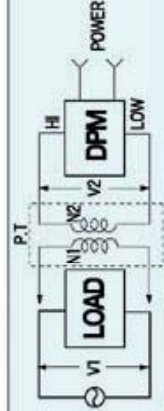


• 접속 응용례 - Application example of connection

▶ AC전압 측정법 (Measuring method of AC voltage)



측정전압 V1이 AC400V이하일 때
(When measuring voltage V1 is below AC400V)



※ $V2 = \frac{N2}{N1} \times V1$ (측정전압 V1이 AC400V 이상일 때) (When measuring voltage V1 is above AC 400V)

※ 측정하고자 하는 전압이 AC400V 이상일 때는 외부에서 변압기(P.T.)를 사용하여 주십시오.(V2 전압이 최대측정전압 이하가 되어야 합니다.)

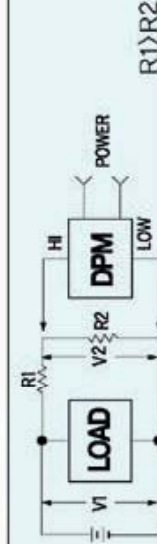
(※ When voltage intended for measurement is above AC 400V, use a potential transformer(P.T) in the outside.(V2 voltage shall be below the max. measuring voltage))

▶ DC전압 측정법 (Measuring method of DC voltage)



측정전압 V1이 DC300V이하일 때

(When measuring voltage V1 is below DC300V)



※ $V2 = \frac{R2}{R1+R2} \times V1$ (측정전압 V1이 DC300V 이상일 때) (When measuring voltage V1 is above DC 300V)

※ 측정하고자 하는 전압이 DC300V 이상일 때는 외부에서 배율저항을 사용하여 V2전압이 최대측정전압이하가 되게 R1, R2저항값을 정하십시오.

※ When voltage intended for measurement is above DC 300V, decide R1, R2 resistance value by using the magnification resistance so that V2 voltage may be below the max. measuring voltage.

● 바르게 사용하는 방법 - Right using method

- 전기종 AUTO ZERO 기능을 갖고 있습니다.
- 즉, 측정 Input 단자가 개방되거나, 단락되었을 때 "000"을 지시합니다.
- 입력을 가했을 때 이상한 문자가 표시되면 입력사양보다 입력신호가 크거나 측정입력에 문제가 있으므로 전원을 차단하고 선로를 점검하십시오.
- DC전압 측정시 측정전압이 DC300V 이상이면 배율저항을 사용하여 Input전압을 분할시켜 주십시오.
- AC전압 측정시 측정전압이 AC400V이상이면 P.T를 사용, 2차전압이 400V이하가 되게 하여 주십시오.
- 기본사양으로 표기된 지시값은 측정입력과 지시값이 1:1입니다.
ex) INPUT: 0~200V
지시 : 0~199.9V
사양 No. : 4번

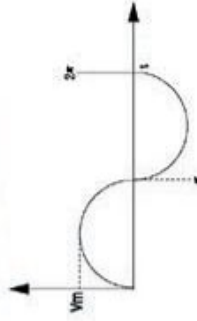
- All the types of voltmeter have auto zero function.
That is, when measuring input terminal is open or short-circuit, "000" in indicated.
- In the case that abnormal letter appear when input is applied, it is because the input signal is larger than input spec or measuring input has the problem, turn off the power source and check-out circuit line.
- When measuring DC voltage, if measuring voltage is above DC300V, separate input voltage by using magnification resistance.
- When measuring AC voltage, if measuring voltage is above AC400V, set the secondary voltage as below 400V by P.T
Indication value mentioned as basic spec has 1:1 relations of measuring input and indication value.
ex) Input : 0~200V
Indication : 0~199.9V
Spec number : No. 4

● 교류의 측정방법 - Measuring method of AC

- 교류에서의 전압 또는 전류를 측정하는 방법에는 크게 두가지로 구분되는데, 평균값을 읽는 방법과 실효값을 읽는 방법을 들 수 있습니다.
- 어떤 방법으로 측정하여 한다는 규정은 없으며, 단지 사용자의 주관에 의하여 선택할 수 있습니다. 일반적인 평균값(AVG) 측정과 실효값(rms) 측정시에는 약 1.1배의 차이를 나타냅니다. 저희 YongSung에서는 실용성 있는 실효값 지시형을 생산합니다.

- Measuring methods of voltage of current in AC are divided into two methods, average value(AVG) reading method and root mean square(rms) reading method. User can choose any method depending on his own judgement.
Generally, AVG and rms measurement have a difference of approx 1.1 times. Yongsung is manufacturing rms indicating type for paractical.

(정현파의 경우) (in regular wave)



$$\text{평균값(AVG)} = \frac{2V_M}{\pi}$$

$$\text{실효값(rms)} = \frac{2}{\sqrt{2}} V_M$$

평균값(AVG)=0.637Vm(단, Vm은 최대값) (but, Vm is max value)
평균값의 정의 : 교류파형에서 반주기씩 평균한 값을 취하는 방법을 말합니다.

Definition of average value : the method taking-out average value by each half-circle in AC wave form.

▶ 평균값 측정시 일그러진 파형의 측정결과치

Measuring result value of distorted wave form in measuring average value

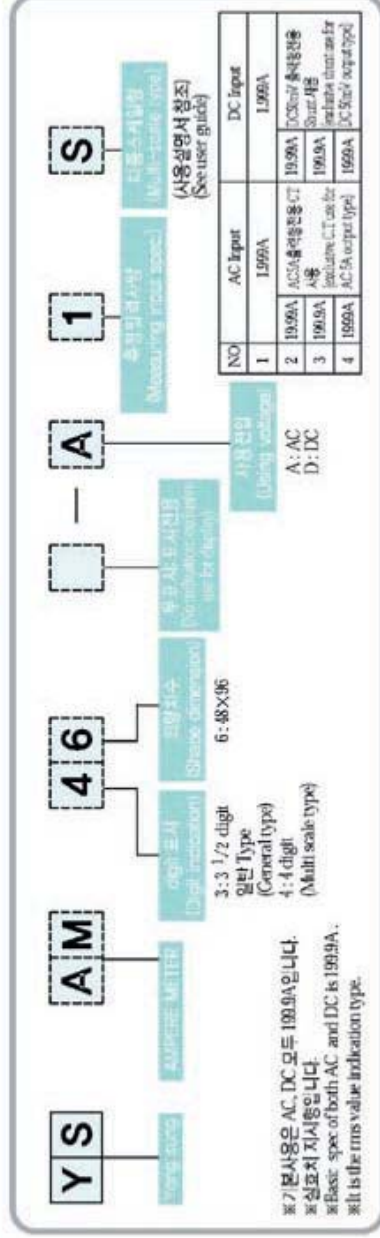
평균값을 측정할 경우에는 파형의 일그러짐 율에 따라 지시치의 편차가 크게 나타날 수 있습니다. 정현파에 가까운 파형은 평균값이나 실효값중 어떤 방법이나 큰 차이는 없습니다.

In the case of measuring average value, deviation of indication value can be severe according to the distortion rate of wave form. Wave form which is close to the regular wave has a little deviation in AVG or rms.

16-2

AC, DC 전 류 계
AC, DC Ampere Meter

• 形式 區分圖 - Type classification diagram



• 特徴 - Features

- 최대 표시가 9999.(Multi-Scale type은 9999까지 표시됩니다.)
- AUTO ZERO 기능
- 7 Segment LED Display
- DIN 규격에 의한 Case size
- 표시전용
- 다중스케일형은 10~100A는 5A 간격, 100A~1000A는 50A 간격, 1000A~10,000A는 500A 간격으로 선별 조절 가능합니다.
- Max display is 9999.
- AUTO ZERO function
- 7 Segment LED Display
- Case size by Din standard
- Exclusive use for display
- Multi-scale type can be selective-controlling used as 5A interval for 10~100A, 50A interval for 100~1000A, 500A interval for 1000~10000A.

• 定格 - Rating

모델명 (Model name)	AM36-A-□ AM46-A-□	AM36-D-□ AM46-D-□
측정기능 (Measuring function)	AC, DC 전류측정 (measuring of AC, DC current)	
정격전압 (Rating voltage)	AC 110/200V	
허용전압변동범위 (Permissible voltage variation range)	정격전압의 ±10% (±10% of rating voltage)	
소비전력 (Power consumption)	4VA	
지시방식 (Indication mode)	7 segment LED display	
지시정도 (Indication grade)	AC : F S=0.5% rdg±1 digit DC : F S=0.5% rdg±1 digit	
샘플링주기 (Sampling frequency)	400ms	
동작방식 (Operating type)	2중 적분방식 (double integration method)	
응답속도 (Response speed)	약 2초 (0에서 max.까지) approx. 2 sec (from 0 to Max.)	
최대허용입력 (Max. Permissible input)	각 레인지별 사양의 150% (150% of spec. by each range)	
표시회수 (Display times)	2.5 times/sec	

● 性能 概要 - Performance summary

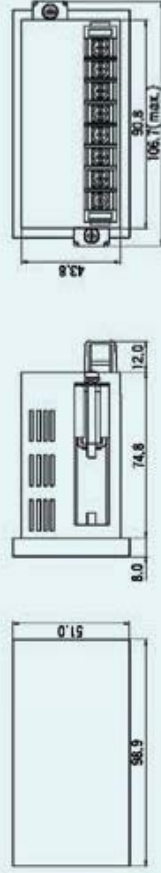
絶縁抵抗 (Insulation resistance)		above 100MΩ (DC 500V, Meg)
耐電壓 (Withstand voltage)		AC 2,000V/min
耐노이즈 (Withstand noise)		노이즈 시뮬레이터에 의한 방형파 노이즈 (펄스폭 1μs)±1KV surge wave noise by noise simulator (Pulse width 1μs)±1KV
振 動 (Vibration)	耐振動 (Withstand vibration)	10~55Hz (주기1분간), 복진폭 0.75mm, XYZ 각방향 1시간 10~55Hz (for 1 min of a cycle), double amplitude 0.75mm XYZ 1 hr for each direction
	誤動作 (Malfunction)	10~55Hz (주기1분간), 복진폭 0.5mm, XYZ 각방향 10분 10~55Hz (for 1 min of a cycle), double amplitude 0.5mm XYZ 10min for each direction
	衝擊 (Impact)	300m/s ² (about 30G)
使用周圍溫度 (Ambient temperature)		100m/s ² (about 10G)
相對濕度 (Relative humidity)		-25℃ ~ +40℃
		45 ~ 85%

