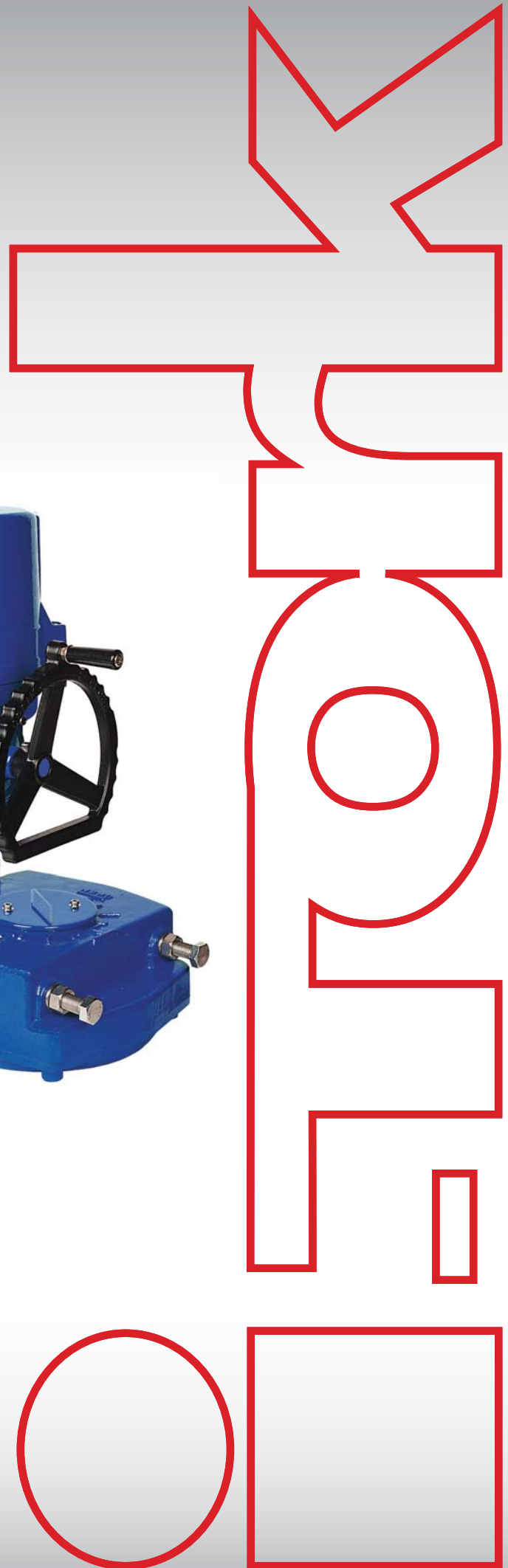


# Electric Actuator ITQ Series



INNOBIZ  
기술혁신형중소기업

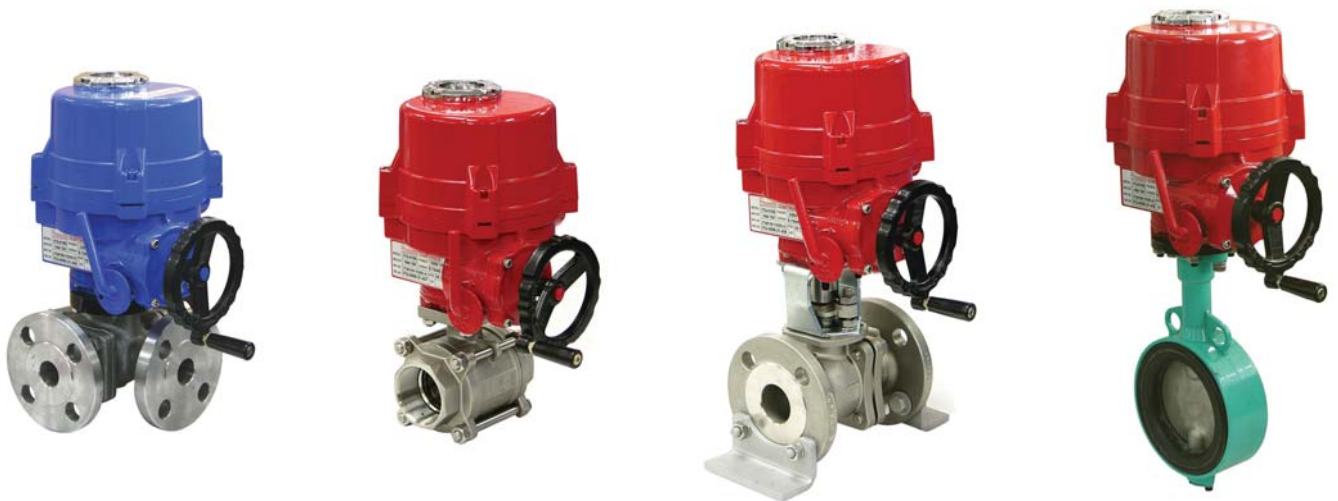
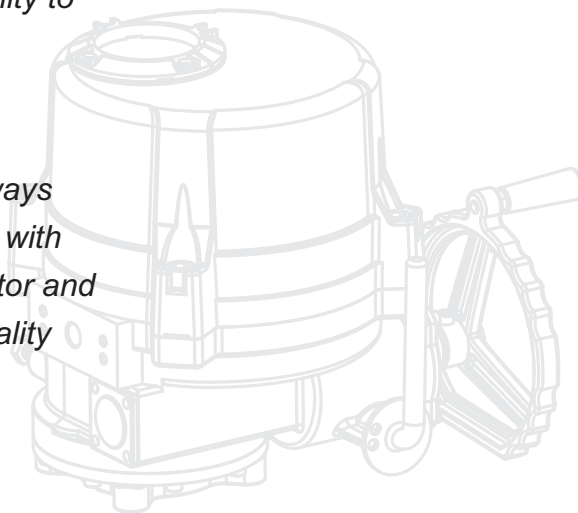
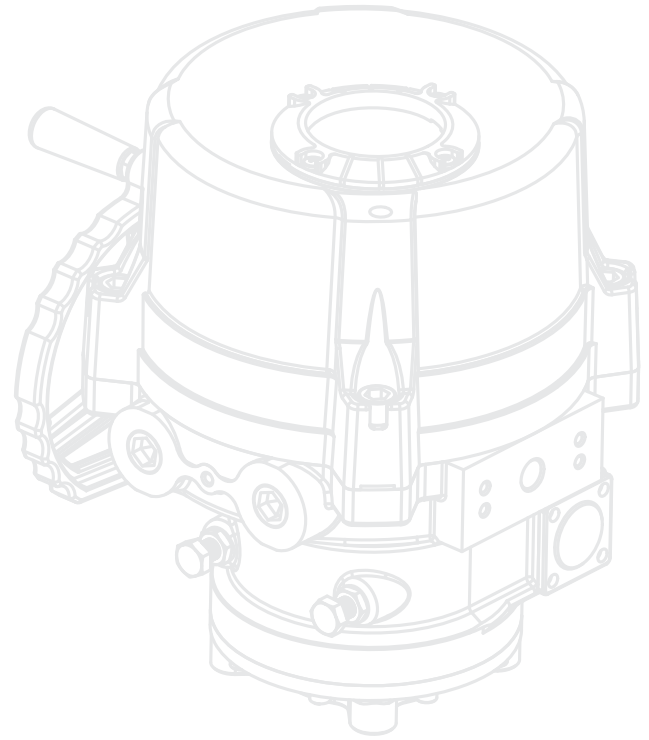


