ELECTRIC ACTUATOR HQ006

INSTALLATION AND OPERATION MANUAL

CHALLENGER

VALVES AND ACTUATORS

www.challengervalves.com.au

CONTENTS

HEAD OFFICE
3 Glenn Street, Shepparton
Victoria 3630
P: 03 5822 1533
F: 03 5822 2277
E: sales@challengervalves.com.au

www.challengervalves.com.au

COMPANY OVERVIEW

INTRODUCTION

Challenger Valves is a leading manufacturer, supplier and distributor of valving and actuation, providing products and solutions to the water, mining, irrigation and general industries. We stock a wide range of products in various materials including ductile iron, stainless steel, brass and uPVC to handle a wide range of industrial applications.

The companies' head office is located in Shepparton, north of Melbourne in central Victoria, with a 2400m² purpose built facility, which includes production, storage and testing. The commitment by the directors to re-invest profits back into the company demonstrates Challenger's commitment to it's customers, employees and long term investment in the Australian market.

Challenger operate branches in Brisbane, Melbourne, Sydney, Perth and Newcastle, supporting an Australia wide distributor network.

HISTORY

Challenger Valves and Actuators were established in 1984 and provide high quality product lines of performance and reliability, backed by a professional team delivering superior service and cost effective solutions to our clients.

QUALITY

Challenger Valves provide in house testing and distributes a range of products that meet or exceed the highest Australian and International Standards, many of which carry the coveted Australian Standard Mark. Customer testaments are available on request.

OH&S

Challenger Valves management team are committed to ensuring the health, safety and welfare of it's employees, visitors and contractors by adhering to all statutory requirements.

NATIONAL CODE OF PRACTICE

Challenger is a compliant participant in the National Code of Practice for the Building and Construction Industry, details available upon request.

HQ 006 INTRODUCTION

This installation and operating manual explains how to install, operate and maintain HQ-006 electric actuators.

Safety notices in this manual detail precautions the user must take to reduce the risk of personal injury and damage to the equipment. User must read these instructions before installation, operating, or maintenance.

DANGER: Refers to personal safety. Alerts the user to potential danger or harm. The hazard or unsafe practice will result in severe injury or death.

WARNING: Refers to personal safety. Alerts the user to potential danger. Failure to follow warning notices could result in personal injury or death.

CAUTION: Directs the user's attention to general precautions that, if not followed could result in personal injury and/or equipment damage.

Note: Highlights information critical to the user's understanding of the actuators' installation and operation.

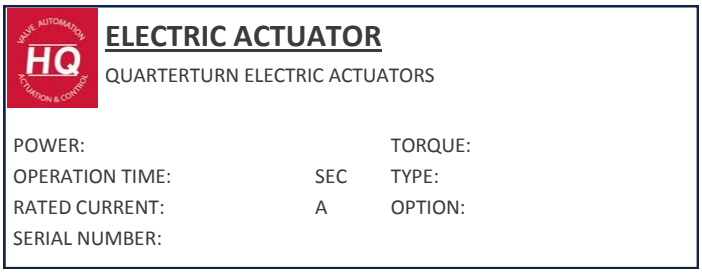
PRODUCT IDENTIFICATION

The actuator name plate is located on the top cover of the actuator.

The name plate contains the following:

- HQ logo (trade mark)
- Electrical power supply
- Model
- Type
- Rated current
- Operating time (seconds)
- Serial No.
- Option

Name Plate



Initial Inspection

Upon receipt of the actuator, inspect the condition of the product and ensure the name plate matches the order sheet or your requirements, also check for any damage that may have occurred during shipment. If the wrong product has been shipped immediately or is damaged report to the coordinator.

Storage

Actuators must be stored in a clean, cool and dry area. The unit shall be stored with the cover fastened and the conduit openings sealed. Storage must be off the floor, covered with a seal dust protector.

When actuators are stored outdoors, they must be stored off the ground, high enough to prevent being immersed in water or buried in snow.

GENERAL INFORMATION AND FEATURES

HQ series electric actuators are designed to provide reliable and efficient operation of 90 degree quarter turn valves , dampers, etc.

Performance

Type	Max output torque	Operating Time (sec)	Duty cycle IEC 34 - 1	Mounting size	Power 1 Phase	Rated current (A) 50/60Hz 1 Phase			Weight
	Kgf.m	50/60HZ	S4(%)	ISO 5210	AC,DC	110V AC	220V AC	24V DC	Kg
HQ006	6	12/14	50	F03, F05, F07	AC110V, 220V, DC24V, 24 VAC	0.4A/0.39A	0.02A/0.19A	0.4A	3

HQ006 Standard Technical Data (optional)

Enclosure Rated	Weatherproof IP67
Enclosure	High grade aluminium alloy, corrosion coated
Power Supply	110/220 VAC 1 Ph, 24 VAC - 24VDC 50/60Hz
Motor	Reversible motor
Limit Switches	2 x open/close SPDT, 250 VAC 10A rating
Auxiliary Limit Switches	2 x open/close SPDT, 250 VAC 10A rating
Indicator	Continuous position indicator
Manual	Manual Override Nut
Space Heater	2W
Conduit Entries	2 x PG 13.5
Lubrication	Grease moly EP
Ambient Temperature	-20°C~ + 70°C
External Coating	Dry powder polyester

HQ Option Technical Data (optional)

PIU	Potentiometer unit (0~ 1K Ω)
PCU	Proportional control unit (input, output 0~10 VDC or 4~20mA DC)
CPT	Current position transmitter (output 4~ 20mA DC)

Duty Cycle

Duty cycle is rated IEC60034 - S4 50% / S2 30 min
Exceeding the actuators rated duty cycle may cause thermal overload.

Type of duty according to VDE 0530 / IEC 60034-1

Short - time duty S2	**Intermittent duty S4**
The operation time at a constant load is short, so that thermal equilibrium is not reached. The pause is long enough for the machine to cool down to ambient temperature. The duration of the short - time operation is limited to 15 min (10 min, 30 min).	The duty is a sequence of identical cycles which consist of starting time, operation time with constant load and rest period. The rest period allows the machine to cool down so that so that thermal equilibrium is not reached. The relative on-time at S4-25% or S4-50% is limited to 25% and 50% respectively

Heater

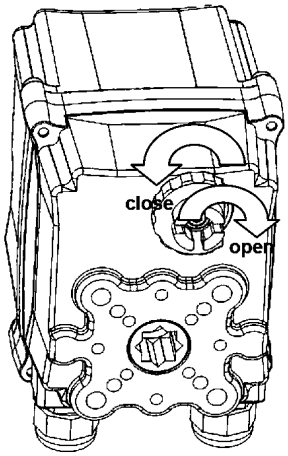
Condensation in the actuator is possible due to wide fluctuation of the ambient temperature. The heater integrated in the control unit prevents this in general.

