Written in Jun, 2008

# ATS & ACU User's Manual

ATS( Automatic Transfer Switch )
MODEL : Y-TYPE, B-TYPE

ACU( ATS Control Unit )
MODEL : MP5

## ◈ Table of Contents ◈

### ATS Manual



### ACU Manual




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# Cautions for your safety

1. Please be well informed of user's manual and drawings of the product in order to operate safely.
2. Please follow all safety instructions to prevent potential accidents and dangers.
3. There are two types of cautions; "Warning" and "Caution", where each meaning are as follow:

| | |
|---|---|
| ⚠ Warning | Potential injury or death may arise in case of violation of safety instructions |
| ⚠ Caution | Potential injury or product damage may arise in case of violation of safety instructions |

4. Meanings of picture signals appear in the manuals are as follow:

| | |
|---|---|
| ⚠ | Please be careful as it may cause product damage |
|  | Please be careful as it may cause electrocution |

5. Please keep this manual close to the product

## ⚠ Warning

1. Please do not perform wiring work when power is on or in operation as it may cause electrocution.
2. Please do not disassemble the product even when power is off, as the charging current inside the product may still cause electrocution.
3. Please do not touch with wet hands as it may cause electrocution.
4. Please do not touch when sheath of electric wire is damaged as it may cause electrocution.
5. Please do grounding of electric wire to prevent electrocution.

## ⚠ Caution

1. Please permit a correct power supply to prevent product damage and fire
2. Please be sure no foreign substances enter into the product as they may cause short circuit or fire.
3. Please connect wire with correct load to input and output sockets to prevent product damage and fire.
4. Please connect wire as instructed to prevent product damage and fire.
5. Only technicians or properly trained personnel may use this product as irrational use of this product may cause injuries or damages to the product and devices connected to the product.
6. As this product comprises of electrical components, please separate the product before performing the test which requires high voltage such as inner voltage test or insulation resistance test.
7. Please use fuse and electric wire with correct capacity to prevent fire.
8. Please hold this product firmly as it is used for engine generator with high vibration.
9. Please make sure there are no untangled parts before installation.

# 1. Introduction

This is a manual about ATS(Automatic Transfer Switch) composed with ETS(Emergency Transfer Switch) and ACU(ATS Control Unit), which automatically or manually transfers power from commercial power to the emergency generator power or vice versa.

# 2. Features

2.1. ATS usually means only switch itself without controllers, but our ATS is of ETS with ETS controller, so-called ACU that is connected bly connector. Our ATS, therefore is unique, easy to install additional wiring is not necessary.

2.2. Single-core control structure - light, small and accurate movement with good latch structure.

2.3. For Y-type, wrong connection is avoidable by locating commercial power and power supplying terminal to emergency generators on the upper side.

2.4. Remote control and monitoring using RS485 MODBUS RTU communication.

2.5. Able to transfer when outage or low voltage of more than 1P is detected from 3P commercial power.

2.6. Solenoid anti burnt down design inside ETS.

2.7. For B type, attachable on the wall without lifting to bolt up.

# 3. Specifications

| | Rating | |
|---|---|---|
| Model | Y | B |
| Rated Voltage | 600Vac 50/60Hz, 125Vdc | |
| Rated Current | 100~400A | 600-1200A |
| Number of Poles | 2, 3, 4 | |
| Means of Connecting | FRONT | BACK |
| Power Input | 220Vac, 10A | |
| Low Voltage | -25% | |
| Transferring Time | Within 15ms | |
| Contact Parting Time | Within 10ms | |
| Chattering Time | Within 3ms | |
| Weight | 10kg | 43kg |

# 4. Conditions of Use

4.1. Operation Temperature : -10° ~ 40°C

4.2. Storage Temperature: -24° ~ 45°C

4.3. Relative Humidity : 0% ~ 90% non-condensation

4.4. Vibration : amplitude-0.35mm, frequency-0~30Hz

4.5. Maximum Operating Altitude : 1,000m

4.6. Place to Apply : Inside the building

4.7. Place to Attach : On the flat surface

4.8. Place of no dust, no salt, no polluting gas and no vibration

## 5. Names of Part

5.1. ATS is distinguished to two types, Y and B - Y type is also named as T or W type and B type as BACK or M type.


- Y type
- 100~400A
- Including ACU-MP5 (Connected by connector)


- B type
- 600A~1200A
- Including ACU-MP5 (Connected by connector)

## 6. Structure

a. After opening the package, please check if there is any problem to contents.

b. Please check whether the rating written on the ATS is identical to specifications that you require.


[ATS ]


[ACU-MP5]

[2M Connector]

## 7. Cautions on Treatment ( Storage and Carrying)

7.1. Although the product is designed to prevent unstable operation, not all dangerous factors can be removed. Please manipulate the product being fully aware of them and please

wear safety device according to appropriate preventive measure.

7.2. Please store the product in dry and well-ventilated place.

7.3. Please care for the switch not to be impacted when moving the product.

7.4. Please never go under the switch when lifting with lifter or lifting by fixing with chain-block. Its large weight can cause incident by falling down.

## 8. Cautions on Installation and Operation

8.1. Please keep a safe distance from BUS BAR of this product when attaching the product on the electric conductor like steel plate.

