Sumitomo Drive Technologies

ASTERO® Socket-type Speed Control Motor (CAL-type) Maintenance Manual

■The gear head and motor should be handled, installed and maintained by trained technicians. Carefully read this manual and all accompanying documents before use.
■A copy of this manual should be sent to the actual user of the gear unit.
■This manual should be maintained by the user.

1. Safety and other precautions

⚠CAUTION

General
- The gear head and motor should be operated only within its name plate and catalogue ; otherwise, electric shock, injury or damage to a system may occur.
- Keep hands and all foreign objects from the internal moving part of the gear unit and motor; otherwise, electric shock, injury, fire or damage to a system may occur.
- Damaged units should be taken off-line; otherwise, injury or fire may occur.
- Do not remove the nameplate.
- Any modifications or alterations of any kind, to the unit, will void the warranty and all subsequent claims.

Transport
- Exercise ample care not to drop the unit and fall during transport.

Installation
- Do not place any inflammables around the gear head and motor; otherwise, fire may result.
- Do not place any objects that will hinder ventilation around motor; otherwise, cooling effect is reduced, and may lead to a possible fire hazard and a burn due to excessive heat built-up.
- Do not touch the key way at the shaft end or on the inside of the dear unit and motor; otherwise, injury may result.
- When the unit is used in food processing applications vulnerable to oil contamination, install an oil pan or other such device to cope with rare oil leaking. Otherwise, oil leakage may damage products.

Coupling with other machines
- Install appropriate guard devices around rotation parts ; otherwise, injury may result.
- Confirm the direction of rotation before coupling the unit with its driven machine. Difference in the direction of rotation may cause injury or damage to the system.

Wiring
- Do not touch lead wire when measuring the insulation resistance. Electric shock may result.

⚠ DANGER

Wiring
- Connect a power cable to the motor according to the connection diagram or maintenance manual; otherwise, electric shock or fire may result.(Without terminal box, exercise insulation in the connecting part.)
- Do not forcibly curve, pull or clamp the power cable and lead wires; otherwise, electric shock may result.
- Correctly ground the grounding bolt; otherwise, electric shock may result.
- Use power source stated in the nameplate; otherwise, motor's burning or fire may result.

Operation
- Never approach or touch any rotating parts (shaft, etc.) during operation; otherwise, loose clothing caught in these rotation parts may result in severe injury.
- When the power supply is interrupted, be sure to turn off the power switch. Unexpected resumption of power may cause injury or damage to the equipment.

Daily inspection and maintenance
- Never approach or touch any rotating parts (shaft, etc.) during maintenance ; otherwise, loose clothing caught in these rotating parts may result in severe injury.

Inspection upon delivery
- Verify that the unit received is in fact the one ordered. When a different product is installed, injury or damage to the system may result.

2. Model Symbol

Table 1. Model

Part No.	Power Source	Applicable Motor
CAL06A	Single-phase 100V50/60Hz, 110V60Hz	6W
CAL90A	Single-phase 100V50/60Hz, 110V60Hz	15-90W
CAL06C	Single-phase 200V50/60Hz, 220V60Hz	6W
CAL90C	Single-phase 200V50/60Hz, 220V60Hz	15-90W
CAL06D	Single-phase 200-240V50Hz	6W
CAL90D	Single-phase 200-240V50Hz	15-90W

Table 2. Combination table of motor type and condenser

Condenser		DMF-25255	DMF-25505	DMF-25605	DMF-251006	DMF-252006	DMF-252406	DMF-45704	DMF-45904
Speed Control	Induction	A6U06A	A7U15A	A8U25A	A9U40A	A9U60AH	A9U90AH	A6U06C A6U06D	A7U15D

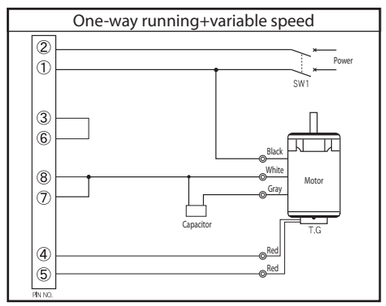
Condenser		DMF-45125	DMF-45155	DMF-45205	DMF-45255	DMF-45355	DMF-45505	DMF-45705
Speed Control	Induction	A7U15C	A8U25C A8U25D	A9U40D	A9U40C	A9U60DH	A9U60CH A9U90DH	A9U90CH

CAL (1) — 06 (2) — A (3)