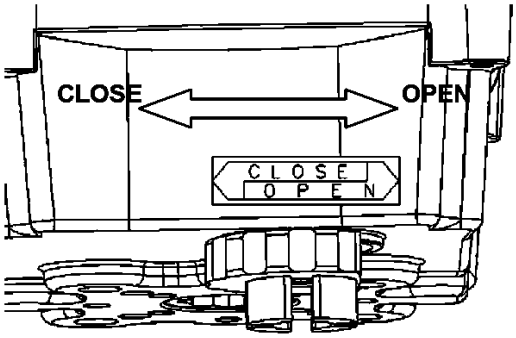
Manual Hand Wheel and Lever

HQ actuators are provided with a manual operation system.
The HQ006 actuator comes standard with a manual override nut.
This is located on the bottom of the unit, and can be easily operated with a 5M wrench.
Turn the hand wheel until the valve reaches the required position
Turn clockwise to open and counter clockwise to close

When nut becomes tight **DO NOT FORCE** further as this will cause serious damage to the gearing.

CAUTION: The manual nut is to facilitate the setting up of the actuator drive to the valve shaft at time of assembly or to drive the valve to a fail safe position in the event of power failure. **It is NOT designed to free up a jammed valve. Using the manual nut when the valve is tight or jammed will damage the gears and void any warranty.**
To free up a tight or jammed valve you must remove the actuator from the valve, using a spanner directly on the valve shaft, rotate until it turns freely.
If the torque required to move the valve is greater than the rated output torque of the actuator the unit will not operate.





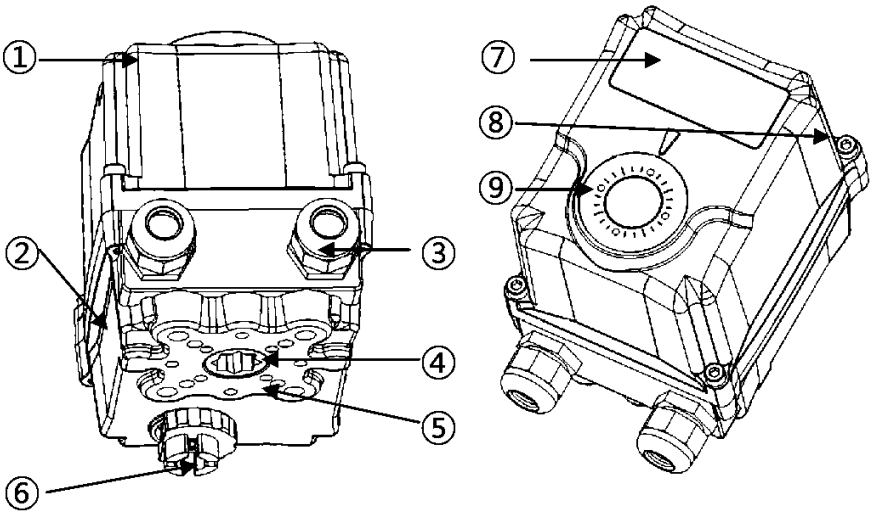
HQ006

Note: The override engagement lever returns automatically to auto position when the actuator is operated electrically.

Lubrication

HQ is a totally enclosed unit with a permanently lubricated gear train (Moly EP Grease). Once installed lubrication should not be required. However, periodic preventative maintenance will extend the operating life of the actuator.

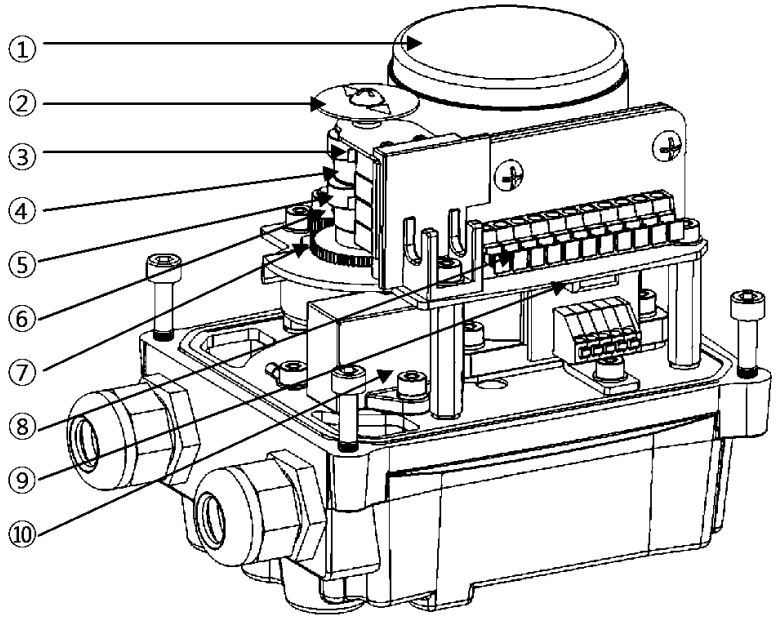
External Parts



External Parts

1. Top Cover
2. Body
3. Cable Entry (PG 13.5) x2
4. Drive Shaft
5. Mounting Base (F03, F05, F07)
6. Manual Override Nut
7. Name Plate
8. Cover Bolt (captive design)
9. Indicator

Internal Parts for Standard Models



Internal Parts - HQ006 Series

1. Motor
2. Indicator
3. Open Limit Switch
4. Additional Open Limit Switch
5. Close Limit Switch
6. Additional Close Limit Switch
7. Potentiometer Unit
8. Terminal
9. Heater
10. Capacitor

INSTALLATION INSTRUCTION

Pre-Installation (for use in General Services)

Verify the actuators name plate to ensure correct model number, force, operating speed, voltage and enclosure type before installation and use.

It is important to verify that the output force of the actuator is appropriate for the force requirements of the valve and that the actuator duty cycle is appropriate for the intended application.