8.2. Please make an enough insulation distance over 150㎜ not to reduce performance of switch.

8.3. Please connect and fasten the terminal with suitable bolt and rated torque.

8.4. Please install on the flat surface - if installed on the rough surface, the product can be twisted so that can cause to reduce performance by affecting contact contacting.

8.5. Please don't install to the high temperature, humid, dusty, gas-polluted, vibrating and flammable place.

8.6. Structure of ATS is designed to be installed to constant direction, so changing installation can even change properties. Please install correctly.

8.7. Please consult with us when it is impossible to install correctly affected by wiring or device positioning state.

8.8. Please install the product to be parallel with surface of panel so that label can be read in front of it.

8.9. Connecting main cable which is tightly pulled or pushed can affect contact contacting so that even cause fire accident or disability of movement.

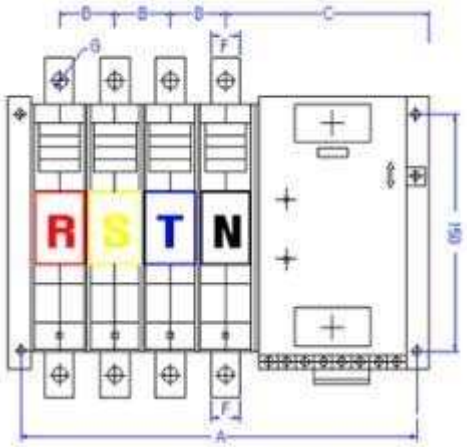
8.10. Regulation about external force on copper plate terminal.

- Main cable can be broken or have fault if forcing on the plate with power more than following torque values. Please make reference to and follow below table.

| | Y-Type 200A | B-Type 1200A |
|---|---|---|
| | | |
| Bolt Torque Limit | 2.1kg.m(M8 Bolt) | 5.3kg.m(M10 Bolt) |
| Parallel Torque Limit | 2.7kg.m | 17.6kg.m |
| Orthogonal Torque Limit | 2.3kg.m | 26.6kg.m |

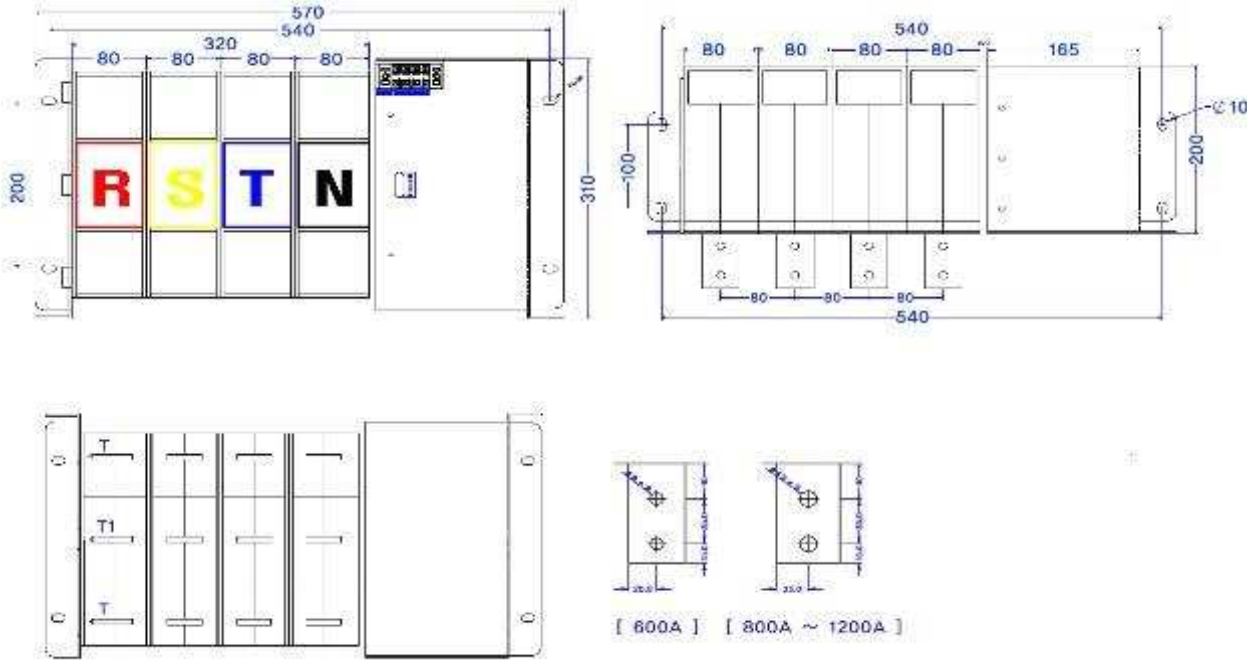
# 9. Outline Dimension

## 9.1. Y Type




| Type | | Y1 | Y2 | Y4 |
|---|---|---|---|---|
| A | 2P | 208 | 208 | 226 |
| | 3P | 246 | 246 | 274 |
| | 4P | 284 | 284 | 322 |
| B | | 38 | 38 | 48 |
| C | | 145 | 145 | 150 |
| D | | 30 | 30 | 39 |
| E | | 34 | 34 | 44 |
| F | | 20 | 20 | 30 |
| AT | | 5 | 5 | 5 |
| BT | | 5 | 5 | 5 |
| LT | | 6 | 6 | 6 |
| Ø | | 8 X 10 | 8 X 10 | 10 X 12 |
| Weight | 2P | 8 | 8 | 8 |
| | 3P | 9 | 9 | 10 |
| | 4P | 10 | 10 | 11 |