● 外形/值數圖 - Shape/Dimension Drawing

YS AM46

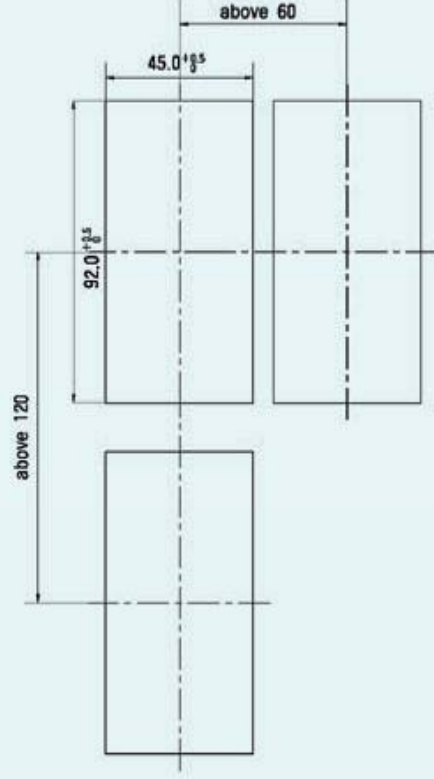


(unit : mm)

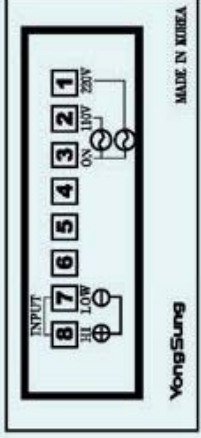


● 판넬 取付 值數圖 - Panel attachment dimension drawing

(unit : mm)



• 접속도 - Connection diagram

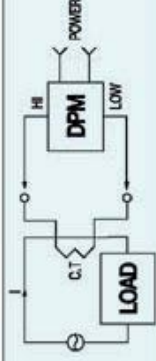


• 접속 응용례 - Application example of connection

▶ AC전류계 접속방법(Connection method of AC ampere meter)

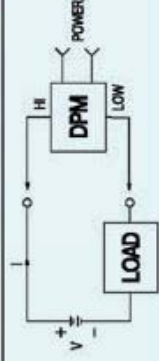


AC5A 이하 전류측정법
(Current measuring method of below AC5A)

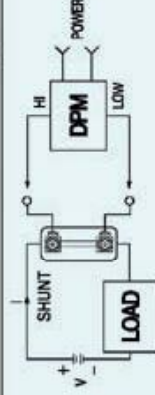


AC5A 이상 전류 측정법
(Current measuring method of above AC5A)
※ AC5A 이상인 전류는 전류변환기(C.T)를 사용하여 측정합니다.
※ Current above AC5A shall be measured by current transformer(C.T).

▶ DC전류계 접속방법 (Connection method for DC ampere meter)



DC5A 이하 전류측정법
(Current measuring method of below DC5A)
※ DC5A 이하인 전류는 전류계에 직접 연결하여 측정합니다.
※ Current below DC5A shall be measured in direct connection with ampere meter.



DC5A 이상 전류측정법
(Current measuring method of above DC5A)
※ DC5A 이상인 전류는 Shunt를 사용하여 측정합니다.
※ Current above DC5A shall be measured by shunt.

● 바르게 사용하는 방법 - Right using method

● 일반형

- 전기종 AUTO ZERO 기능을 갖고 있습니다.
- 즉, 측정 INPUT 단자가 개방되거나, 단락되었을 때 "000"을 지시합니다.
- 입력을 가했을 때 이상한 문자가 표시되면 입력사양보다 입력신호가 크거나 측정입력에 문제가 있으므로 전원을 차단하고 선로를 점검하십시오.
- DC전압 측정시 직접 측정할 수 있는 전류는 5A이하입니다.
- 기본사양으로 표기된 지시값은 측정입력과 지시값이 1:1입니다.

ex)

	외부 Shunt형 (external shunt type)	내부 Shunt형 (internal shunt type)
INPUT	0~200A	0~5A
지시 (Indication)	0~199.9A	0~1.999A
사양 No.(Spec.number)	3	1

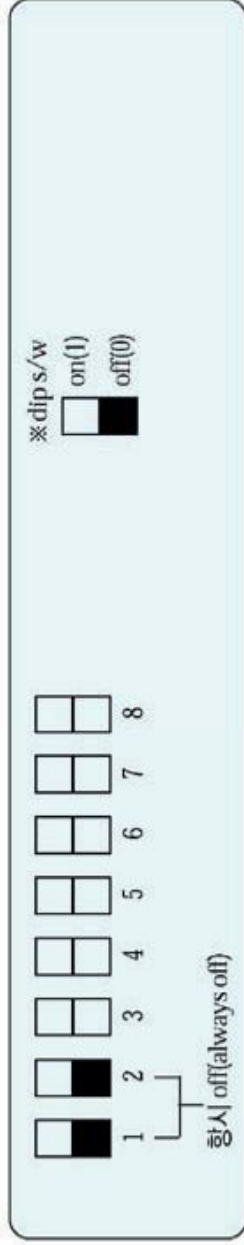
● General type

- All the types of voltmeter have auto zero function.
- That is, when measuring input terminal is open or short-circuit, "000" in indicated.
- In the case that abnormal letter appear when input is applied, it is because the input signal is larger than input spec or measuring input has the problem. turn off the power source and check out circuit line.
- In measuring DC current, direct measurable current is below 5A.
- Indication value mentioned as basic spec has 1:1 relation or measuring input and indication value.

● 다중스케일형 - Multi-Scale type

- Analog meter와 마찬가지로 회로 구성시 사용하는 Shunt(50mV)의 용량에 맞추어 meter의 Dip S/W를 Setting 한다.
- Meter의 전원을 투입시 회로 Setting값이 1초간 display된 후, 측정 Mode로 들어갑니다.
- 이때, ---- 표시되면 Dip S/W가 불량이고, 원하는 dip의 Ampere값이 나타나면 정상이다.
- 측정 Mode로 들어갔을 때 ---- 가 표시되면 현재 측정치가 overflow되어 있는 표시고, -부호가 들어오면 underflow가 되어 있는 것이니 입력을 점검하십시오.
- Like analogue meter, set Dip S/W of meter according to the capacity of shunt (50mV) which is used at the circuit composition.
- When apply the power source of meter, the measurement mode appears after circuit setting value is displayed during 1 second.
- In this case, when ---- is displayed, the Dip S/W setting is bad and if wanted dip ampere value appear, it is normal.
- When entered the measurement mode, if ---- is displayed, the present measurement value is the overflow state, and - code appear, it is the underflow state and then check - out input.

• DIP S/W 설정방법(다중스케일형) – Setting method of Dip S/W (Multi-Scale type)



용량 (capacity)	DIP S/W 설정 (Dip S/W setting)	자릿수 (Binary setting)	용량 (Capacity)	DIP S/W 설정 (Dip S/W setting)	자릿수 (Binary Setting)
10A		000000	100A		010010
15A		000001	150A		010011
20A		000010	200A		010100
25A		000011	250A		010101
30A		000100	300A		010110
35A		000101	350A		010111
40A		000110	400A		011000
45A		000111	450A		011001
50A		001000	500A		011010
55A		001001	550A		011010
60A		001010	600A		011100
65A		001011	650A		011101
70A		001100	700A		011110
75A		001101	750A		011111
80A		001110	800A		100000
85A		001111	850A		100001
90A		010000	900A		100010
95A		010001	950A		100011

용량 (capacity)	DIP S/W 설정 (Dip S/W setting)	자릿수 (Binary setting)	용량 (Capacity)	DIP S/W 설정 (Dip S/W setting)	자릿수 (Binary Setting)
1000A		100100	6000A		101110
1500A		100101	6500A		101111
2000A		100110	7000A		110000
2500A		100111	7500A		110001
3000A		101000	8000A		110010
3500A		101001	8500A		110011
4000A		101010	9000A		110100
4500A		101011	9500A		110101
5000A		101100	10000A		110110
5500A		101101			

17 기술 자료

TECHNICAL DATA

17-1 집합형 표시등

Combination Display Light

• LED Type Unit의 사용에 있어서 - In using LED Type Unit

LED Unit는 반도체에 의해 구성되어 있는 부품이므로, 사용최대전압과 사용최대전류를 초과해서 사용하게 되면 이상방열에 의한 LED소자의 열화에 의해 휘도의 지향성저하 색조의 변화, 점등불능이 될 수 있습니다.下記사항을 충분히 고려하여 사용하여 주십시오. 또한, V_A 다이오드 브릿지 압력측의 교류전압, V_B 는 다이오드 브릿지 출력측의 정류전압치를 뜻합니다.

LED Units consist of semi-conductor. If maximum using voltage and current is exceed, spacial distribution decline of brightness, color change, and illuminating disability due to overheating of LED element by abnormal illuminating can occur. Consider following note. V_A is input AC voltage of diode bridge and V_B is output rectifying voltage value.

1. LED Unit의 전원에 있어서 - Power of LED Unit

정전압식 직류형 LED UNIT에 있어서는, 정전압화된 직류전원이 LED UNIT의 파손방지 및 휘도의 면에서 최적입니다. 다른직류전원을 사용할 경우는 약간의 휘도 저하가 있을 수 있으니 전원의 종류에 따라 다음의 주의점에 유의하여 사용하십시오.

In overall voltage type DC LED Unit, constant voltage DC power is optimum in order to prevent damage and maintain good brightness.

If use orther DC power, because a little brightness decline can occur, follow below note according to type of power source.

▶ 용성 LED Unit의 사용전압 범위에 있어서 - Yongsung, using voltage range of LED Unit

LED Unit의 사용전압 범위는 완전직류로 정격전압의 $\pm 10\%$ 이내로 되어 있습니다. 전압에 있어서는 이 범위內가 되도록 충분히 고려하여 주십시오.

Using voltage range of LED Unit is perfect DC and within $\pm 10\%$ of rating voltage. Make sure the voltage is within this range.

(1) 스위치 전원 등의 정전압직류전원이 제일 적합합니다. LED Unit의 사용전압범위로 사용전압범위로 사용하여 실시요.

(2) 3상전파정류에 의한 직류전원

V_B LED Unit의 정격전압치 이하가 되도록 전압변동에 유의하여 사용하십시오.

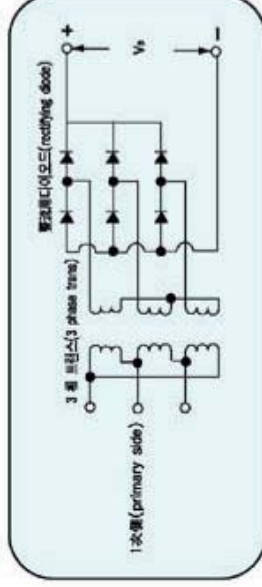
(1) Constant voltage DC power of switching power etc., is optimum.

Use within using voltage range of LED Unit.

(2) DC power by 3 phase electric wave rectifying.

Be careful of voltage change in order that V_B is below rating voltage value of LED Unit.

• 회로예 - Example of circuit



(3) 단상전파정류에 의한 직류전원

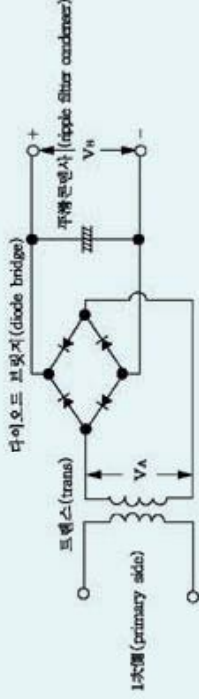
DC power by single phase electric wave rectifying.