(1)Maker symbol CAL: CAL Series
(2)Output power 06: 6W 90: 15-90W
(3)Power voltage A: Single-phase 100V (50/60Hz) 110V(60Hz)
C: Single-phase 200V (50/60Hz) 220V(60Hz)
D: Single-phase 200V-240V(50Hz)

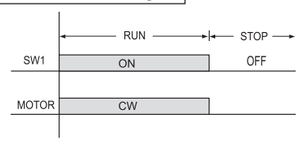
3. Wiring Diagram

[1] ■6W-90W



SW1	AC125V or AC250V 5A or larger

• Example of running operation

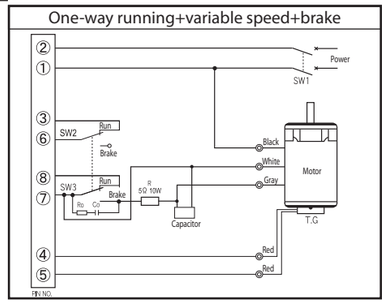


For single-phase AC220 to 240V, 50Hz motor connections, use the brown wires instead of the gray ones in the diagram.

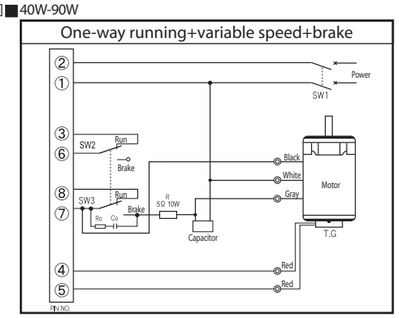
[1] Notes 1 The motor's shaft rotates in the direction of CW viewed from the shaft side. For rotating the shaft in the opposite direction (CCW), switch between white and gray lead wires of the motor.

[1] Notes 2 The fan shall be connected to a motor of 60W or more. Refer to [10] motor with fan for wiring.

[2] ■6W-25W



[3] ■40W-90W

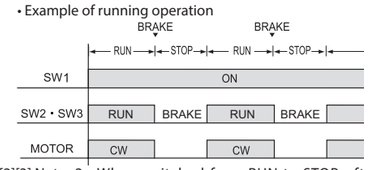


[2][3] Notes 1 The motor rotates in the direction of CW viewed from the shaft side. For rotating the shaft in the opposite direction (CCW), switch between white and gray lead wires of the motor.

SW1,3	AC125V or AC250V 5A or larger
SW2	DC 20V 10mA
CR circuit Ro,Co	Ro = 10-200Ω(1/4W or larger) Co = 0.1-0.2μF (for AC125V or AC250V)
R	4.7Ω-6.8Ω 10W or larger

Note: CR circuit is for the surge voltage protection.

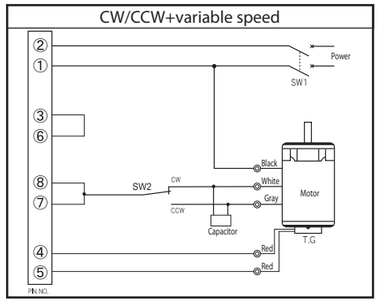
• Example of running operation



[2][3] Notes 2 When switched from RUN to STOP, after applying the brake (electric brake) for about 0.5-second, the motor stops quickly.

[3] Notes 3 The fan shall be connected to a motor of 60W or more. Refer to [10] motor with fan for wiring.

[4] ■6W-90W

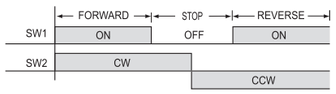


SW1, 2	AC125V or AC250V 5A or larger

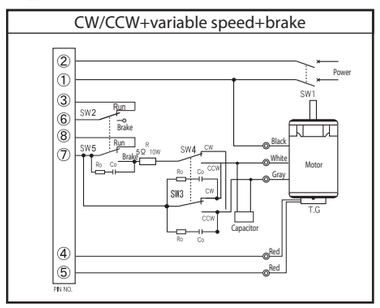
[4] Notes 1 Set stop periods and switch SW2 after the motor rotation stops.

[4] Notes 2 The fan shall be connected to a motor of 60W or more. Refer to [10] motor with fan for wiring.

• Example of running operation

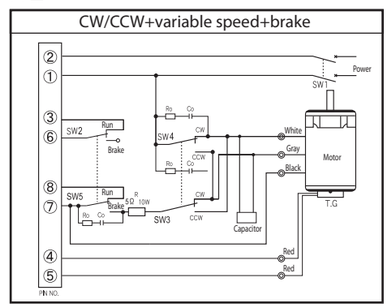


[5] ■6W-25W



[5][6] Notes 1 When switched from RUN to STOP, after applying the brake (electric brake) for about 0.5-second, the motor stops quickly. Do not operate SW3 or 4 during the 0.5-second operation.