## 9.2. B Type



| Type | | BA | BB | BC | BD |
|---|---|---|---|---|---|
| Short-time Curt. | | 15KA | 15KA | 22KA | 22KA |
| Short-time Max Curt. | | 37.5KA | 37.5KA | 50KA | 50KA |
| Weight | 3P | 34 | 35 | 36 | 37 |
| | 4P | 38 | 40 | 42 | 44 |
| Thickness(insert) | | 7t | 7t | 10t | 12t |
| Weight | A | 8 | 8 | 8 | 8 |
| | B | 5 | 5 | 5 | 5 |

## 10. Manipulation

10.1. Our ATS is guaranteed in switching performance about electrical manipulation. About mechanical manipulation, on the other hand, it is not guaranteed because switching power and speed is different from manipulating persons. Therefore, please manipulate ATS mechanically only in emergency.

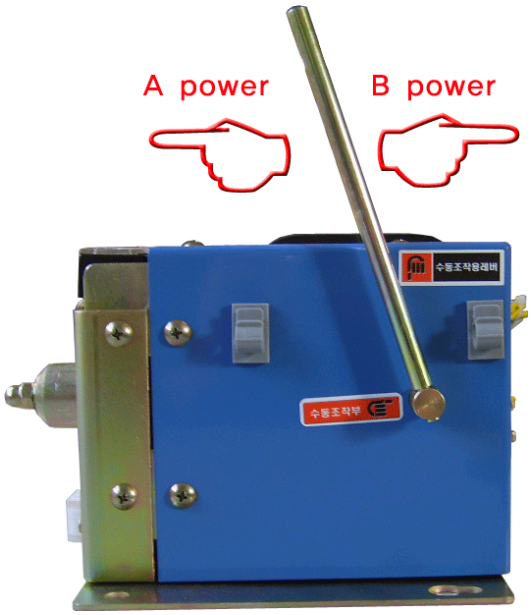
10.2. When insertion is not smooth, please insert after removing the causing factor. If not, fire or fault can occur.

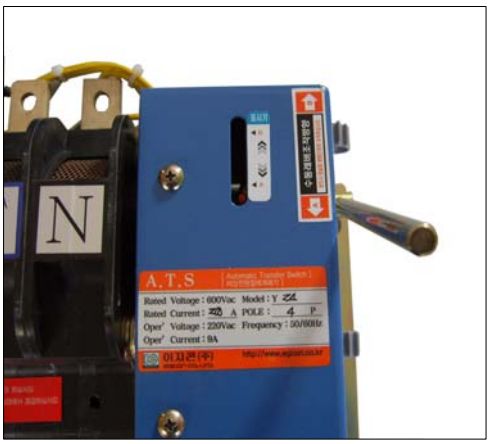
10.3. Please don't manipulate without ARC CHUTE, which cause firer or disability of movement.

10.4. When mechanically manipulating, please turn power supply off.

10.5. Please don't control under the -25% of rated voltage.

10.6. Transferring direction of Y type.




- Insert lever into the indicated hole to manually manipulate.
- Force to a direction of A power or B power.
- Check indicator points intended location.
- Remove lever after use.