WARNING: Read this installation and maintenance manual carefully and completely before attempting to install , operate or trouble shoot the HKC actuator.

Actuator Mounting

Note:

- Prior to mounting the part-turn actuator it must be checked for damage.
- Damaged parts must be replaced by original spare parts.

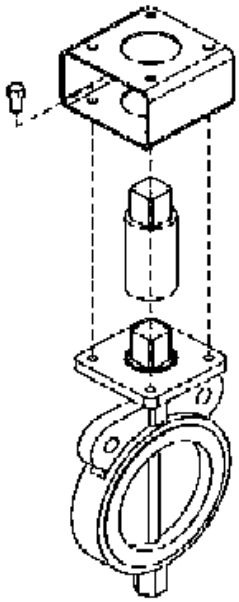
Mounting is most effectively carried out with the valve shafting pointing vertically upwards, however mounting is also possible in any other position.

The HQ series actuators are supplied with a Union Joint and nut which is removable for ease of machining.

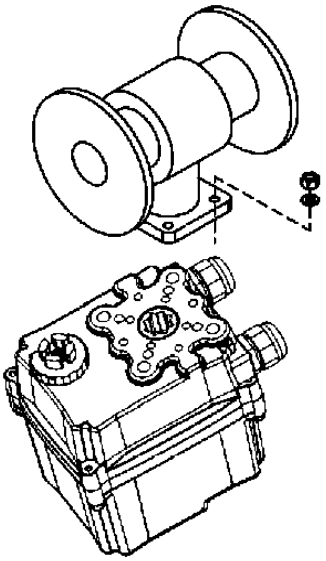
CAUTION:

- Do not attempt to work on your HKC actuator without first shutting off Incoming power.
- Do not attach ropes or hooks to the hand wheel for the purpose of lifting by hoist.

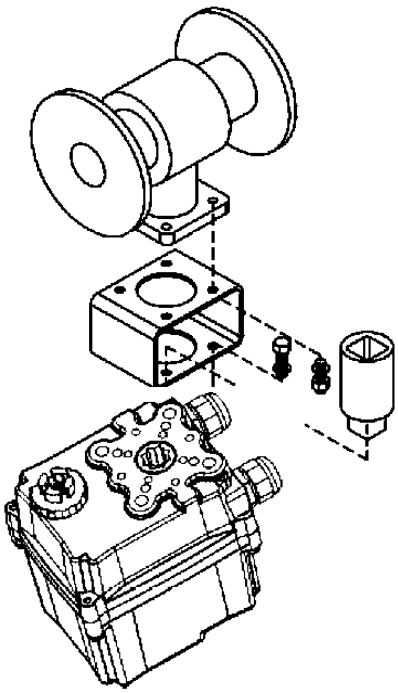
ACTUATOR MOUNTING DETAILS



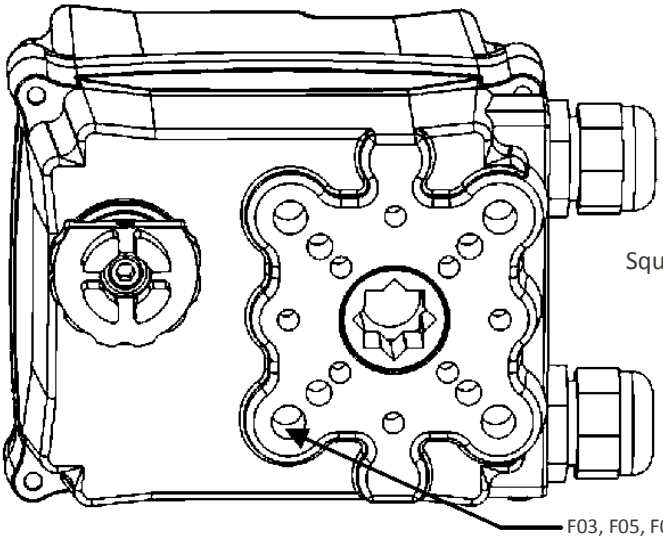
*Direct mounting / ISO (ISO standard)



*Bracket Mounting

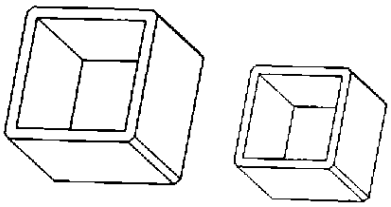


HQ006: ISO5211 F03/F05 and F07



Star Adapter 14mm - 11 mm
11mm - 9mm

Square Adapter 14mm - 11 mm
11mm - 9mm



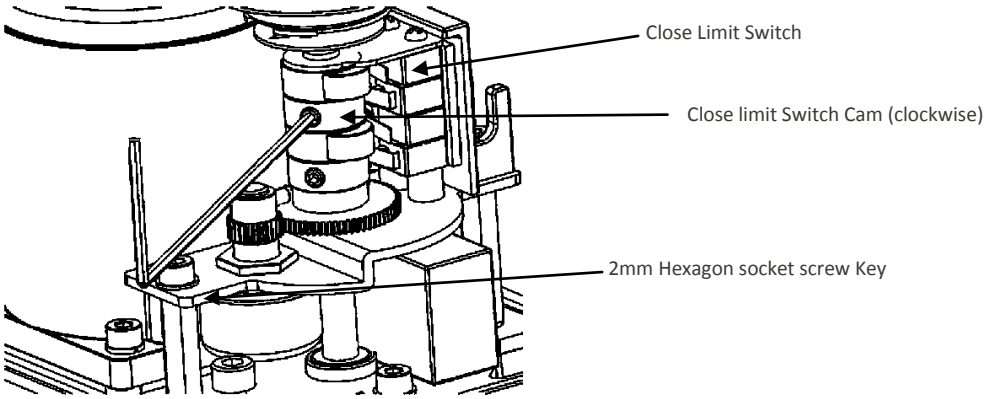
Danger: HAZARDOUS VOLTAGE (Make sure all power is disconnected prior to mounting)

Limit Switch Setting

- Rotate the actuator hand wheel manually to closed position
- Using hex wrench, loosen the set screw on the CLOSE limit switch cam
- Rotate the CLOSE cam towards CW limit switch lever until the switch “clicks” Tighten the set screw with hex wrench
- Rotate the actuator hand wheel manually to open position
- Using hex wrench, loosen the set screw in the “open” limit switch cam
- Rotate to “open” cam towards CCW limit switch lever until the switch “clicks” (fig 2)
- Tighten set screw with hex wrench