① 평활콘덴서를 사용한 경우 (Using ripple filter condenser)

최소부하시의 V_B 가 LED Unit의 정격전압치 이하가 되도록 전압변동에 주의하여서 사용하십시오.

Be attention to voltage change in order that V_B in minimum load is below rating voltage value of LED Unit.

회로예 (example of circuit)



(註) 다른 부하를 LED Unit와 같이 사용할 경우는 부하의 동작에 의한 전압변동을 고려하여 주십시오.
(Note) When using other load with LED Unit, consider voltage change due to load operation.

[참고] (Reference)

V_A 와 V_B 의 전압관계에 있어서는 다음식과 같습니다.

(콘덴서로 맥류를 완전히 평활했을 때)

Voltage relation of V_A and V_B is as following.

(After filtering wave with condenser)

$$V_B = 1.41 * V_A \cdot 1.5$$

(단, 1.5는 다이오드 브릿지의 전압강하분)

(1.5 is voltage drop value of diode bridge.)

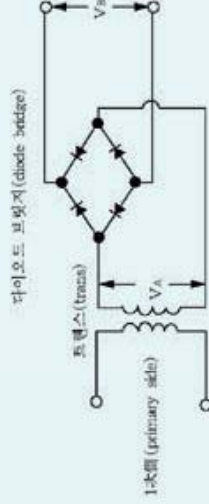
② 평활콘덴서를 사용하지 않을 경우 (Not using ripple filter condenser)

이 경우는 다이오드 브릿지 입력측의 교류전압 V_A 를 아래표와 같이 사용하여 주십시오.
이 범위를 초과하게 되면 발열에 의해 LED가 열화될 경우가 있습니다.

In this case apply AC voltage V_A of diode bridge input side as following.

If this range is exceed, LED can be overheated due to illuminating.

회로예 (example of circuit)



전전압식 LED (overall voltage type LED)	V_A 의 최대허용전압치 (maximum permissible voltage value of V_A)
24V	AC20~22V 초과하지 않도록 해 주십시오. (AC20~22V do not exceed!)

(4) 배터리 (Battery)

충전시 및 충전직후는 전압이 LED Unit의 정격전압을 초과할 수 있으니 주의하여 주십시오.
사용하여야 할때는 LED Unit 정격전압의 $\pm 10\%$ 범위로 사용하여 주십시오.

Since voltage can exceed rating voltage after and during charge be careful not to exceed it.

When exceeding it use within the range of LED Unit rating voltage $\pm 10\%$.

2. 노이즈 (Noise)

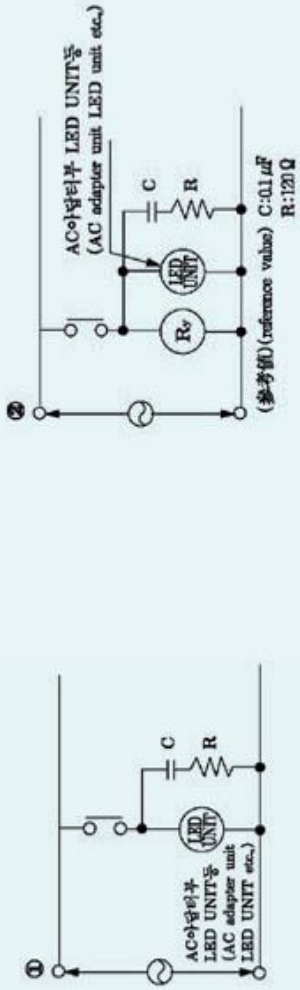
외부의 노이즈등이 회로에 더해지면 LED 소자의 열화에 의한 휘도의 저하, 색조의 변화, 점등불능이 될 수 있습니다.

이러한 현상이 예상될 경우에는下記보호대책을 고려하여 주십시오.

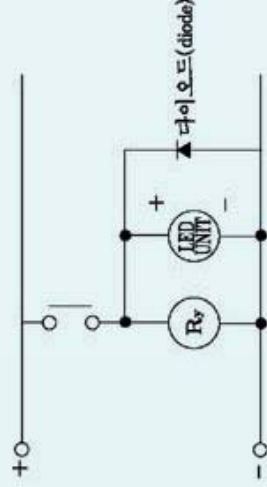
노이즈 대책으로는「CR소자」 또는「서지억소바」 등의 소자를 사용하여 주십시오.

If external noise etc, is applied to circuit decline of brightness distribution, color change, lighting disability due to overheating of LED element can occur. In this case, consider following note. For noise measures, use element such as CR element, surge absorber.

회로예 1 AC의 경우 (circuit example 1 for AC)



회로예 2 DC의 경우 (circuit example 2 for DC)



참고치 (reference value)

- 다이오드의 전류용량: 솔레노이드등의 사용전류와 동등치이상의 제품
Current capacity of diode : same or above value as using current of solenoid etc.
- 다이오드의 역방향내전압: 솔레노이드등의 사용전압의 약 10배
Reverse direction withstand voltage of diode : about 10 times of solenoid using voltage

3. LED 반 점등(반불 현상) 대책에 있어 : 대책에 따른 제품은 형식구분도상에 따른 스페셜 타입입니다.

In LED half illumination measures : product according to measure is special type by type section diagram.

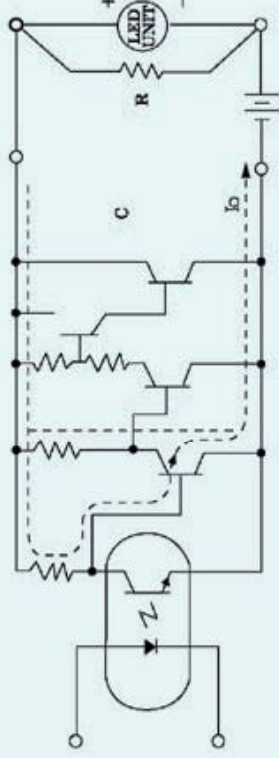
LED Unit을 점등하는데 있어, 무점점 스위치, PLC 또는 점점 보호회로 등에 의한 누설 전류에 의해 출력 OFF 상태에서 도 LED가 반점등하는 경우가 있습니다. 이 경우에는 아래와 같은 대책이 필요합니다.

In lighting LED Unit, LED can be half-illumination due to leakage current by non-contact switch, PLC or contact protective circuit, in even output OFF state, In this case, following measures is necessary.

④ T.R(트랜지스터) 출력형 무점점스위치 등에 LED Unit(직류형)을 점등할 경우에는 LED와 병렬로 분류저항 "R"을 삽입해 주십시오.

⑤ When lighting LED Unit(DC type) to T.R(transister) output type non-contact switch etc. insert branch resistance "R" in parallel with LED.

회로예 (example of circuit)

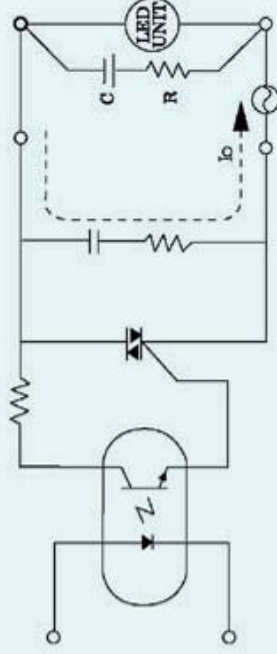


Io : 출력 OFF시의 누설전류 (leakage current at output OFF)
R : 분류저항(branch resistance)

⑥ CR 소자 등이 내장되어 있는 트라이악 출력형 무점점 스위치 PLC 등에 LED Unit(교류형)을 점등할 경우에는 LED Unit와 병렬로 CR소자를 삽입해 주십시오.

⑦ When lighting LED Unit to triac output type non-contact switch etc. which has CR element, insert CR element parallel with LED Unit .

회로예 (example of circuit)



AC 아답터부 LED Unit 등
(AC adapter Unit, LED Unit etc.)

※참고치 - reference value

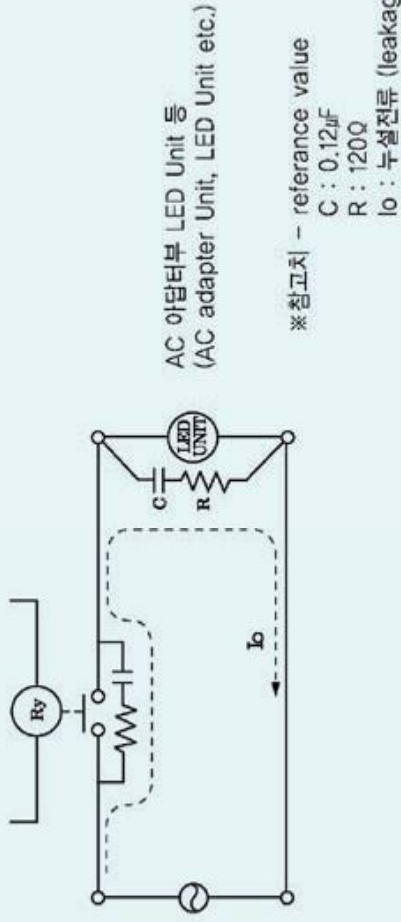
C : 0.12 μ F

R : 120 Ω

Io : 누설전류 (leakage current)

- © 점접 보호용 CR 소자를 병렬로 접속된 Relay 출력에 LED Unit(교류형)를 점등할 경우에는 LED Unit와 병렬로 CR소자를 삽입해 주시오.
- © When lighting LED Unit(AC type) to Relay output connected in parallel with contact protective CR element, insert CR element in parallel with LED Unit.

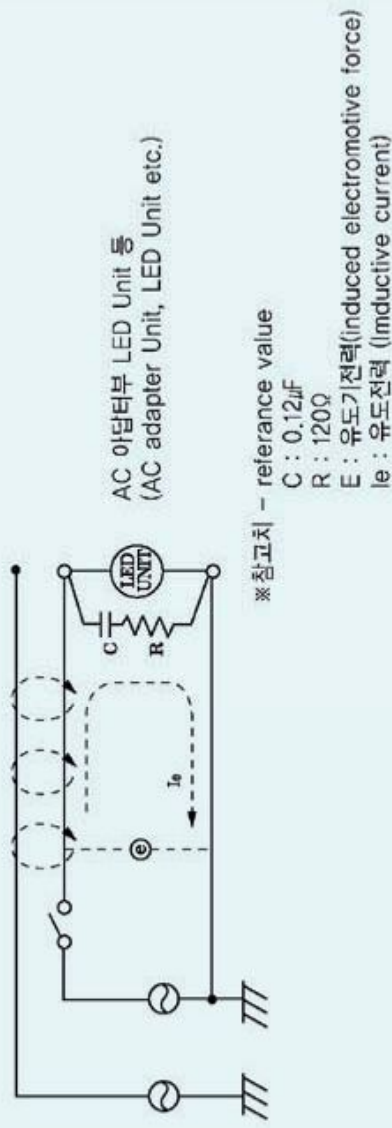
(회로예) (example of circuit)



(2) 유도전류 (inductive current)

- AC 아답터 등이 부착된 LED Unit는 주변의 교류 라인으로부터 유도되어 반 점등 되는 경우도 있습니다. 이 경우도 LED Unit와 병렬로 CR 소자를 삽입해 주십시오.
- LED Unit including AC adapter etc. can be half-illumination due to induction from around AC line. In this case, insert CR element in Parallel with LED Unit.