10.7. Transferring direction of B type

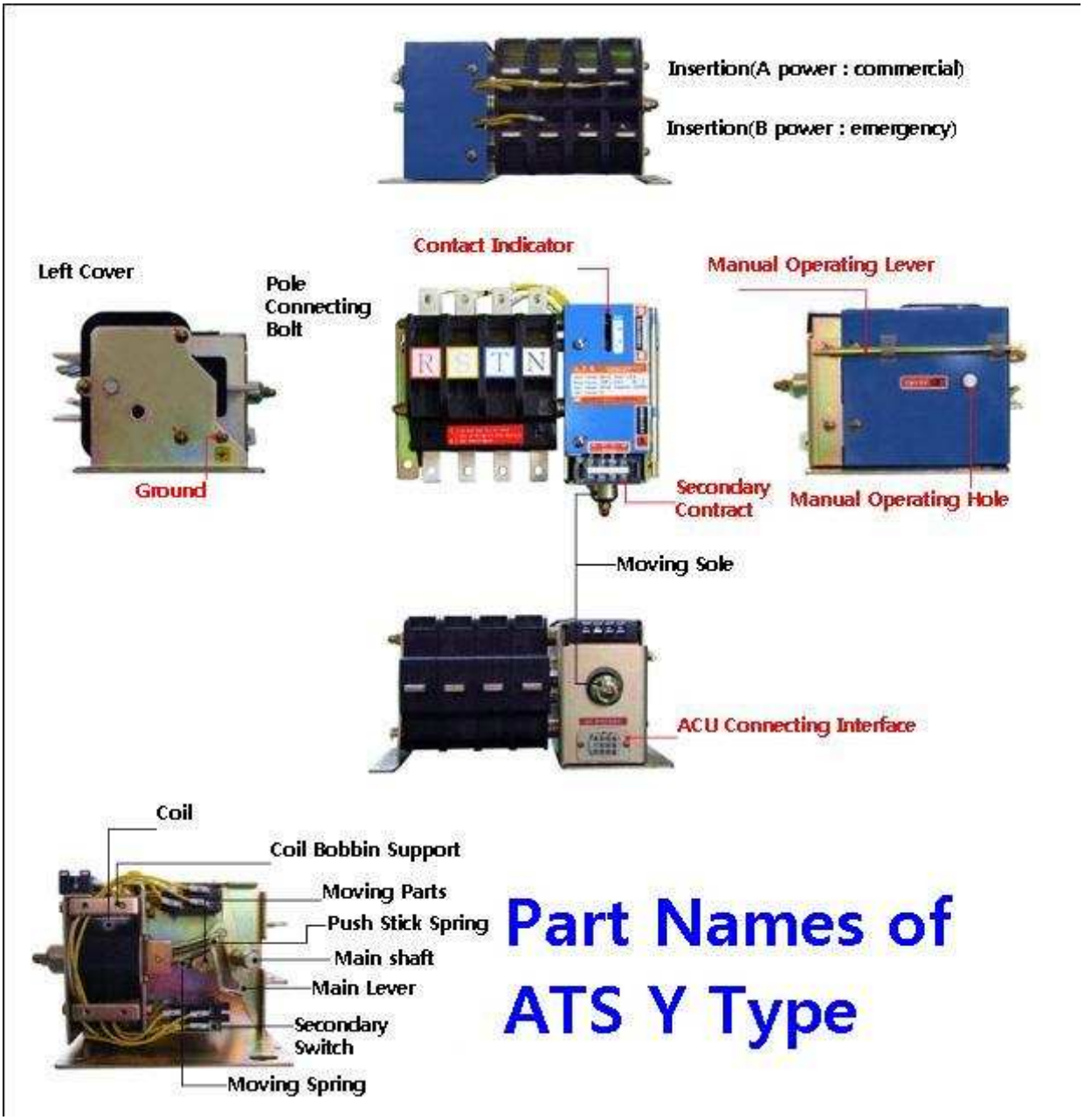
- Insert lever into the indicated hole to manually manipulate.
- If wanting to transfer after checking location of lever, pull the lever to the direction

indicated on above picture until the sound occurs.

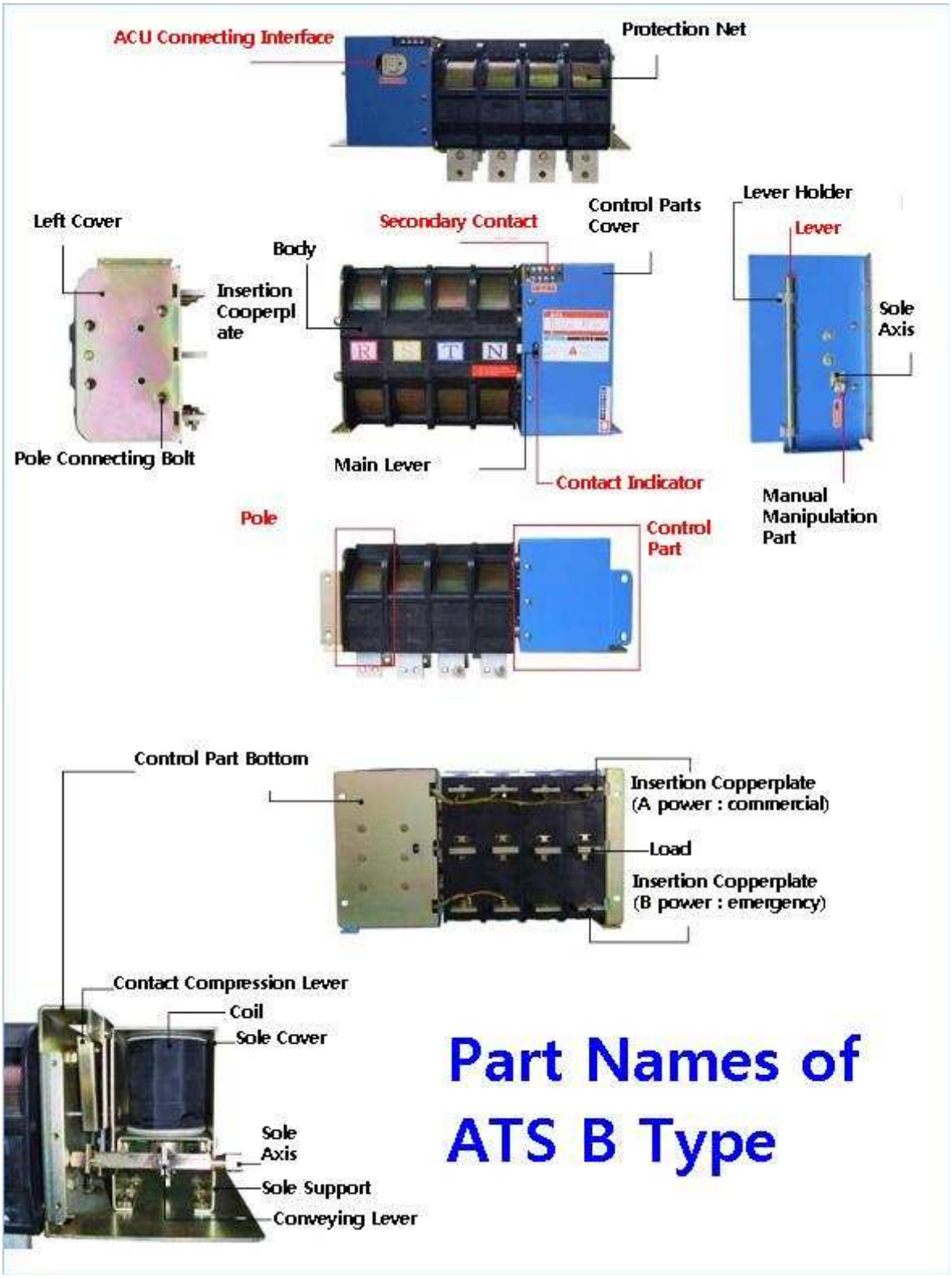
- At the next time to transfer(consecutive transferring), check the location of indicator after transferring to same direction.
- Remove lever after use.