Danger: HAZARDOUS VOLTAGE (Make sure all power is disconnected before prior to mounting)

Close Cam Setting



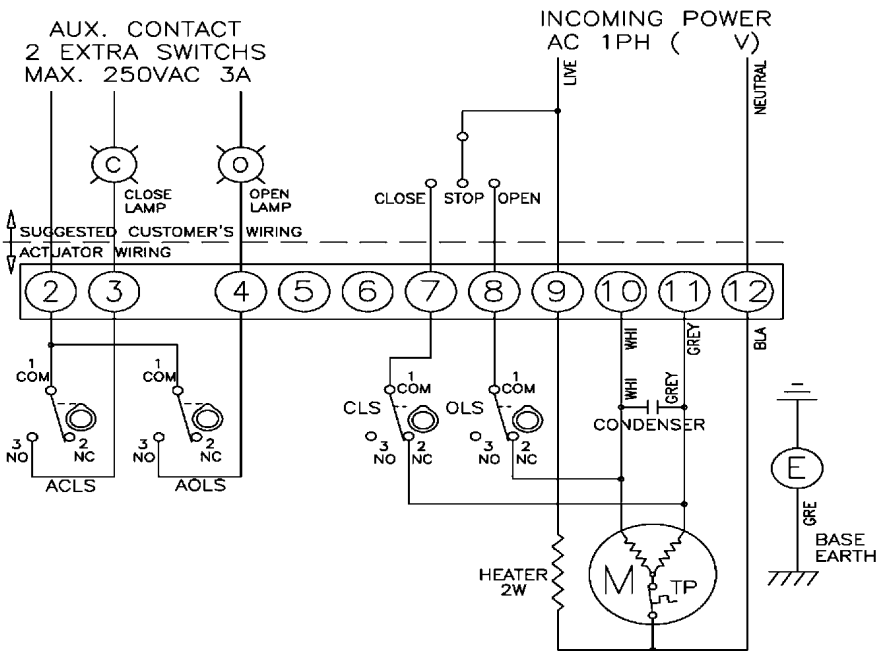
OPERATION INSTRUCTION

Electrical Connections and Preliminary Test

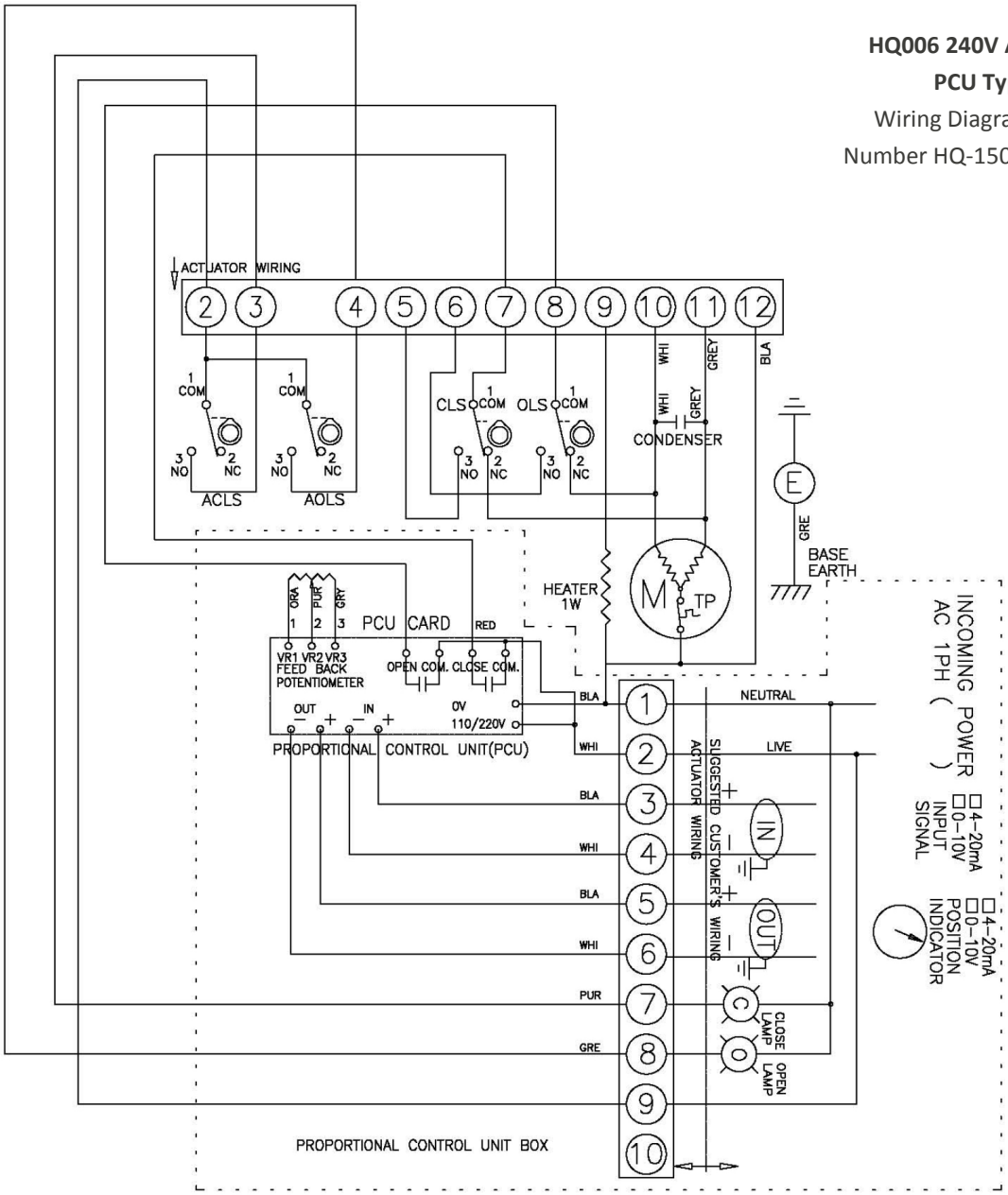
- Loosen the screws on the actuator cover and lift it off
- Make sure that the power supply voltage is in accordance with the data on the actuator name plate
- Connect wires according to the enclosed wiring diagram
- Move the valve manually to a half-open position, operate and electrical opening and check that the motor rotates in the right direction
- Standard units are counter-clockwise to open set
- Test the actuator and check the limit switches work correctly
- Check all the cable glands are correctly tightened, applicable cable glands should be selected to be meet the applications condition. Over the grade IP67 of cable gland recommended in potentially explosive atmospheres.
- Mount cover and tighten cover bolts