(회로예) (example of circuit)



17-2

릴레이
Relay

• 릴레이(繼電器)란? - What is relay?

전기량 또는 물리량에 의한 응답(應動)으로 전기회로를 제어하는 기능을 가진 장치.

This is the device which has the control function of electric circuit by reaction due to previously related quantity of electricity or quantity of physical.

• 릴레이의 종류 - Relay's type

1. 제어제전기 (Control relay)

제어회로 및 조작회로의 제어용입니다. (연동신호, 표시등에 사용)

For control of control circuit or actuation circuit (used for interlocking signal, pilot lamp)

2. 제어용 전자제전기 (Electromagnetic control relay)

제어용으로 사용되는 전자제전기로 전자력에 의하여 접점을 개폐하는 기능을 가진 장치의 총칭입니다.

As an electromagnetic relay used for control, a general name of device with function of contact switching by electromagnetic power.

3. 보호제전기 (Protective relay)

전기회로의 사고 기타의 이상상태를 검출하여 그 상태를 알리거나 전기회로의 이상부분을 분리하는 등의 기능을 목적으로 하는 계전기입니다.

The relay the purpose of functioning to inform the unusual state of electric circuit (accident and others) after checking or to separate the complete part of electric circuit etc.

4. 보조제전기 (Auxiliary relay)

보호제전기나 제어제전기 등의 보조로 쓰이는 것으로 점점용량의 증가, 점점수의 증가, 또는 한시(限時)의 부가(附加) 등을 목적으로 하는 계전기입니다.

As used for the auxiliary of protective relay or control relay etc., this is for the increase of contact capacity and contact number or the addition of limited time.

• 용어의 뜻 (KSC 4520)

1. 힌지형 전자(電磁) 계전기 : 코일에 조작 입력을 가하거나 제거함에 따라서, 전자석의 접극자가 지지점을 중심으로 회전운동을 하고, 그 움직임에 따라서 직접 또는 간접으로 접점의 개폐를 하는 기구.
2. 신호전달 : 코일의 소비전력이 자기(自己)와 거의 같은 값의 다른 계전기를 제어해서 전기 신호를 전달하는 것.
3. 코일 : 계전기를 동작 상태로 하거나 유지 상태로 유지하기 위한 전지력 공급부분, 이것은 주로 권선으로 구성된다.
4. 동작 : 계전기가 복귀 상태에서 동작 상태로 이행되는 것.
5. 복귀 : 계전기가 동작 상태에서 복귀 상태로 이행되는 것.
6. 동작상태 : 모든 상시폐로 접점이 열린 상태 또는 모든 상시개로 접점이 닫힌 상태.
7. 복귀상태 : 모든 상시개로 접점이 열린 상태 또는 모든 상시폐로 접점이 닫힌 상태.
8. 유지상태 : 계전기를 동작시킨 후 규정의 코일 전압 또는 전류의 변동폭 이내에서 어떠한 접점도 복귀하지 않는 상태.
9. 정격전압 : 계전기를 통상 사용하기 위하여, 코일에 가하는 기준 전압.
10. 정격전류 : 계전기를 통상 사용하기 위하여, 코일에 가하는 기준 전류.
11. 동작전압 : 복귀상태의 계전기의 조작 입력을 증가시켜, 계전기가 동작 상태로 될 때의 전압.
12. 동작전류 : 복귀상태의 계전기의 조작 입력을 증가시켜, 계전기가 동작 상태로 될 때의 전류.
13. 정격점접전류 : 개폐부의 성능을 정하는 기준이 되는 정격 통전 전류이하의 전류.
14. 정격점접전압 : 개폐부의 성능을 정하는 기준이 되는 전압.
15. 정격통전전류 : 접점을 개폐하지 않고, 온도 상승 한도를 초과하지 않고, 연속하여서 개폐부에 통전할 수 있는 전류.
16. 정격절연전압 : 절연 설계의 기준이 되는 전압.
17. 개폐부 : 계전기에 의하여 개폐되는 외부 회로에 접속되는 계전기의 도전부분 전체를 계전기의 개폐부라 하고, 개폐부는 점점, 접촉스프링, 내부도선, 단자 등으로 구성된다.
18. 점점 : 전기 회로의 접속 또는 개폐하는 기능을 가진 전기적 점점, 일반적으로는 콘택트라고도 한다.
19. 상시개로 점점 : 복귀 상태에서 개로하고, 동작상태 및 유지상태에서 폐로 하는 점점. 또한 메이크 점점 또는 a점점이라고도 한다.
20. 상시폐로 점점 : 복귀 상태에서 폐로하고, 동작상태 및 유지상태에서 개로 하는 점점. 또한 브레이크 점점 또는 b점점이라고도 한다.
21. 절환점점 : a점점, b점점 모두 갖춘 점점 구조로서, 가동점점축 또는 고정 점점축의 도전부가 공통의 것, C점점, 트랜스퍼 점점이라고도 한다.
22. 무개로 절환점점 : 상시폐로점점과 상시개로 점점이 각각 속하는 개폐부의 일부를 공유하는 구조로서 계전기가 동작 및 복귀할 때에 개로하는 점점의 개로에 앞서 폐로하는 점점이 폐로하고, 일시적으로 쌍방의 점점이 폐로상태를 유지할 때의 절환점점, C점점, 콘티어뉴어스 점점, 메이크 비포어 브레이크 점점이라고도 한다.
23. 정격부하 : 개폐부의 성능을 정하는 기준이 되는 값.
24. 개폐빈도 : 계전기의 단위 시간당의 동작 회수.
25. 절연거리 : 상호 절연해야 할 부분 상호간의 최단 거리, 공간거리와 연면거리로 이루어진다.
26. 공간거리 : 절연된 2개의 나중전부의 최단 공간거리.
27. 연면거리 : 2개의 나중전부 사이의 절연물의 표면에 따르는 최단거리.

• Terms Explanation (KSC 4520)

1. Hinge type electromagnetic relay : The device which opens/closes contact directly or indirectly acc. to the movement, which the contact pole of electromagnet does rotational movement with centering the supporting point, as actuation input is given to coil or removed.
2. Signal transmission : This is that the consuming power of coil controls other relay with almost same value as itself and transmits electric signal.
3. Coil : As a electric power supplying part to maintain relay with operating or keeping state, it is composed of mainly winding.
4. Operation : This is that a relay is carried out from return state to operating one.
5. Return : This is that a relay is carried out from operating state to return one.
6. Operating state : The state which all normally closed (or open) contact is opened (or closed).
7. Return state : The state which all normally open (or closed) contact is open (or closed).
8. Maintaining state : The state which any contact does not return within regulated coil voltage or current variation width after operating relay.
9. Rating voltage : Reference voltage given to coil in order to use relay usually.
10. Rating current : Reference current given to coil in order to use relay usually.
11. Operating voltage : The voltage when relay becomes operating state with increasing actuation input of relay in return state.
12. Operating current : The current when relay becomes operating state with increasing actuation input of relay in return state.
13. Rating contact current : The current below rating conductive current, which is the reference to decide switching function.
14. Rating contact voltage : The reference voltage to decide switching function.
15. Rating conductive current : Continuously conductible current to switching part without switching contact and without exceeding temperature rise limit.
16. Rating insulation voltage : Reference voltage of insulation design.
17. Switching part : Relay's switching part includes the entire conductive parts of relay which is connected to outer circuit switched by relay, and is composed of contact, contact spring, inside leading wire, terminal etc.
18. Contact : Electric contact which has the function of electric circuit connection or switching.
19. Normally open contact : The contact which opening in return state while closed in operating & keeping state. Also it is called as 'make contact' or 'a contact'.
20. Normally closed contact : The contact which closed in return state while opens in operating & keeping state. Also it is called as 'brake contact' or 'b contact'.
21. Transfer contact : As all equipped contact structure of a & b contact, the conductive part of movable contact side or fixed contact side is in common. Also, called as C contact, transfer contact.
22. No opened circuit transfer contact : As a structure sharing some switching part to which normally closed and open contacts are belonged resp., this is the switching contacts when the closing contact closed before the opening of opening contact when relay operates and returns, and both contact keep the closed state temporary. Also, called as CI contact, continuous contact, make before break contact.
23. Rating load : Reference value to decide switching function.
24. Switching frequency : Relay's operation frequency per unit time.
25. Insulation distance : The shortest distance between the parts which have to be insulated mutually. Composed of space distance & creepage distance.
26. Space distance : The shortest space distance of insulated two revealed charging part.
27. Creepage distance : The shortest distance which follows the surface of insulation between two revealed charging parts.

• 점접 배열의 기호 및 용어 - Symbols & Terms of Contact Arrangement

기호(Symbols)	배열(Arrangement)	약어(Abbreviation)
A점접 (a contact)		1A
B점접 (b contact)		1B
C점접 (C contact)		1C
2중차단 X점접 (Double breaking X contact)		1X
2중차단 Y점접 (Double breaking Y contact)		1Y
2중차단 Z점접 (Double breaking Z contact)		1Z

• 점접 보호회로 - Contact Protective Circuit

유도부하를 개폐할 경우에는 아래 도표의 회로를 참고하여 주십시오. 점접의 신뢰성이 향상되며 수명이 길어집니다. 릴레이를 유도부하(Relay, Solenoid, Buzzer 등) 개폐에 사용하는 경우 Arc의 원인으로 일어나는 접촉장해를 방지하기 위하여 불꽃제거 회로로 보완하십시오.

이 경우 복귀시간이 늦어지는 일이 있으니 주의하십시오.

When switching the inductive load, Please refer to the circuit in the diagram below.

The reliability of contact is increased and lifetime longer.

In case of using relay in inductive load (relay, solenoid, buzzer etc.) switching, please compensate by flame removing circuit in order to prevent contact obstacle due to Arc. In this case please note return time can be delayed.

회로의 예(Circuit example)	판정(Judgement)	사용상 주의사항(Remarks in use)
	○	(1) r는 數·0 이상이 필요하다. (2) AC의 전압으로 사용될 때 ① R의 임피던스가 클 때(X) ② R의 임피던스가 C,r의 임피던스에 비하여 작을 때(O) (1) r requires above ten times 9. (2) When using AC voltage When R's impedance is big(X) When R's impedance is smaller than C,r(O)
	○	AC, DC 모두 적용(Both AC, DC applied)
	○	DC 전용(극성예 유의하십시오) AC는 적용할 수 없다. Only DC applied. AC not applicable.
	○	AC, DC 모두 적용(Both AC, DC applied)
	×	점접투입시 Condenser의 단락전류가 흘러 점접이 움직입니다. When projecting contact, contact is melted/attached due to the short circuit current of condenser.
	×	점접투입시 Condenser의 충전電流가 흘러 점접이 움직입니다. When projecting contact, contact is melted/attached due to the charged current flow of condenser.

• 점접 보호 - Contact Protection

점접의 신뢰도(信賴度)는 릴레이의 放置時間, 방치시 殘留磁氣의 有無에 따라 크게 다릅니다.