[6] ■40W-90W



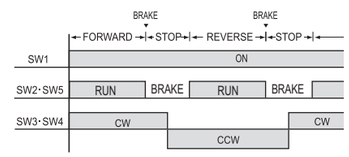
[5][6] Notes 2 Switch SW3 or SW4 before switching STOP to RUN in the SW2 or 5

[6] Notes 3 The fan shall be connected to a motor of 60W or more. Refer to [10] motor with fan for wiring.

SW1,3,4,5	AC125V or AC250V 5A or larger
SW2	DC 20V 10mA
CR circuit Ro,Co	Ro=10-200Ω(1/4W or larger) Co=0.1-0.2μF (for AC125V or AC250V)
R	4.7Ω-6.8Ω 10W or larger

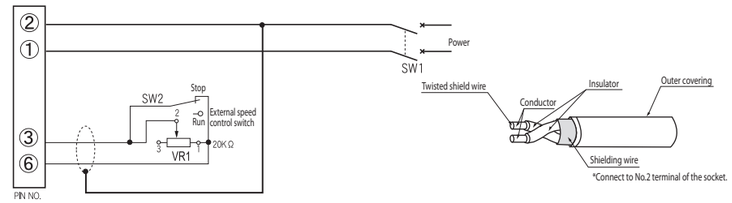
Note: CR circuit is for the surge voltage protection.

• Example of running operation



[7] ■How to use the external measuring equipment

When distance control is required

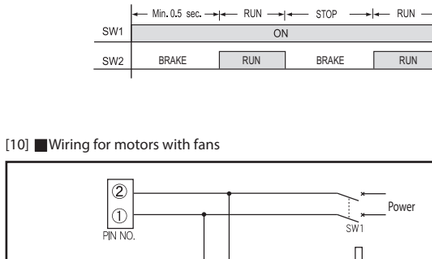


VR1	20KΩ 1/4W B type
SW2	DC20V 10mA

Notes 1 Set the scale of the speed control switch to LOW position.
2 Apply short wires if possible, otherwise a malfunction might occur.
In case of it, connect the shielding wire to No.2 terminal of the controller.

[8] ■How to use the external measuring equipment

When multiple speed setting required

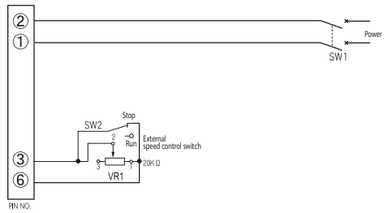


VR1,2,3	20KΩ 1/4W B type
SWA,B,C,2	DC20V 10mA

Notes 1 Set the scale of the speed control switch to LOW position.
2 If the motor speed must be adjusted to multiple settings, you can connect VR1, VR2 and VR3 and use SWA, SWB, SWC, (etc.) to switch the speed. The switching timing of the switches should be made roughly equal to the time for opening/closing the relay contact (SW4).

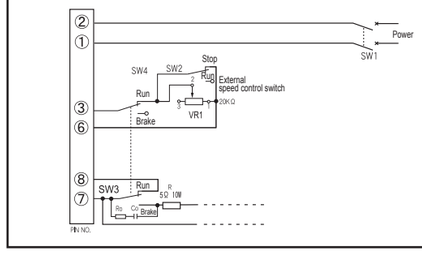
[9] ■Decreasing the starting time

When braking not required



VR1	20KΩ 1/4W B type
SW2	DC20V 10mA

When braking required

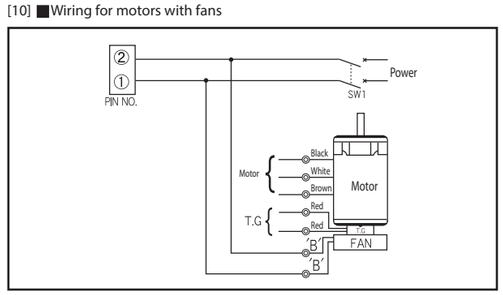


Note: CR circuit is for the surge voltage protection.

* If the motor starts in retard when a start signal is applied from the RUN switch (SW), control RUN or STOP by signals from SW2 with the external speed control switch VR. In this case, set the scale of the speed control switch to LOW position.