Wiring Diagrams for Standard Models - 240V AC

HQ006 240V AC
On/Off type
Wiring Diagram
Number HQ-110-A



HQ006 240V AC
PCU Type
Wiring Diagram
Number HQ-150-B

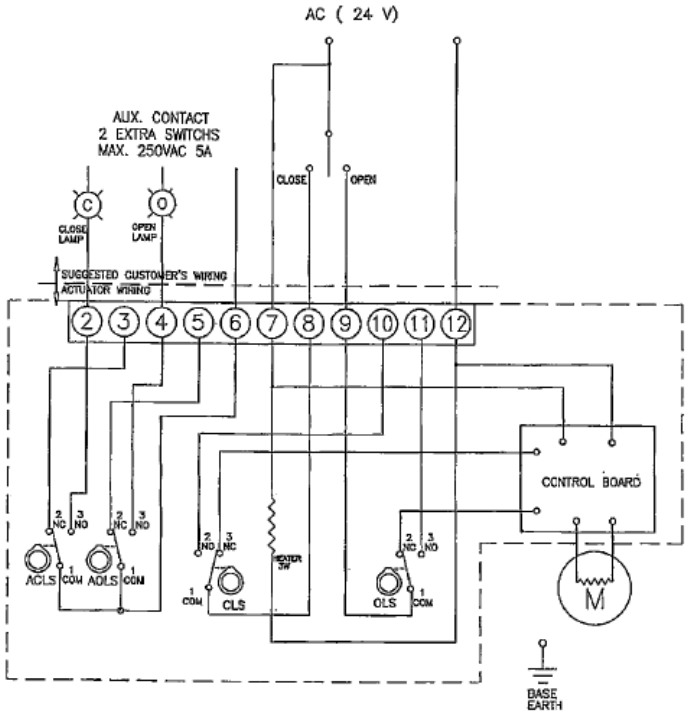


Wiring Diagrams for Standard Models - 24V

AC Wiring Diagram - 24V AC

On/Off type

Wiring Diagram Number HQ-740-B



TORQUE AND LIMIT SWITCH OPERATION			
SWITCH	CLOSE ⟵	INTERMEDIATE	⟶ OPEN
CLS 1-2			
CLS 1-3			
OLS 1-2			
OLS 1-3			

SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 5A
OLS	OPEN LIMIT SWITCH	250VAC 5A

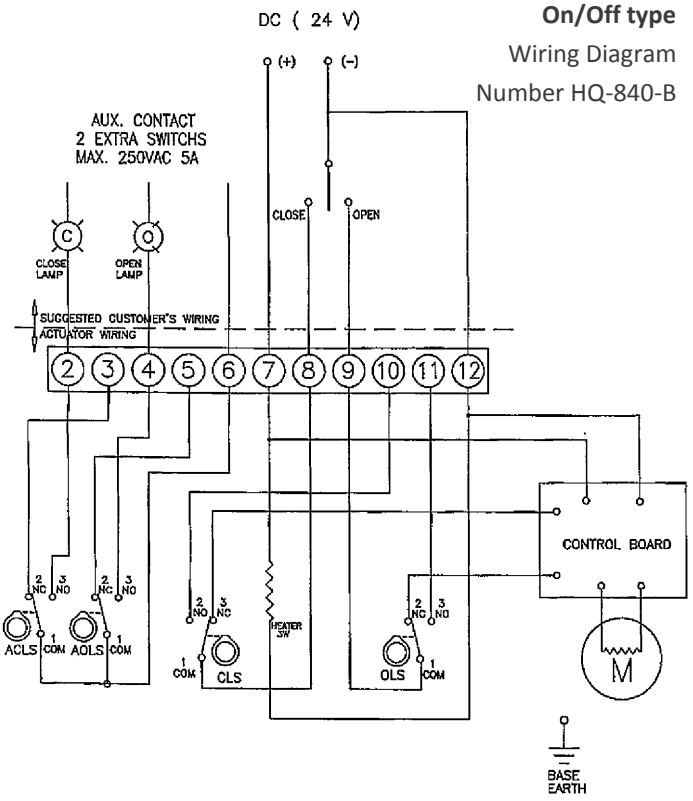
*EACH ACTUATOR SHOULD BE POWERED THROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS.

DRAW	P.S. KIM	CHECK	
DESIGN	S.I.CHOI	APPR.	
	PART NAME	AC WIRING DIAGRAM STANDARD	
	DWG. NO	HQ-740-B	
	ISSU. DEPT. HADR	DATE 2004.12.01	
HQ-006	HKC		
APPLICATION	HK CONTROMATIC CO., LTD.		