The reliability of contact is largely different depending on relay's neglecting time, the presence of residual magnet in neglecting.

1. 개폐 동작없이 장시간 방치할 경우나 동작빈도가 적을 경우, 점접에 耐蝕性이 높도록 대처 하십시오.
(비상등, 비상경보설비, 자동점검회로 등)

In case of long neglecting without any switching operation or less operating frequency, please take action to increase the corrosion resistance on contact. (emergency lamp, emergency alarm equipment, automatic inspection circuit etc.)

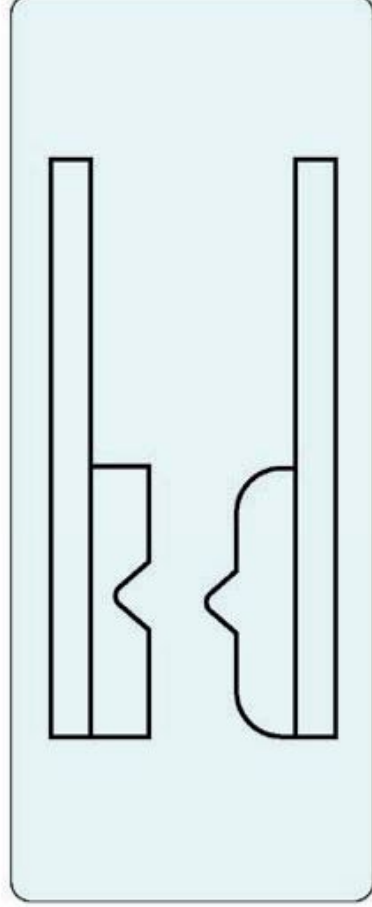
2. 동작빈도가 적은 경우나 동작없이 장시간 방치할 경우에는 방치중의 코일을 무여자(無勵磁)로 설계하여, 코일온도 상승에 의한 점접의 부식이 촉진되지 않도록 하는 것이 이상적입니다.

In the aforementioned case, it is ideal to design the coil in neglecting with no excitation in order not to accelerate the contact corrosion due to coil temperature rise.

• 점접 전이 현상 - Contact Transfer Phenomenon

유동성부하(회로)를 열 때 점접간에 높은 전압이 발생하여 아크 방전이나 불꽃 방전을 일으킵니다. 이 방전 에너지가 크면 점접금속이 전이(轉移)나 마모를 유발하여 접촉기능이 불량하게 됩니다. 점접의 전이현상이란 한쪽 접점이 용융 또는 증발하여 다른 점접으로 전이되는 것이며 그림과 같은 요철(凹凸) 현상이 생기는 것을 말합니다. 기폐 회수가 증가 함에 따라 요철이 폐쇄(lock)되면 개폐불능이 됩니다.

When opening inductive load(circuit), high voltage between contacts is happened resulting in arc discharge or flame discharge. If this discharge energy is high, contact metals cause transfer or wear-out and contracting function becomes bad. Contact's transfer phenomenon means that one side contact is melted or evaporated to transfer to other contacts and the uneven phenomenon is appeared as shown in the fig. If the uneven is locked due to the increase of switching frequency, switching becomes impossible.



용량성부하(회로)와 긴 케이블을 통하여 부하에 통전하는 회로를 닫는 경우에는 일반적으로 점접이 방전 전류가 흘러야 크방전이 일어납니다. 이 방전 에너지가 점접소모와 용착의 원인이 됩니다. 방전 전류를 제거하기 위하여 상시 개로시에는 CR형이나 다이오드(Diode) 바리스터(Varistor)를 이용한 불꽃 소화회로가 이용되고 폐로시에는 파동억제기(Surge Suppressor)가 사용됩니다.

In case of closing circuit conductive to load through capacitive load(circuit) and long cable, arc discharge is occur in general as discharge current flows to contact. This discharge energy causes contact wear-out and deposition. In order to remove discharge current flame extinction circuit using CR type or diode varistor is used in regular open circuit while in closed circuit surge suppressor is done.

코일 입력시 주의사항 - Remarks in Coil Input

1. 코일 온도상승 (Coil Temperature Rise)

코일에 전류를 흘리면 코일열동선, 교류전원에는 철심 등의 자기재료의 철손이 더하고 열이 발생하여 온도가 높아집니다. 흔히 접점에 전류를 흘리면 접점부에 열이 발생하는데 코일온도상승에 많은 영향을 받습니다. (접점정격2A 이하의 릴레이는 접점 전류치의 코일 온도상승에 의한 영향이 거의 없습니다.)

If flowing current to coil, coil copper loss(heat) and the iron loss of magnetic materials like iron core in AC power source are added and temperature is gone up due to heat occurrence. Very often, if flowing current to contact, heating is occurred on contact part and gives very much influence on coil temperature rise. (Relay below contact rating 2A is little influenced by coil temperature rise in contact current valve.)

2. 맥동전압에 따른 온도상승 (Temperature Rise by Ripple Voltage)

ON시간 2분 이하의 맥동 전압에 사용할 경우 코일 온도상승치는 ON시간에 관계되고 ON-OFF의 비율에 따라 차이가 있습니다. 연속 통 전시에도 비율에 따라 약간의 차이가 있습니다.

In case of using to ripple voltage below 2 min of on time, coil temperature rise value is related to ON time and there is difference depending on ON-OFF ratio. Also in continuous conducting there are some difference depending on ratio.



3. 코일 온도에 따른 동작전압의 변화 (Operation Voltage Change by Coil Temperature)

- 직류형 릴레이에 연속 통전한 후 OFF하고, 즉시 ON하면 코일 온도상승으로 코일 저항이 증가하여 동작전압이 약간 높아집니다. 또 주위온도가 높은 장소에서 사용하면 역시 동작전압이 높아집니다.

- If immediately OFF and ON after continuously conducting to direct type current relay, operation voltage becomes a little higher due to coil resistance increases by coil temperature rise. Furthermore, when using in higher ambient temperature, operation voltage also goes up.

- 동선의 저항온도 계수는 1℃에 약 0.4%이고 이 비율로 코일저항이 증가합니다. 그러므로 릴레이를 동작시키는 데는 동작전류 이상의 전류가 필요하며 저항치의 증가에 따라 높아지게 됩니다.

- Resistance temperature coefficient of copper wire is approx 0.4% at 1℃ and with this ratio coil resistance increases. Therefore, in order to operate relay, the current over operating current is required and it gets higher depending on the rise of resistance value.

4. 직류 입력용 전원 (Power Source for DC Input)

- 직류용 릴레이의 전원은 배터리입니다. 전파 또는 반파 정류회로와 필터콘덴서를 사용한 것 등이 있습니다.

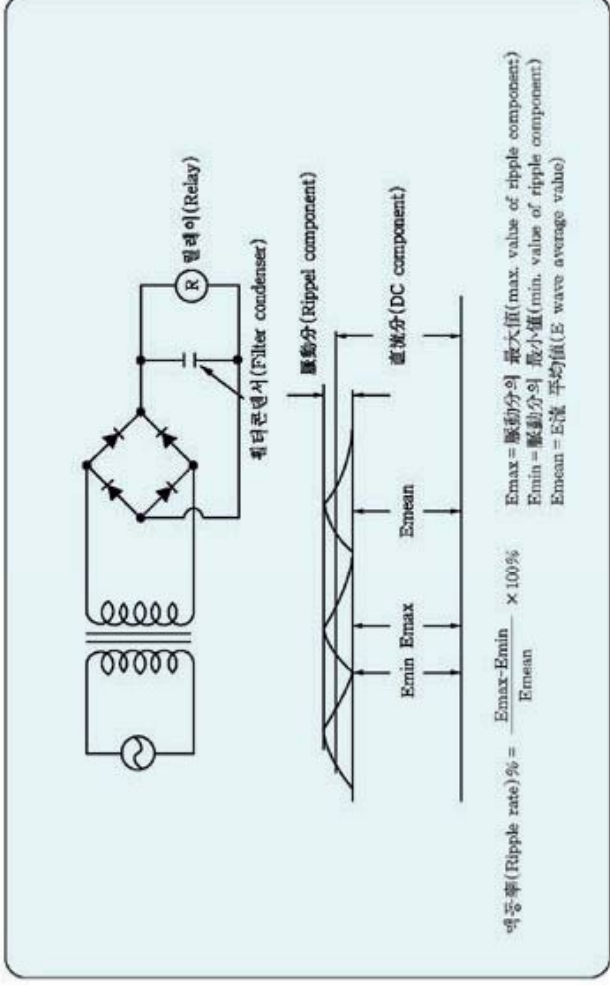
- The power source of DC relay is battery. Some use full wave or half wave rectifier circuit, and filter condenser.

- 릴레이의 동작 전압 특성은 전원의 종류에 따라 다소 변화하므로 안정된 특성을 얻으려면 완전 직류가 바람직합니다.

- As the operation voltage characteristics of relay is some varied by power source type, in order to get stable characteristics, perfect DC is required.

- 맥동을 사용한 직류전원의 경우 특히 반파정류회로와 필터콘덴서를 사용할 때 필터콘덴서 용량이 부족하면 맥동의 영향으로 동작전압이 크게 변화하거나 소음이 나는 수가 있으니 사용회로에서의 특성 확인이 필요합니다.

- In case of DC source using ripple, especially if filter condenser capacity is short in using half-wave rectifier circuit and filter condenser, operation voltage is largely or noise can occur by the ripple influence. Thus, checking characteristics in using circuit is required.



5. 교류 코일의 인가전압 (AC Coil's Applied Voltage)

- 릴레이가 안정된 동작을 할 수 있게 정격전압의 +10%, -15% 범위내로 전압을 인가하여 주십시오.

Please apply voltage within +10%, -15% of rating voltage in order for relay to do stable operation.

- 교류 코일에 인가하는 전압은 정현파형(Sine Curve)이 필요합니다.

The applied voltage for AC coil requires Sine Curve.

- 전용 전원을 그대로 사용하면 그 장치의 渡形 때문에 진동음과 이상 과열이 발생합니다. 교류 코일에서는 限取코일로 진동음을 방지하는 구조로 되어있지만 渡形이 기능을 못하게 하기 때문입니다. 아래 그림은 渡形을 표시한 것입니다.

If using the applied power source as it is, vibration noise and unusual overheating are occur due to the device waveform distortion. Although AC coil is composed of vibration protective structure, waveform distortion prevents from functioning. The following sketch shows waveform distortion.

그림-1 콘덴서에 의한 전압변동률수회로

(fig. 1) Voltage change absorbed circuit by condenser

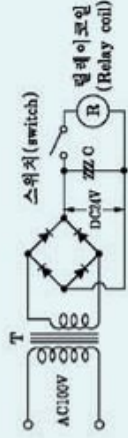


그림-2 교류안정화 전원의 쉐

(fig. 2) Waveform distortion AC stabilized power source



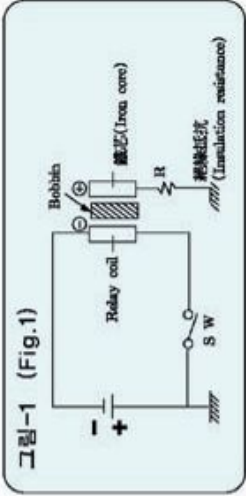
6. 코일의 전식(電蝕) (Coil's Electrolytic Corrosion)

- 릴레이의 코일 전압회로가 높을 때(특히 DC48V 이상의 경우) 직류 릴레이를 온도와 습도가 높은 곳에 장시간 또는 연속 통전하면 코일이 전기적으로 부식되는 현상, 즉 전식이 일어나 단선되는 경우가 있습니다. 이를 보호하기 위하여 다음 사항에 주의하십시오.