## 11. Outward and Names

### 11.1. Y Type



11.2. B type


ACU Connecting Interface
Protection Net
Left Cover
Secondary Contact
Control Parts Cover
Lever Holder
Lever
Body
Insertion Cooperplate
Sole Axis
Pole Connecting Bolt
Main Lever
Contact Indicator
Manual Manipulation Part
Pole
Control Part
Control Part Bottom
Insertion Copperplate (A power : commercial)
Load
Insertion Copperplate (B power : emergency)
Contact Compression Lever
Coil
Sole Cover
Sole Axis
Sole Support
Conveying Lever
Part Names of ATS B Type

## 12. After Sales Policy

12.1. Guarantees until a year after product is released.
12.2. Guarantees only for malfunction during normal use.
12.3. Free repairing.
12.4. Can guarantee only if callback is possible, except Korea.
12.5. Repairs only if brought back to factory.(If possible, need to consult)
12.6. Can handle within a week after receipt.
12.7. Guarantee receipt during 9:00 ~ 18:00 on weekday.
12.8. Guarantee receipt request via TEL : (+82) 32 677 9806, FAX : (+82) 32 677 9807
EMAIL : sales@egcon.co.kr, WEB : http://www.egocn.co.kr
12.9. Warranty Exception
- Abnormal use or malfunction caused by careless treatment
- Malfunction caused by unauthorized disjoining
- Malfunction cause by fire, damage from salt, flood, thunderbolt and etc.
- Need to pay for warranty exception

## 13. What is ATS? [According to KEMC(Korea Electrical Manufacturing Cooperative) Standard No.1112]

13.1. Emergency Transfer Switch : Switch used at transferring from commercial power to emergency power, or vice versa with rating voltage under 660Vac or under 250Vac of electrical path.

- TRANSFER SWITCH with HEAD CONTROLLER—we call it ACU—is usually called ATS, and one without head controller is called TS(we call ETS).
- Function of Head Controller
  13.1.1. Detecting state of commercial power or emergency power to transfer them automatically.
  13.1.2. Halting transferring by voltage lack detection( 85~115% consecutive control)
  13.1.3. Ablt to set TIME when outage or electricity returns(0~10 sec)
  13.1.4. When electricity returns, transferring to commercial power with high priority.
  13.1.5. Alarming over frequency detection
  13.1.6. Detecting constant voltage of generator power
  13.1.7. Alarming over over current detection

13.2. This device is installed between commercial power source and emergency power to transfer power from commercial power source to emergency power source while using commercial power connecting it to load in usual time.