• Example of running operation

[10] ■Wiring for motors with fans



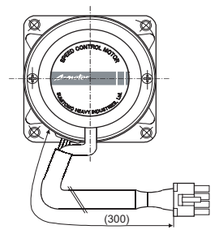
Voltage	Color of lead wire 'B'
Single-phase 100-110VAC	Brown
Single-phase 200-240VAC	Yellow

For motors of 60W or more, fans are available.
Install the wires of the fan by reference to the diagram at the left.

4. How to Connect

Induction Motor

(Motor)

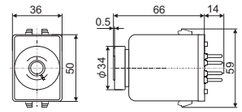


Notes) Use extension cables for supplying power.

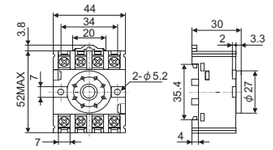
Extension cable for power line
(attached to the controller)
- Motor power wire (black, white, gray)
- TG power wire (red...2 wires)
- FAN/60W and 90W only (yellow...2 wires)

Controller / Condenser Common Use

(Unit)



(Condenser)



5. Specifications

Part No.	CAL06A	CAL90A	CAL06C	CAL90C	CAL06D	CAL90D
Rated Voltage	Single-phase AC100V 50/60Hz, Single-phase AC110V 60Hz		Single-phase AC200V 50/60Hz, Single-phase AC220V 60Hz		Single-phase AC200V-240V 50Hz	
Voltage Range	±10%					
Applicable Motor Output	6W	15-90W	6W	15-90W	6W	15-90W
Controllable Speed Range	50Hz : 90 - 1400 r/min 60Hz : 90 - 1700 r/min					
Speed Regulation	5%(Standard value)					
Speed Control Switch	Built-in (external speed control switch installable)					
Brake	Braking with electric brake allowed					
Braking Period	0.5s (Standard value)					
Parallel Operation	Not allowed					
Slow Start / Slow Stop Functions	Not allowed					
Operating Temperature Range	-10 - 50 ℃					
Storage Temperature Range	-20 - 60 ℃					
Operating Humidity	Under 85%RH with no condensation					

*1 The applied motor is a separate-type speed control motor (T-G voltage 12V).
*2 Electric brakes do not have holding torque.

6. General Specification of Speed Control Motor

Item	Spesification
Insulation Resistance	At least 100MΩ when measured with a 500V DC meager between the motor coil and case at normal temperature and humidity after motor has reached rated torque.
Insulation Withstand Voltage	Normal function when a 1500V, 50/60Hz current is applied between the motor coil and case for 1 minute at normal temperature and humidity after the motor has reached rated torque.
Temperature Rise	Shall be 60°C or less when the temperature rise on the enclosure is measured by thermometer after the motor reaches the rated torque. (Shall be 45°C or less in the case of motor with fan.)
Insulation Class	130(B)
Overheating Protector	Built in thermal protect (auto restore type) Release:120±5°C Release:77±5°C
Working Ambient Temperature	-10°C-+50°C
Working Ambient Humidity	Under 85%RH with no condensation

7. Warranty

The scope of warranty of our delivered products is limited only to what we manufactured.
Warranty (period and description)

Warranty period	The warranty period applies only to new products and represents 18 months after the shipment or 12 months after the actual operation, whichever is shorter.
Description	If the product failed within the warranty period, during which despite a proper mounting, connection and maintenance & administration are followed according to the maintenance manual, and the product is properly run based on the specification on the catalog or under conditions agreed separately, we will repair or provide an alternative product at our discretion for free of charge, except the exclusions below. However, as far as the product is connected with customers' other devices, we will not indemnify those expenses on dismounting from/mounting on the devices, etc. and other associated construction expenses, transportation expenses and opportunity loss and operation loss the customers suffered from, and other indirect damages.
Exclusion from the warranty	The following items will be excluded from the warranty: 1. A breakdown resulting from defects in the installation of the product and coupling with other devices, etc. 2. A breakdown resulting from insufficient maintenance & administration and improper handling of the product, including a case that the product is not stored according to our defined storage manual. 3. A breakdown resulting from operation which does not fall within our specification and other operation conditions and use status we hardly can know. 4. A breakdown resulting from defects, special specification, etc. of device prepared and connected by customer. 5. When this product is disassembled or modified by the customer, or the parts are replaced by the customer. 6. A breakdown resulting from defects in parts supplied or specified by customers. 7. A breakdown caused by inevitable force including earthquake, fire, flood disaster, salt damage, gas damage, and lightning strike, etc. 8. Natural wear and tear, abrasion, and deterioration of such relevant consumable parts as a bearing and oil seal, etc. under normal usage. 9. A breakdown caused for reasons not attributable to each of the above item.

■Specifications, dimensions, and other items are subject to change without prior notice.

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