When relay's coil voltage circuit is high (especially above DC 48V), if DC relay conducts long or continuously in the place with higher temperature and humidity, wire can be disconnected by occurred electrolytic corrosion, the phenomenon which coil is corroded electrically. In order to protect this, please note the following points.

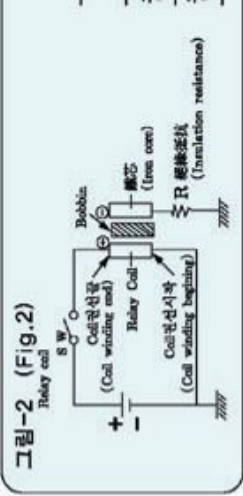
1) 전원의 +측을 그림1과 같이 샤시어스(Chassis earth)를 하십시오.

Please chassis earth + side of power source like in fig. 1



2) 부득이 - 측에 어스(접지)할 경우나 할 수 없을 경우 그림2와 같이 접점(또는 스위치)을 전원의 +측에 놓고 코일의 시작 단자를 - 측이 되도록 하십시오.

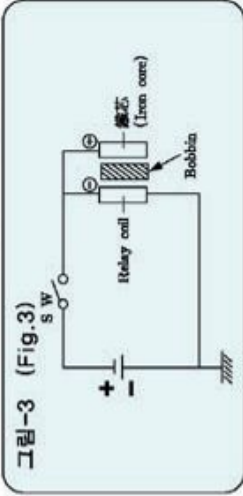
If able or unable to earth(ground) on - side, please switch on +side of power source and let the starting terminal of coil be - side in fig 2.



	YSMR07-2P	YSMR05-3P
권선시작단자번호 (Winding beginning terminal No.)	2	2
권선끝 단자번호 (Winding end terminal No.)	7	10

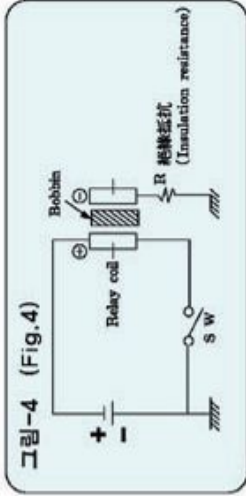
3) 접지단자가 불필요할 경우는 그림3과 같이 접지단자와 코일 +측을 접속하십시오.

In unnecessary case of grounding terminal, please connect grounding terminal to coil +side as in fig 3.



4) 전원의 - 측을 접지하고 - 측에 접점(또는 스위치)을 넣는 것은 피해주십시오.

Please avoid grounding - side of power source and switching in.



5) 어스단자 부착용 릴레이인 경우, 어스단자의 효과(감전방지, 소음방지)를 고려하지 않을 때는 어스접속을 하지 않는 것이 전식방지에 유용합니다. (상기 그림3의 경우는 제외)

In case of relay for earth terminal attachment, when earth terminal effects(electric shock protection, noise protection) are not considered, no earth connection is useful for electrolytic corrosion prevention. (except the above fig. 3.)

※참고(Reference): 일반 릴레이는 철심에 절연물을 끼워 사시와 연결되어 있습니다. 어스단자 부착 릴레이는 철심과 직접 사시 어스가 가능하지만 전식을 고려할 때 접속하지 않는 것이 좋습니다.

General relay fits insulation materials to iron core and is connected to chassis. Earth terminal attachment relay is possible to chassis earth directly to iron core but considering electrolytic corrosion it is better not to connect.

부하의 종류와 돌입전류(突入電流) - Load Type and Rush Current

부하의 종류 및 전류특성은 개폐에 관련하여 접점에 주는 영향이 큼니다. 따라서 부하의 전기특성을 확인 검토하고 사용하십시오.

With reference to switching, load types and current characteristics give big influence on contact. Accordingly, checking the electric characteristics of load before using should be made.

1) 저항부하 (Resistance Load)

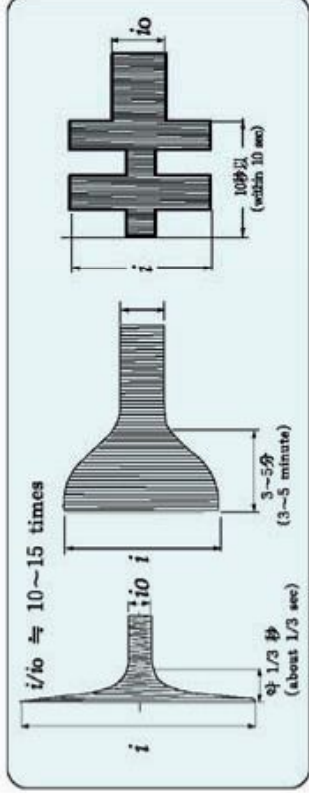
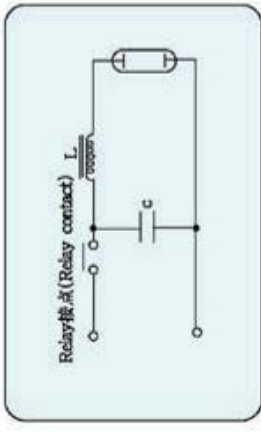
돌입전류/정격전류= $i/i_o=1$ 배

rush current/rating current= $i/i_o=one\ time$

2) 램프부하 (Lamp Load)

일반적으로 방전등 회로에는 방전관, 변압기, 초우크코일, 콘덴서 등이 조합되어 고역률형(高力率型)으로 전원역률이 낮은 경우 20~40배의 돌입전류가 흐르는 것도 있으므로 주의하시기 바랍니다.

Please note as generally discharge lamp circuit combine with discharge tube, transformer, choke coil, condenser etc, is high power factor type, in case of low power impedance, 20~40 times of rush current can be flowed.



3) 콘덴서 부하 (Condenser Load)

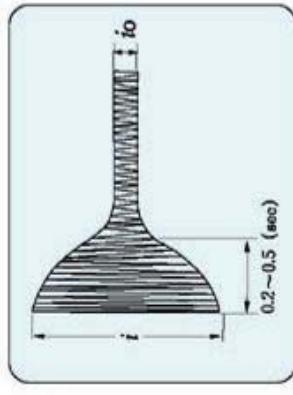
$i/i_o=20\sim40\ times$



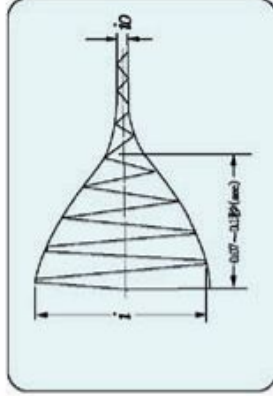
4) 모우터 부하 (Motor Load)

Breaking, Inching등을 실시하면 과도상태가 반복되어 조건은 아주 악화해집니다.

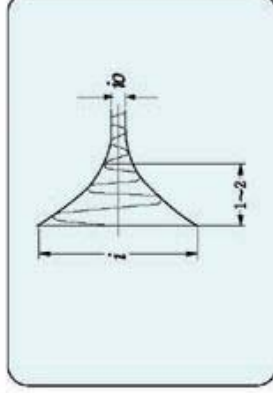
If exercising breaking & inching, transient state is repeated and the condition becomes very severe.



5) 솔레노이드 부하 (Solenoid Load)



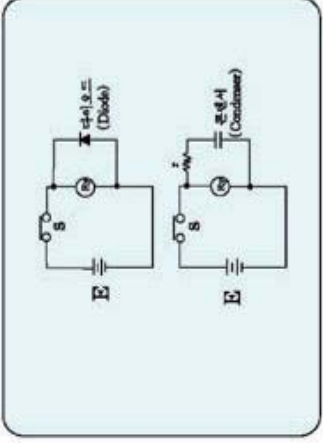
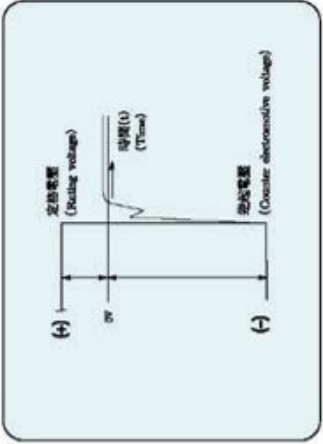
6) 전자접촉기 부하 (Electronic Contactor Load)



7) 직류형 역기전압(逆起電壓) (DC type counter electromotive voltage)

DC형의 입력을 차단하는 경우 코일 양단에 약 200~3000V 정도의 역기전압이 발생됩니다. 트랜지스터 회로에 사용할 때는 오동작, 파괴가 발생되니 주의하십시오. 코일에 병렬(並列)로 콘덴서, 또는 다이오드를 사용하여 어느정도 감소시킬 수 있으며 그 값은 실험치로 산출됩니다.

When breaking DC type input, about 200~3,000 of counter electromotive voltage on both coils is occur. In using for transistor circuit, please note the possibility of wrong operation and destruction. This can be some reduced by using condenser or diode parallel to coil and the value is calculated with testing value.



회로상의 주의점 - Remarks on Circuit

접점 보호와 회로자체의 보호를 위하여 안전상 피하여야할 접속방법을 설명하오니 충분히 검토하시고 참고하십시오.

For protection of contact and circuit itself, here are explanation on connection methods which have to be avoided for obvious safety reason. Please have enough consideration and refer to them.

1) ON-OFF 제어회로의 사용상 주의점(Remarks in using ON-OFF Control Circuit)

- SCR을 사용하여 릴레이를 개폐하는 경우 전원에 반파정류를 그대로 사용하여 SCR의 복귀를 용이하게 하는 경우가 많으나, 이런 경우 릴레이의 동작 및 복귀의 타이밍은 동기(同期)하기 쉽습니다.

In case of relay switching by SCR, there are many cases which make SCR's return easy by using half-wave rectification as it is, but in this case the timing of relay operation & return is likely to be synchronous.

- 온도제어와 같이 부하가 히터등의 대전류 부하인 경우, 릴레이 접점이 어느 것은 피이크(Peak)에서, 또 어느 것은 영위상(零位相)에서만 개폐하게 됩니다. (이것은 릴레이의 감동과 응답속도차에 의한 현상입니다.) 그러므로 극단적으로 수명이 길고, 짧은 것이 나타나 최초 기기의 품질 체크에 주의하여야 합니다.