# ACU Manual

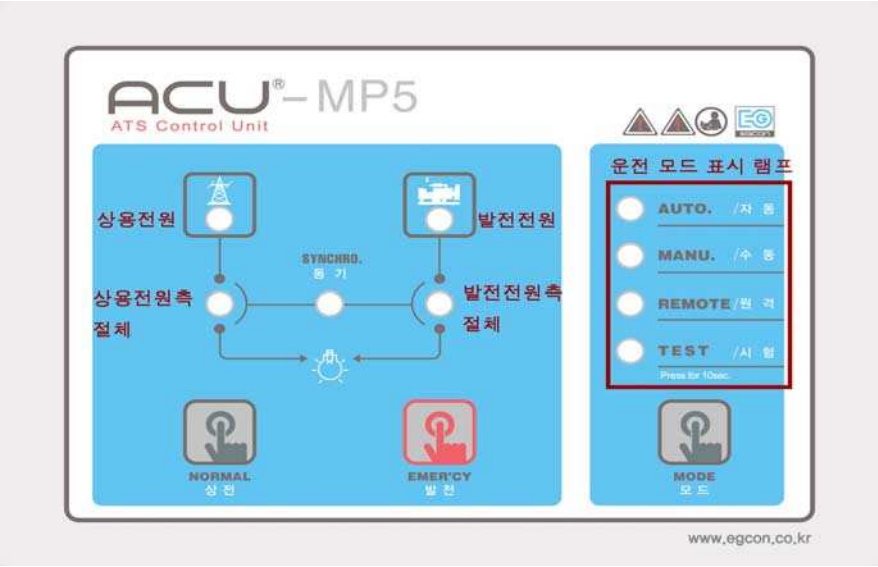
## 1. Functions and Features

1.1. Transfers automatically and manually(optional)
1.2. Beautiful design and nice interface to easily manipulate
1.3. Manipulated by one controller - simple
1.4. Commercial power, generator power and insertion state indication
1.5. Detects 3P of commercial power and indicates absent phase.
1.6. Prepares engine start contact at commercial power fault(outage or absent phase)
1.7. SEMI AUTO function : When both commercial power and generator power is in normal state, if one of the powers is abnormal, switch is transferred to a normal power source even before waiting time for transferring.
1.8. TEST mode is available in manual mode.
1.9. Solenoid anti burnt down design for ETS : During manual and automatic mode, if ETS does not transfer after transfer output, buzzer goes off and indication lamp blinks.(ATS normally operates by being transferred manually)
1.10. Buzzer's going off prevents accidents by notifying transfer waiting.

## 2. Specifications

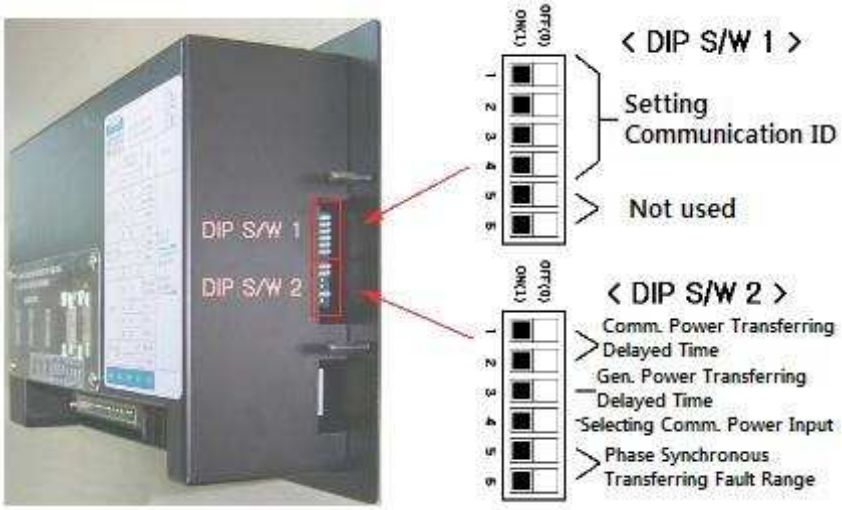
2.1. Power Input : 220 Vac
2.2. Input of Commercial Power : 3P4W, 380/220Vac, 50/60 Hz
2.3. Input of Generator Power : 1P, 220Vac, 50/60 Hz
2.4. Phase-Synchronous Transferring Error Rate : 5% , 20 % , 30%
2.5. RS-485 MODBUS RTU communication
2.6. Transferring Output Contact Capacity : 250Vac, 10 A (Dry contact)
2.7. Capacity of Assistant Contact of Commercial Power Fault : 250Vac, 10A(Dry contact)
2.8. Attached on the front

## 3. Lamp and Switch



| Name | Function | LED Color |
|---|---|---|
| Commercial Power Lamp | Turns on when commercial power is normally input | GREEN |
| Generator Power Lamp | Turns on when generator power is normally input | RED |
| Commercial Power Lamp | Turns on when ATS is transferred to commercial power | GREEN |
| Generator Power Lamp | Turns on when ATS is transferred to generator power | RED |
| Synchro | Turns on when phase is synchronized within the setting range | YELLOW |
| Auto. | At automatic mode | GREEN |
| Manu. | At manual mode | RED |
| Remote | At remote control mode | GREEN |
| TEST | At test mode | GREEN |
| Commercial power transferring button | Transferred to commercial power at manual mode | |
| Generator power transferring button | Transferred to generator power at manual mode | |
| Operation mode changing button | Selecting Auto., Manu., Remote., TEST(Keep pressing about 10sec) | |

## 4. Setting DIP SWITCH




o : ON, X : OFF

| Function | DIP S/W 2 | | | | | | Setting |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | |
| Waiting time for transferring to commercial power | X | X | | | | | 10 Sec |
| | X | O | | | | | 30 Sec |
| | O | X | | | | | 1 Min |
| | O | O | | | | | 3 Min |
| Waiting time for transferring to generator power | | | X | | | | 2 Sec |
| | | | O | | | | 5 Sec |
| Selecting commercial power input | | | | X | | | 3P4W |
| | | | | O | | | 1P2W |
| Selecting use of synchronous transferring function & setting fault range | | | | | X | X | Nonuse synchro. transferring |
| | | | | | X | O | Fault rate 5% |
| | | | | | O | X | Fault rate 20% |
| | | | | | O | O | Fault rate 30 % |

4.1. DIP S/W 1 selecting is explained on the website.

4.2. 'Waiting time for transferring to commercial power' means the time to wait for transferring when commercial power is normal at automatic mode. The commercial power is recognized as normal state if within the set VOLT RANGE.

4.3. 'Waiting time for transferring to generator power' means the time to wait for transferring from commercial power to generator power(emergency power) when commercial power is out and generator power is normal.