DC Wiring Diagram - 24V DC

On/Off type

Wiring Diagram Number HQ-840-B



TORQUE AND LIMIT SWITCH OPERATION			
SWITCH	CLOSE ⟵	INTERMEDIATE	⟶ OPEN
CLS 1-2			
CLS 1-3			
OLS 1-2			
OLS 1-3			

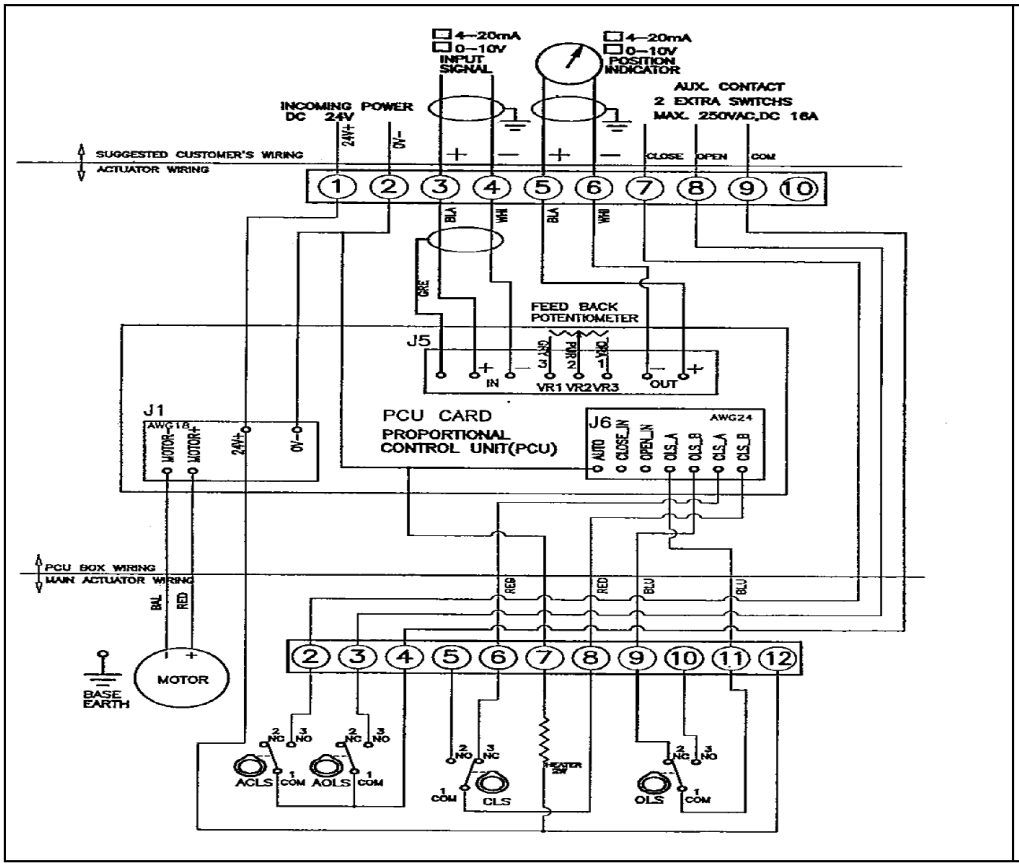
SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	0VAC 5A
OLS	OPEN LIMIT SWITCH	0VAC 5A

*EACH ACTUATOR SHOULD BE POWERED THROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS.

DRAW	P.S. KIM	CHECK	
DESIGN	S.I.CHOI	APPR.	
	PART NAME	DC WIRING DIAGRAM STANDARD	
	DWG. NO	HQ-840-B	
	SSU. DEPT. HADR	DATE 2004.12.01	
HQ-006	HKC		
APPLICATION	HK CONTROMATIC CO., LTD.		

PCU Wiring Diagram 24V DC

Wiring Diagram Number HQ-850-c



TORQUE AND LIMIT SWITCH OPERATION				
SWITCH	CLOSE ← INTERMEDIATE → OPEN			
CLS 1-2				
CLS 1-3				
OLS 1-2				
OLS 1-3				
ACLS 1-2				
ACLS 1-3				
AOLS 1-2				
AOLS 1-3				

SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250 VAC
OLS	OPEN LIMIT SWITCH	250 VAC
ACLS	AUX. CLOSE LIMIT SWITCH	250 VAC
AOLS	AUX. OPEN LIMIT SWITCH	250 VAC

* EACH ACTUTAOR SHOULD BE POWERED THROUGH IT'S INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT FEED BETWEEN TWO OR MORE ACTUATORS

DRAW	B.R.LEE	CHECK	
DESIGN	S.K.KANG	APPR	S.M.
	PART NAME 1 PH WIRING DIAGRAM PCU		
	DWG.NO HQ-250-		
HQ-006	ISSU. DEPT. HADR DATE: 2011		
APPLICATION	HKC - H K C CO. LTD		

NOTE:

The HQ006 24V Unit requires the relay panel to be programmed ot suit either AC or DC operation.

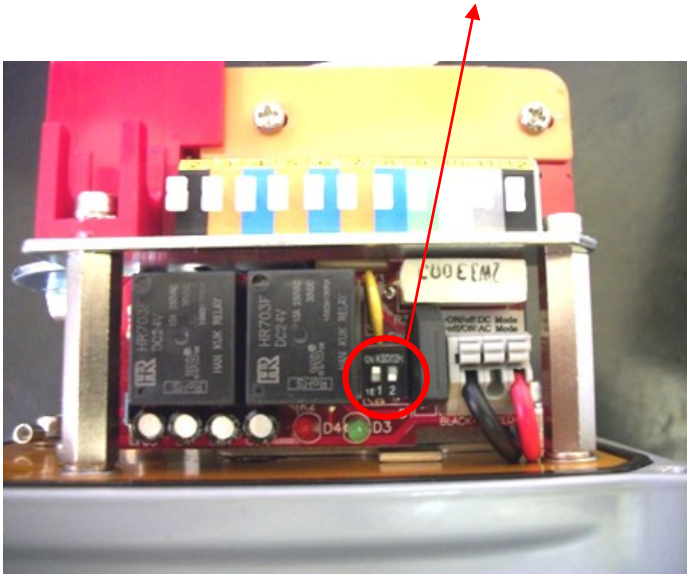
Use the below photos to set Dip Switches to suit.

HQ 006-2

AC OPERATION DIP SWITCH 1 DOWN - DIP SWITCH 2 UP

HQ 006-2

DC OPERATION DIP SWITCH 1 UP - DIP SWITCH 2 DOWN



MAINTENANCE

Caution: Turn off all power services before attempting to perform a service on the actuator. POTENTIAL HIGH PRESSURE VESSEL. Before removing or disassembling the actuator ensure the valve or other actuated devices are isolated and not under pressure.

Maintenance under normal conditions at six month intervals, however when conditions are more severe, more frequent inspections may be advisable.

- Ensure valve actuator alignment
- Ensure wiring is insulated, connected and terminated properly
- Ensure all screws are present and tight
- Ensure cleanliness of internal electrical devices
- Ensure conduit connections are installed properly and are dry
- Check internal devices for condensation
- Check power to internal heater
- Check enclosure O-ring seals and verify the O-ring is not pinched between flange
- Verify declutch mechanism
- Visually inspect during open /close cycle
- Inspect identification labels for ware and replace if necessary

Warning: Treat cover with care. Gap surfaces must not be damaged or dirtied in any way. Do not jam cover during fitting.