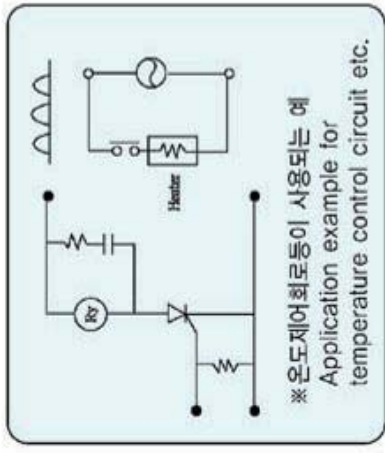
In case load is big current load(heater etc.) like temperature control, some relay contacts are switched at peak while others only at 0°C. (This happens due to reaction & response speed difference).

As extremely long and short lifetime is appeared, therefore, please check the quality of the first device with care.

- 반도체로 릴레이를 동작시킬 경우 상기의 개폐 릴레이는 조작회로를 세트로 하여 수명확인과 신뢰성을 확인하십시오. In case of operating relay by semiconductor, please set the aforementioned switching relay with operation circuit and check the lifetime and reliability.

- LED Type은 반불이 발생할 수 있으니 사용전 충분히 검토바랍니다.

Since LED Type can cause dimness according to circuits, we recommend that you examine it before use.

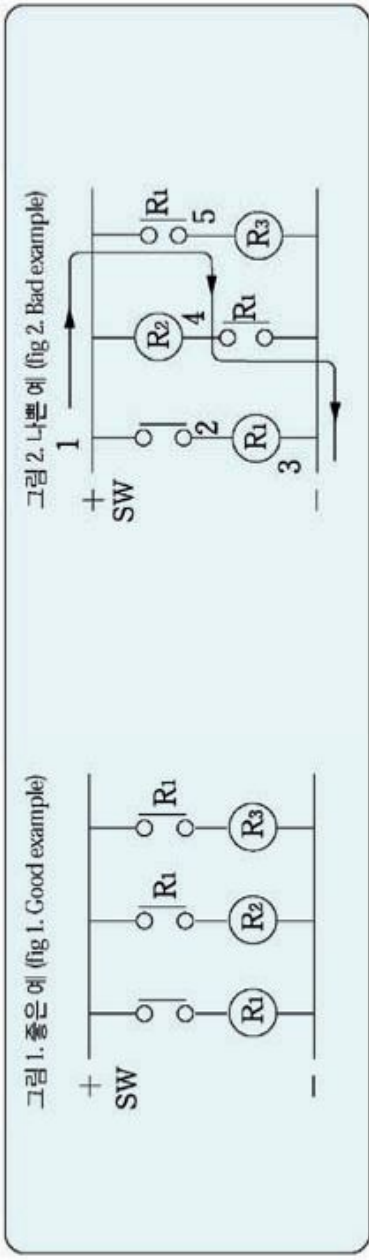


2) 다극(多極) 릴레이의 부하접속은 전위차(電位差) 회로가 되지 않도록 그림1과 같이 코일 단자의 한쪽을 공통으로 접속하십시오.

그림2의 경우 개폐시 아크(Arc) 발생이 없을 때나 전압이 30V이하인 경우에는 가능하지만 1, 5, 4, 3에서 단락(短絡) 형성이 있으므로 바람직하지 못합니다.

In order for the load connection of multi-poles relay not to be potential difference circuit, please connect one side of coil terminal in common like shown in fig. 1.

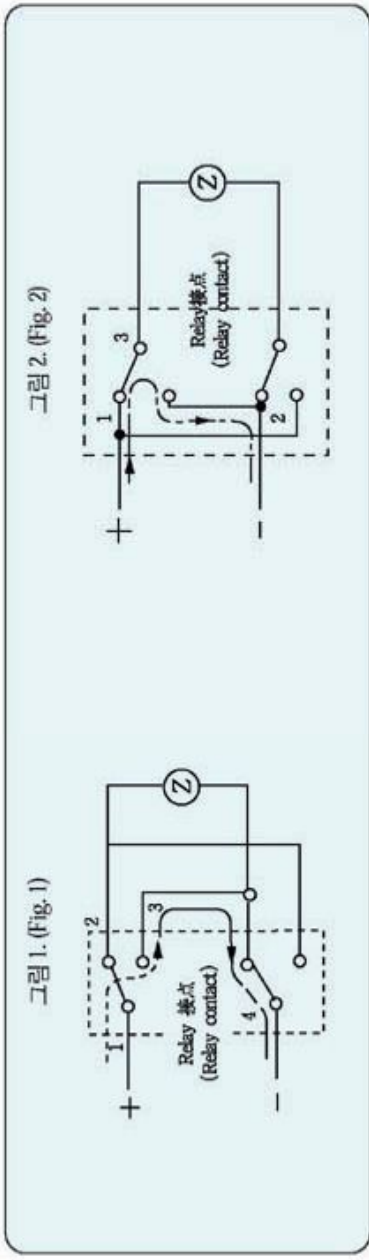
As for fig. 2, it is only possible when switching does not cause any arc or when the voltage in under 30V, but not ideal as short circuit is possible in 1, 5, 4, 3.



3) 피해야 할 회로 (Circuit which has to be avoided.)

그림1과 그림2는 접점간 아크에 의해 단락형성 가능성이 있으므로 피하여 주십시오. 그림1은 1, 3, 4에서, 그림2는 1, 3, 2에서 단락형성이 가능함으로 위험합니다.

Please avoid fig. 1 & 2 as there is the possibility of short circuit formation by arc between contacts. It is dangerous as 1, 3, 4 of fig. 1 and 1, 3, 2 of fig. 2, have possibility of short circuit formation.



4) 여자(勵磁)전류가 서서히 변하는 회로 (Circuit which exciting current is slowly changed)

코일에 여자된 전류가 완전 개폐되지 않고 서서히 상승 또는 하강하는 회로에서는 회로에서는 동작시간이 불안정하게 되고 접점의 스냅(Snap)성이 불안하게 됩니다. 그러므로 아크가 발생하는 회로에서는 아크가 장시간 지속되어 접점 수명이 단축되게 됩니다. 따라서 정류의 전기적 수명보다 저하되니 사용에 따라 충분히 검토하십시오.

In circuit which slowly increases or decreases without complete switching of current excited to coil, operating time and contact snap get unstable. Thus, in arc occurred circuit, long lasting arc results in reducing of contact lifetime. Accordingly, please note as its lifetime gets shorter than standard electric life.

5) 회로의 개폐는 AC측에서 하십시오. <그림1> 접점으로 DC를 개폐하는 경우. <그림2>

Please do circuit switching on AC side. (fig. 1) In case of switching DC by contact. (fig. 2)

• AC개폐용량보다 DC개폐 용량이 적어집니다.

DC switching capacity gets smaller than AC.

• 전위현상이 생기고 수명이 짧게 됩니다.

Potential is occur and lifetime shorter.

• 이상부식 현상으로 금속부품이 부식되고 수명이 짧아지는 경우가 됩니다.

Due to unusual corrosion occurrence, metal parts are corroded and life shorter.

그림 1. 좋은 예 (fig 1. Good example)

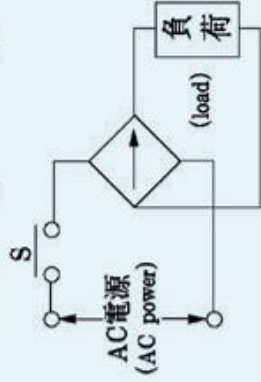
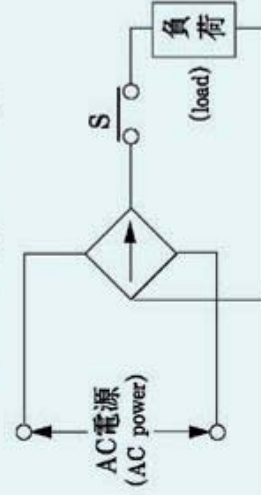


그림 2. 나쁜 예 (fig 2. Bad example)



6) 그림2와 같이 접지측을 개폐하지 않도록 하십시오. 접점군이 접지측(接地側)에 있을 때 그림2의 A부분에서 지락(地絡)할 경우 릴레이가 오동작을 할 수 있습니다. 그림 1은 좋은 예입니다.

As shown in fig. 2 please do not switch the grounding side. When contact collection is on grounding side, in case of grounding at A part in fig. 2, relay can be wrong operated. The fig. 1 is a good example.

그림 1. 좋은 예 (fig 1. Good example)

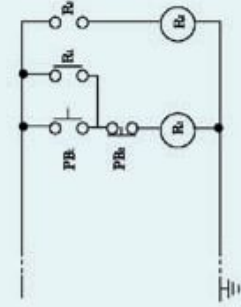
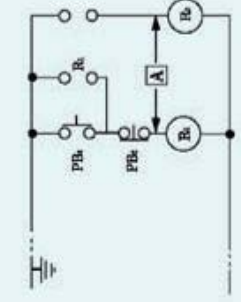


그림 2. 나쁜 예 (fig 2. Bad example)



7) 모우터의 정역운전, 전압절환 (Motor's Forward and Reverse running, Voltage Transfer).

모우터의 정역운전은 아크가 없어진 것이 확실할 때 하십시오. 운전중 회전을 반전할 경우 릴레이접점(R)에 아크가 발생하여 접점 주위의 공기가 이온(Ion)화 되어 전원회로를 단락시켜 접점을 손상시키고 사고를 유발합니다.

Please do motor's forward and reverse running when no arc is ensured. When changing motor's revolution running during, arc is occur on relay contact, and air around contact is ionized, making current circuit be short circuit and causing accidents.

그림 1. 좋은 예 (fig 1. Good example)

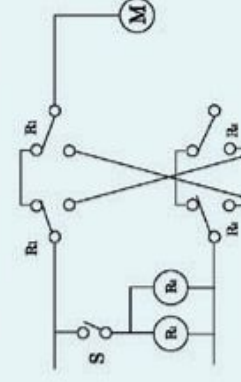
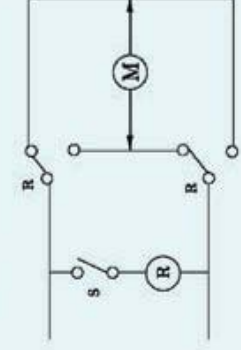


그림 2. 나쁜 예 (fig 2. Bad example)



- 다른 전원을 절환하는 경우 릴레이(R)의 접점으로 절환하면 절환시간이 짧아 아크에 의해 접점손상은 물론 종류가 다른 전원의 교락사고(續絡事故)가 발생합니다.

If transfer by relay contact in case of transfer other power source, short transfer time results in contact damage due to arc as well as other kinds of bridging accident.

그림 1. 좋은 예 (fig 1. Good example)

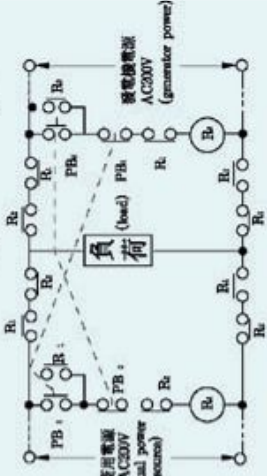
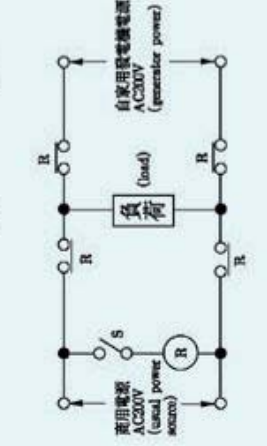


그림 2. 나쁜 예 (fig 2. Bad example)



• 리드선의 접속방법 - How to connect Lead Wire

리드선을 접속할 때는 부하전류의 크기에 따라 도표에 나온 단면적 이상의 것을 사용하십시오. 단자대에 볼트조임 접속일 때는 압착단자 등 적당한 접속단자를 사용하고 접속을 헐겁지 않도록 확실히 체결하십시오.