## 5. Input/Output Terminals

| Terminal | | Description | Rating |
|---|---|---|---|
| COM | R | Input terminal on phase R of commercial power (max 1A) | 3W4P 380/220Vac or 1P 220Vac 10A |
| | S | Input terminal on phase S of commercial power (max 1A) | |
| | T | Input terminal on phase T of commercial power (max 10A) | |
| | N | Input termianl on phase N of commercial power | |
| GEN-T, GEN-N | | Input terminal on generator power(phase T, N) | 1P 220Vac 10A |
| CSL, GND | | Input assistant contact of commercial power | Connecting dry contact(don't insert power) |
| GSL, GND | | Input assistant contact of generator power | Connecting dry contact(don't insert power) |
| COIL-A ,COIL-B | | Output transfer | 220Vac 10A |
| 485+, 485- ,GND | | Connection terminal for RS 485 communication | Using shield cable |
| ST1, ST2 | | Contact is CLOSE when commercial power is out or gets fault(phase-absent). Contact is OPEN when commercial power is normal and the assistant contact of ATS is transferred to commercial power. | Dry contact 300Vac, 5A |

5.1. Please block all power input to ATS before wiring.
5.2. Please connect ATS with provided cable.
5.3. Please use shield calbe to wire RS 485 communication line for remote control.
5.4. Please check commercial power and generator power before inserting power into ATS.

## 6. MANU Operation Test

6.1. ACU operates in a latest selected mode when power is supplied.
6.2. Lamp of commercial power or generator power turns on when commercial power or generator power is supplied respectively.
6.3. When commercial power lamp blinks, check commercial power, which is absent or has low voltage.
6.4. When commercial power is normal and ATS is transferred to commercial power, generator start contact gets OPEN.
6.5. Transfer ATS into generator power using generator power selection switch. If synchronous transfer is set to use, synchronous transfer lamp turns on and ATS is transferred synchronously.
6.6. If ATS is transferred to generator power, insertion lamp turns on.
6.7. Transfer ATS into commercial power using commercial power selection switch. If synchronous transfer is set to use, synchronous transfer lamp turns on and ATS is transferred synchronously.
6.8. Synchronous transfer needs time to synchronize phase.
6.9. If ATS is transferred to commercial power, insertion lamp turns on.

## 7. AUTO Operation Test

7.1. Set AUTO mode using MODE switch.
7.2. Turn commercial power or one of the 3 phases OFF.
7.3. If phase T of power is OFF, all lamps of ACU turns off, but if phase R or S is OFF or has low voltage, lamps blink.
7.4. Generator start contact gets CLOSE.
7.5. Generator power lamp turns on when generator power is supplied.
7.6. If generator power is normal, ATS is transferred to generator power after waiting time and commercial power insertion lamp turns on.
7.7. When commercial power is supplied, commercial power lamp turns on and after waiting time, ATS is transferred to commercial power and commercial power insertion lamp turns on.
7.8. If two powers are supplied and synchronous transfer is selected, insert with synchronization like doing in manual operation.
7.9. If synchronous detection is delayed over 15 sec, transfer without synchronization.
7.10. Generator start contact is OPEN.

## 8. TEST Operation Test

8.1. TEST mode is available only in MANU.(manual) mode.
8.2. If commercial power is normal and the MODE button is pressed over 10 sec while ATS

is transferred to commercial power, after all lamps blink 4 times, TEST LAMP turns on(If MODE button is pressed over 2 sec and under 5 sec, all lamps blink 3 times and then ATS turns back to MANU mode - LAMP TEST)

8.3. If TEST mode is set, generator start contact is CLOSE.

8.4. If commercial power is not supplied within 10 sec, buzzer alarms and mode changes to precious mode.

8.5. If generator power is supplied, generator power lamp turns on and after waiting time passes, ATS is transferred to generator power.

8.6. After ATS is normally transferred to generator power, ATS is transferred to commercial power after transferring waiting time.

8.7. Commercial power insertion lamp turns on.

8.8. TEST mode terminates and mode changes to precious mode.

## 9. Synchronous Operation Setting (Optional)

9.1. Synchronous indication lamp turns on when detected T-N pahses of both commercial power and generator power are same within the setting range in all operation modes.

9.2. If synchronous insertion is set on automatic mode, commercial power and generator power is transferred within the synchronous setting range.

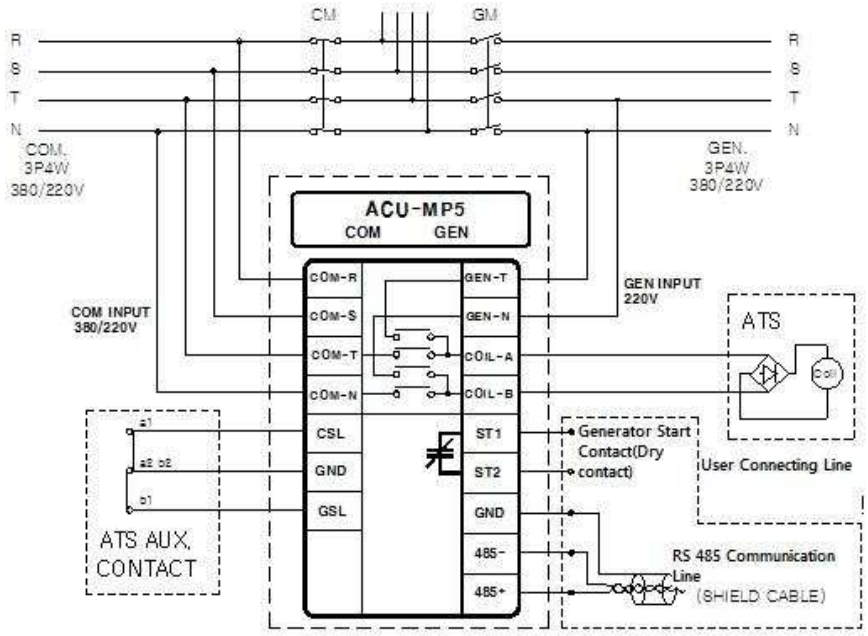
9.3. If power is not synchronous even after 15 sec, power is transferred without synchronization.