Tools

- 1 Metric Allen Key (Hex Wrench)
- 1 Screw Driver
- 1 Metric Spanner
- 1 Wrench 200mm
- 1 Wrench 300mm
- 1 Wire Stripper Long Nose
- 1 Multi Meter (AC, DC, Resistance)
- 1 DC Signal Generator (4 ~-20mA): PCU Board Option
- 1mA Meter (0 ~25mA): PCU & CPT Board Option

TROUBLE SHOOTING

The following instructions are offered for the most common difficulties encountered during installation and start up.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Motor not running	Open in control unit	Refer to appropriate wiring diagram and check for continuity
	Insulation resistance breakdown in motor	Perform megger test
No power available to actuator	Tripped circuit breaker	Reset circuit breaker
Manual override nut hard to turn	Valve stem improperly lubricated. Actuator lubricant has broken down	Lubricate with grease Clean out old grease and replace with recommended lubricant
	Valve packing gland too tight	Loosen gland nuts as necessary
	Jammed valve	Refer to valve maintenance. IMPORTANT: Do not un-jam valve using the manual override. Remove actuator from valve and un-jam valve.
Valve only opens or closes partially with motor	Limit switch improperly set	Check setting and reset if necessary
Manual override nut will not operate valve	Stripped gearing	Replace as necessary
	Broken hand wheel shaft	Replace as necessary
	Broken valve stem	Repair or replace as necessary
Motor runs but will not operate valve	Stripped gearing	Replace as necessary

Actuator does not respond

- Verify the line voltage to the actuator
- Check that the voltage matches the rating on the actuator nameplate
- Check internal wiring against actuator wiring diagram
- Check limit switch cams

Actuator is receiving power but does not operate

- Verify the line voltage to the actuator
- Check actuator force to see if it's greater than the valve force
- Check limit switches and cams
- Check that the force switches have not tripped
- Check mechanical travel stop adjustment
- Verify the actuator against valve rotation (standard units are anti-clockwise open)
- Check internal wiring
- Check for corrosion and condensation
- Verify coupler/bracket are correctly installed and is not causing binding

Actuator runs erratically

- Check ambient temperature
- Verify that the duty cycle has not been exceeded
- Check the position of manual override lever

Optional Equipment

Potentiometer Current Position Transmitter

- Check resistance value
- Check potentiometer gear for jamming
- Check zero and span calibration
- Check board for damage

Current Position Transmitter

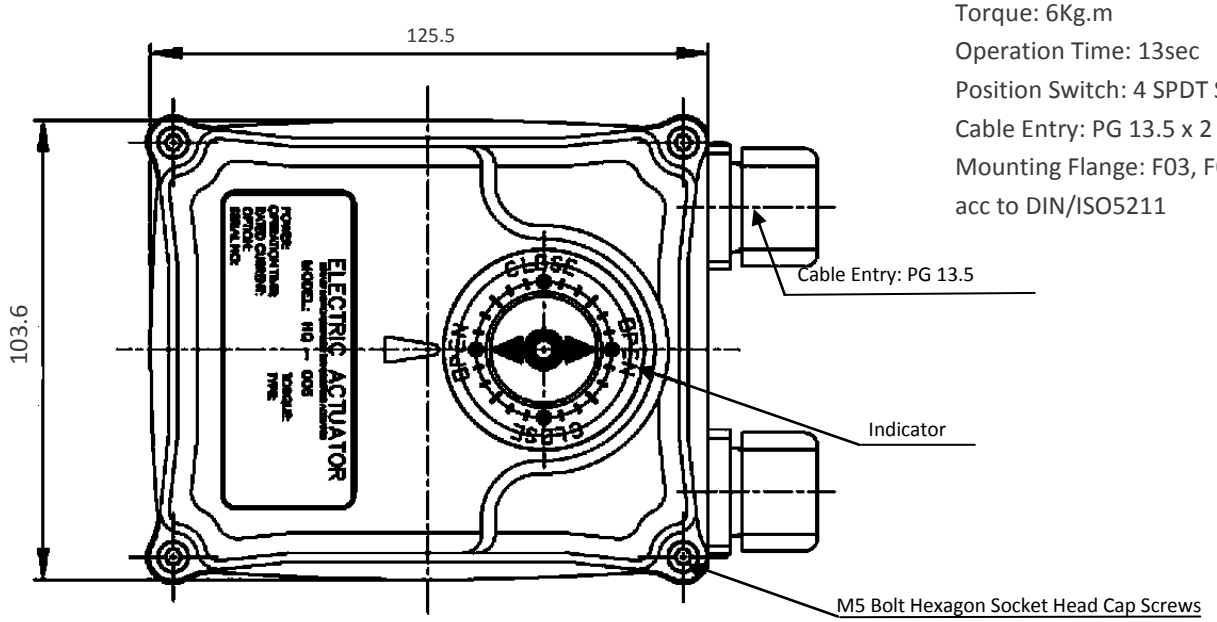
- Verify input signal
- Check dip switch configuration
- Check Board for damage