When connecting lead wire, depending on the size of load current, please use above size of the section area in table. In connection of bolt tightening on terminal band, please use the suitable terminal of solderless terminal etc. and make sure the connection wire not to be come loose.

허용전류(A) Allowable Current(A)	단면적(mm²) Cross-Sectional Area(mm²)
2	0.2
3	0.3
5	0.5
7.5	0.75
12.5	0.25
15	2
20	2
30	3.5

• 납땜 및 세척방법 - How to Soldering and Cleansing

납땜에는 수동식과 자동식이 있습니다. 납땜처리하는 릴레이에 열응력(stress)을 발생하며 후처리 세척용제에 따라 케이스 등의 외관을 손상시켜 릴레이의 기능에 장애를 초래할 가능성이 있습니다. 아래사항을 참고하시어 열발생을 방지하십시오. Soldering has manual and automatic types. Soldering treatment causes heat stress in relay and, depending on after treatment cleansing solvents, possibly makes case appearance damaged and finally can result in malfunctioning of relay. Prevent heat occurrence, referring to following items.

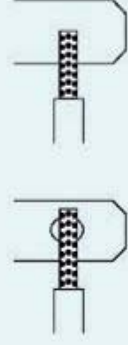
납땜의 좋은 예

(good example of soldering)



납땜의 나쁜 예

(bad example of soldering)



● 프린트기판 납땜법 (Soldering method of Print Substrate)

장치의 소화형에 따라 릴레이를 소켓에 사용하는 플러그인 형보다 반도체와 함께 프린트판에 납땜하는 방법이 많이 사용됩니다. 이때 프린트판에 도포한 후락스(Flux)가 릴레이 속으로 들어가 기능을 손상하는 트러블(Trouble)이 발생하는 수가 있습니다. 프린트기판용 릴레이의 구조가 밀봉형이 아닌이상 그 가능성이 있으므로 다음 설명을 참조하여 적절한 사용방법으로 트러블 방지를 하십시오.

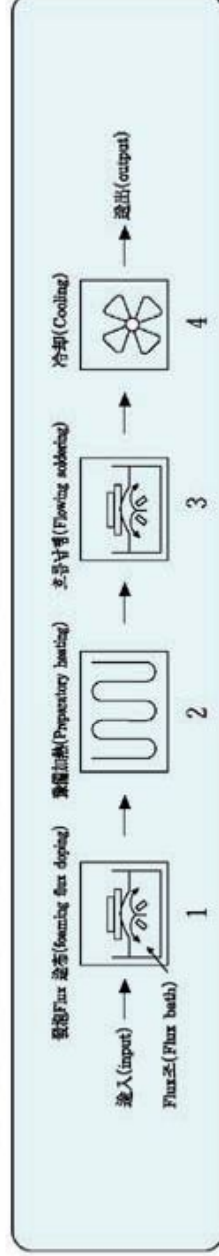
According to the tendency of smaller device, soldering on print substrate with semiconductor is more widely used than plug-in type used relay for socket. Then flux doped on print substrate can put into inside relay resulting in trouble of function damage. Unless the relay structure for print substrate is the enclosed type, there is always the possibility. Thus, please refer to the following explanation and avoid any trouble with using suitable method.

1) 프린트판을 취부할 때는 비틀림이 생기는 취부방법을 장시간 사용하거나 진동이 있는 곳에서는 동박(銅箔)의 단선 또는 납땜이 떨어지는 경우가 있습니다.(릴레이의 특성에 영향을 주는 결과를 초래하니 피해주십시오.)

When attaching print substrate, long using the twisting occurring attachment or using in the place with vibration can cause the disconnection of copperclad and the breaking-away of soldering.(Please avoid this as the result influencing on relay characteristics in caused.)

2) 가장 안전하고 확실한 방법은 수동납땜방법이고 부득이 자동납땜을 할 때는 도표의 공정에 따라 하시고 후락스 도포는 발포(發泡)후락스의 도포 등에 의하여 옅고 균일하게 도포하십시오. 후락스 도포시 프린트 기판보다 후락스가 넘치지 않도록 하는 것이 중요합니다.

The most safe and certain method is a manual soldering. When automatic soldering has to be necessarily done, please follow the procedure in table and, as for flux dopping, please dope by foaming flux dopping etc. with thin and even. In flux dopping, it is important for flux not to be over than print substrate.



3) 후락스 종류는 로진(rosin)계를 사용하십시오. 부식성이 없고 후처리(세척)이 필요없습니다.

As for flux type, please use rosin type, which is not corrosive and not required cleansing.

4) 후락스 도포후 예비가열은 후락스를 가열건조하여 납땜시 후락스가 릴레이에 들어가지 않도록 하는 것이 효과적입니다. 후락스는 납땜성이 좋아지므로 도포후 반드시 예비가열을 실시하십시오.

After flux coping, it is effective to heat and dry in preparatory heating so that in soldering flux cannot come into relay.

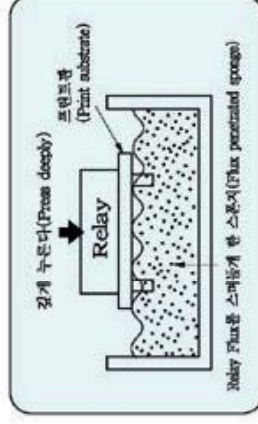
As flux also makes better soldering, please necessarily do preparatory heating after dopping.

5) 납땜할 때 납을 평형하게 하지 말고 2)항의 그림처럼 분류상(噴流狀)으로 하십시오. 프린트판은 그 위를 가볍게 지나는 정도로 위치를 조정하십시오.

When soldering, please do not balance lead but do as jet state in figure of 2). As for print substrate, please adjust the position as the level of lightly passing over it.

- 6) 아래의 그림처럼 후락스를 스폰지에 스며들게 하고 그 위에 프린트판을 누르는 방법은 릴레이에 후락스가 틀림없이 들어가니 절대로 사용하지 마십시오.

As shown on right picture, please never use the method which makes flux penetrate into sponge and press the print substrate over it as flux will definitely come into relay.



세척 (Cleansing)

세척을 실시하면 후락스 등의 녹은 용제가 릴레이 속으로 들어가거나 케이스를 파손시키는 일이 있으므로 前記한 Rosin 후락스를 사용하고 세척을 피하는 것이 가장 이상적입니다만, 부득이 세척할 경우에는 아랫방법을 참고하십시오.

When cleansing, as solvents melted flux etc. come into relay or destroy case, it is ideal to use the aforementioned rosin flux and to avoid cleansing.

But when cleansing has to be necessarily done, please refer to the following method.

- 프린트판 위에 용제가 넘치지 않게 이면만을 세척하십시오. 가체에 용제를 스며들게 하여 이면만을 닦아내는 것이 좋습니다.

Please cleanse only the outside so that solvents cannot overflow on print substrate plate. It is better to wipe only the outside with solvents soaked gauze.

- 최근 유리분말로 프린트판을 스폰레이 하는데 이 경우 유리분말이 릴레이 속으로 들어가 작동 불량을 유발시키므로 사용하지 마십시오.

Recently glass powder is sprayed on print substrate but please do not use this method as the glass power comes into relay resulting in malfunction in this case.

- 케이스는 폴리카보네이트를 사용하고 있으므로 용제는 $\text{CCl}_2\text{F}-\text{CClF}_2$ (Fluorine 113액) 또는 알콜계의 것을 사용하십시오. 기타 트리클렌, 신나, 크로로센, 가솔린 등은 케이스를 변형시키거나 파손시킬 우려가 있습니다.

As polycarbonate case is used, please use $\text{CCl}_2\text{F}-\text{CClF}_2$ (Fluorine 113) liquid of alcoholic solvents. Other trichlene, thinner, chlorocene, gasoline etc. can deform case or destroy.

릴레이의 부착시 주의사항 - Notice when Relay Attachment

- 케이스를 분해하거나 나사를 풀지 마십시오. 특성보증을 할 수 없습니다.

Please do not detach case or loose out screws. Characteristic cannot be guaranteed.

- 초기의 성능을 유지하기 위해 떨어뜨리거나 충격을 받지 않도록 주의하십시오.

In order to keep the initial performance, please do not fall or impact.

- 먼지, SO_2 , H_2S 등 가스(Gas)가 적은 건조한 곳에서 사용하십시오.

Please use in dry place with less dust and gases of SO_2 , H_2S etc.

- 사용 주위온도에 맞게 사용하십시오.

Please use suitably to ambient temperature.

IP □ □

제1표시문자 : 액체에 대한 침입보호(No.2 indication number : intrusion protection against liquid)
 제2표시숫자 : 고체 물체에 대한 침입보호(No.1 indication number : intrusion protection against Solid object)

제1표시문자 (No. 1 indication number)	내 용 (content)
0	보호 불가(protection disable)
1	50mm 이상의 고체물체 침입보호(사람의 손 등) (intrusion protection against solid object above 50mm<human hands etc.>)
2	12mm 이상의 고체물질 침입보호(사람의 손가락 등) (intrusion protection against solid object above 12mm<human fingers etc.>)
3	2.5mm 이상의 고체물체 침입보호(전선 등) (intrusion protection against solid above 2.5mm<wire etc.>)
4	1mm 이상의 고체물체 침입보호(바늘 등) (intrusion protection against solid object above 1mm<needle etc.>)
5	먼지 등 미세물질의 침입보호(먼지, 가루 등) (intrusion protection against small articles such as dust, power etc.>)
6	완벽한 침입보호 (Perfect protection against intrusion)

제2표시문자 (No.2 indication number)	내 용 (content)
0	보호 불가(protection disable)
1	수직으로 떨어지는 액체 침수보호 (immersion protection against vertical dropping liquid)
2	수직에서 15° 범위로 떨어지는 액체 침수보호 (immersion protection against 15° range dropping liquid)
3	수직에서 60° 범위로 떨어지는 액체 침수보호 (immersion protection against 60° range dropping liquid)
4	모든 방향에서 떨어지는 액체 침수보호 (immersion protection against every direction dropping liquid)
5	모든 방향에서 액체를 뿌릴 때 액체 침수보호 (immersion protection against every direction sparring liquid)
6	모든 방향에서 액체를 뿌려도 액체 침수보호 (immersion protection against every direction strong sparring liquid)
7	1m 이내 용기에 침수시켜도 제품내부 침수보호 (inside immersion protection against immersion within vessel below 1m)
8	1m 이상 용기에 침수시켜도 제품내부 침수보호 (inside immersion protection against immersion within vessel above 1m)