9.4. Power transfers at parallel operation.

※ The reason why the phases of commercial power and generator power should be identical

: When commercial power and generator power was supplied, ATS is transferred to one of the powers with energy provided to load. At this time, if remaining voltage of driving motor or inductive load and the phase of commercial power is different, at worst, huge current can occur like it happens when twice of rating voltage(760V = 380 x 2) operates motor. This overload damages ATS contact and devices connected to load. In a serious case, the axis of generator can be broken. Our ACU is designed to try transferring only if both phases of commercial power and generator power are same in order to prevent this overload.

## 10. Wiring Diagram

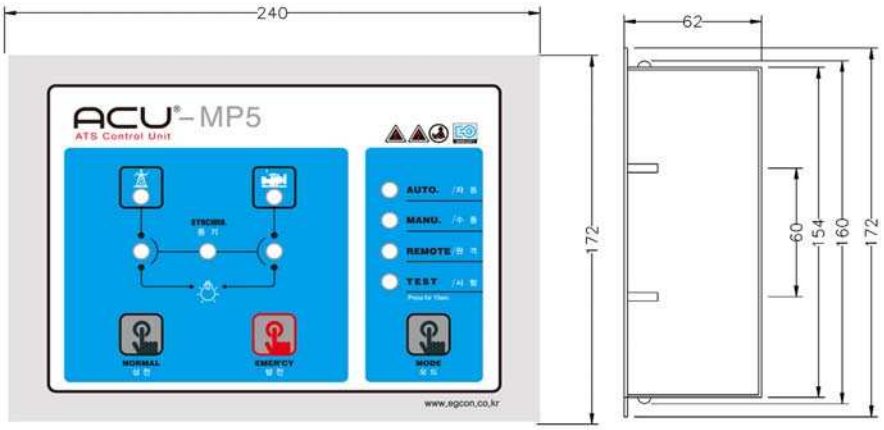


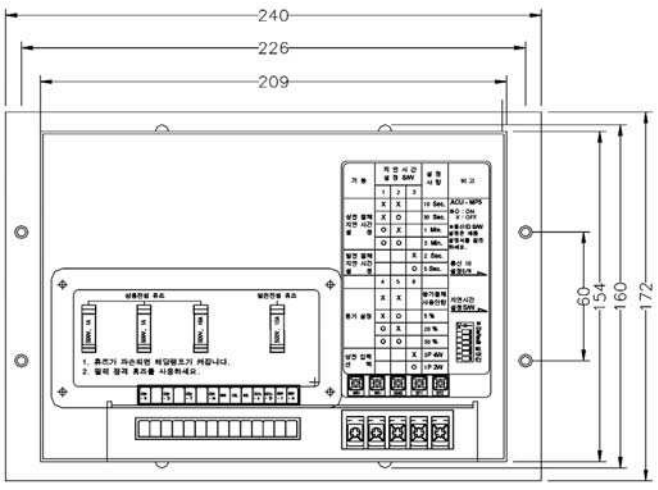

## 11. Outward and Dimension

11.1. Dimension(mm) : W222 * H135 * D55

11.2. Cut-out(mm) : W195 * H125

11.3. Mounting Holes(mm) : W210 * H60, 5 ø-4 Holes



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ENGINE, GENERATOR CONTROL ENTERPRISE

# EGCON®

# 엔진, 발전기 제어 전문기업

## PRODUCTS ITEM

- □ AVR / 자동전압조정기
- □ ABC / 자동밧데리충전기
- □ GCU / 발전기기제어장치
- □ ECU / 엔진제어장치
- □ ESD / 엔진속도검출기
- □ EPD / 엔진보호장치
- □ SCR / 동기검출기
- □ BCU / ACB 제어장치
- □ ACU / ATS 제어장치
- □ MPU / 속도검출센서
- □ GCP / 발전기 운전반
- □ ECP / 엔진 운전반
- □ ATS / ATS 운전반
- □ FGP / 별치형 운전반

AVR
MODEL : 635/631

ABC
MODEL : SMP

ABC
MODEL : SMF

ECU
MODEL : DG1

GCU
MODEL : MP2

DMM
MODEL : 961

ACU
MODEL : MP3

ETS
MODEL : Y, B TYPE


이지콘(주)

경기도 부천시 오정구 내동 182-3번지 (421-806)
홈페이지 : http://www.egcon.co.kr, 이메일 : sales@egcon.co.kr
TEL : 032-677-9806, FAX : 032-677-9807