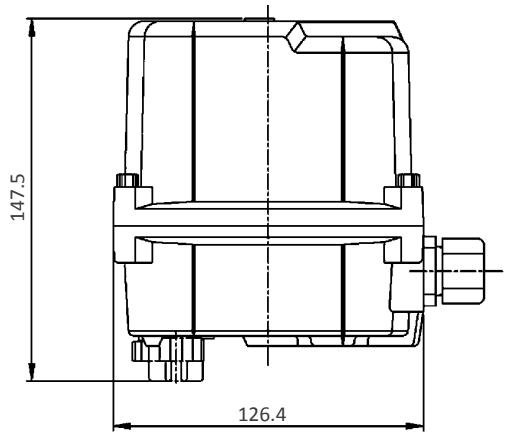
DIMENSIONS FOR ACTUATOR

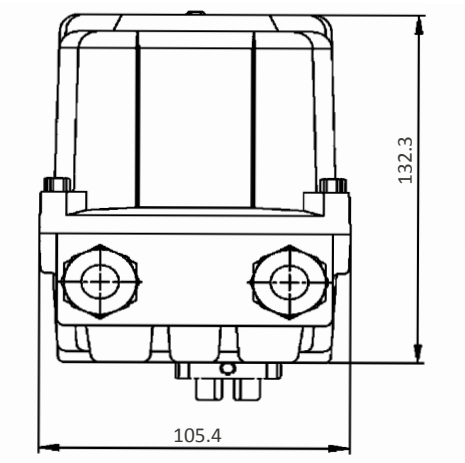
HQ006

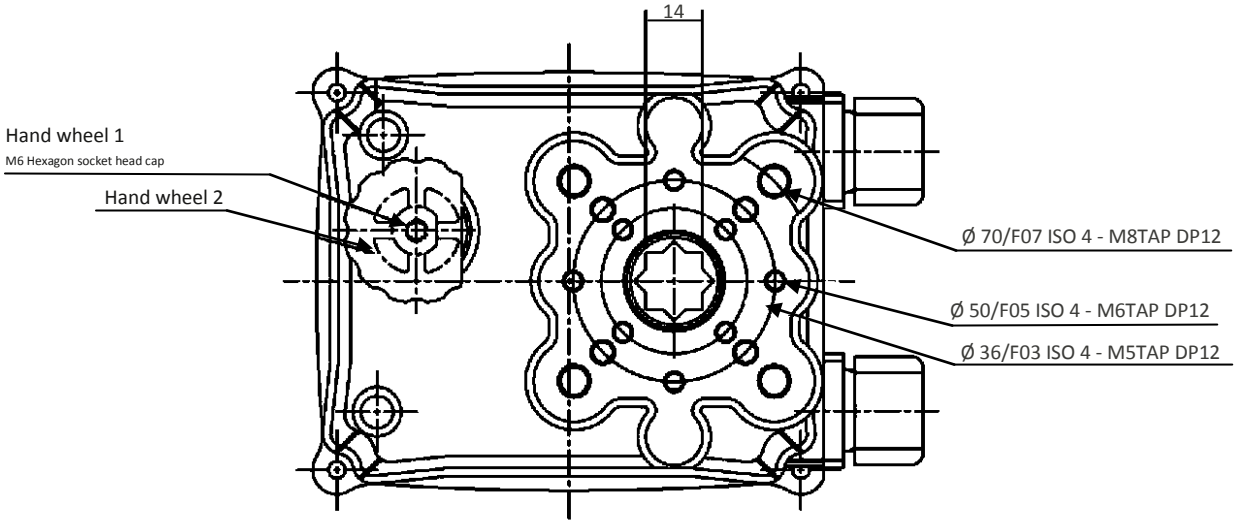
HQ006 On/Off Type

Enclosure: IP67
Torque: 6Kg.m
Operation Time: 13sec
Position Switch: 4 SPDT Switch
Cable Entry: PG 13.5 x 2
Mounting Flange: F03, F05, F07
acc to DIN/ISO5211

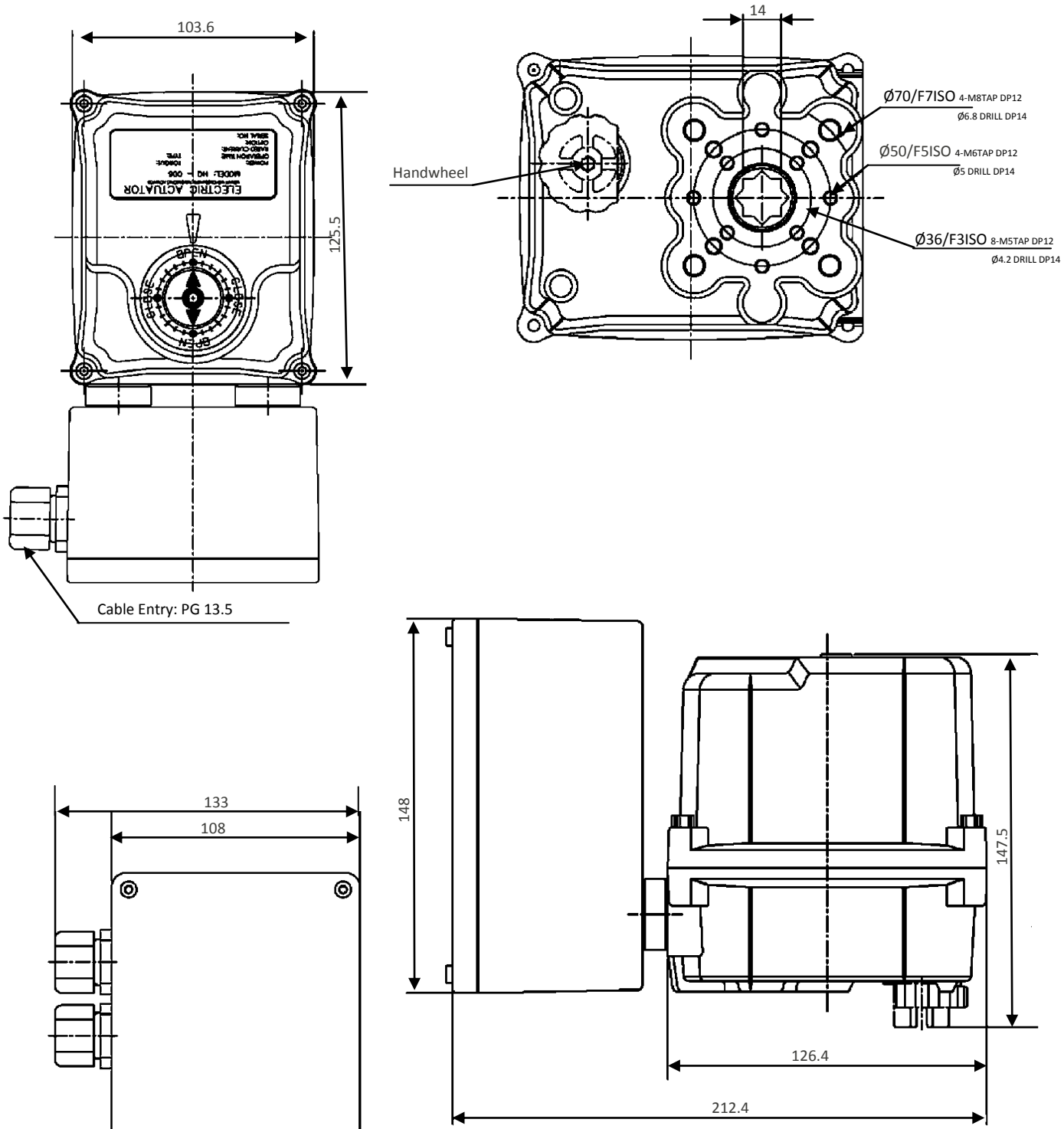








HQ006 PCU TYPE



HEAD OFFICE AND WAREHOUSE
3 Glenn Street
Shepparton Victoria 3630
P: 1800 120 751
Email:
sales@challengervalves.com.au

CHALLENGER
VALVES AND ACTUATORS

www.challengervalves.com.au