KTL

## INTRODUCTION

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- I-Tork controls designs, produces and provides high quality actuators and services related to valve automation.
- Our long years experience in the automation field enables us to launch our ITQ series electric actuator which has compact size, robust construction, reliable performance and ability to integrate fully into sophisticated control systems.
- I-Tork controls is always ready to provide you with our ITQ series actuator and accessories, with quality service.



## FEATURES

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- Compact and robust construction, light weight providing high output torque (Max 9000Nm).
- Wide range of torque variation (From min 100Nm to max 9000Nm).
- Hard anodized aluminum housing inside and outside with external powder coated against severe industrial environment.
- Enclosure using radial seals & O-rings that provide protection to waterproof IP67 (Nema 4 & 6) and optional watertight IP68
- Mounting base according to ISO5211 standard.
- Removable drive bushing for easy machining and mounting.
- Self-locking provided by double worm gearing (no brake required).
- Auto-declutching manual override handwheel with padlockable auto / manual switchable lever.
- Reliable Mechanical Torque sensing system providing safe operation in overload condition.
- Large size window and indicator provides better position indication from a distance.
- Various Local position control options providing easy commissioning and operation in field.
- Digitalized control component.



## CONSTRUCTION

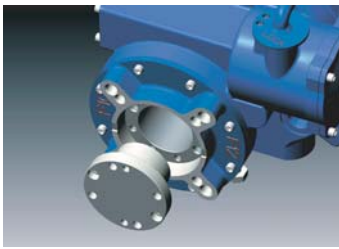


### External mechanical stopper

- Prevents over run of travel angle when limit switch fails.

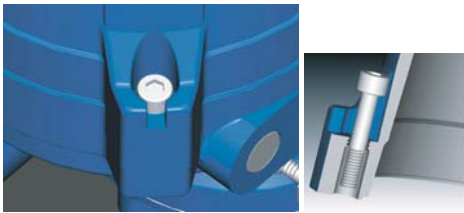
### Cable entries

- Standard 2-PF3/4"(Max 1") for various cable gland.



### Removable drive bushing and ISO5211 mounting base

- (F07~F16) for easy mounting on valve.



### Captive cover bolts

- Designed to prevent losing it during maintenance or installation.
- \* All external bolts are stainless steel for rust prevention.



Standard short    Optional long (Explosion proof)

### ① Housing

- Hard anodized Aluminum casting and external epoxy powder coated against severe industrial environment.

### ② Gearing

- Precisely machined double worm gear c/w minimum back-lash, low noise, high output torque.

### ③ Self locking

- Provided by double worm gearing to keep position of valve unchanged against reverse torque from valve.

### ④ Sealing

- By O-ring in all interfaces IP67(standard), and double o-ring for IP68 (option)

### ⑤ Handwheel

- Different sizes depending on actuator torque, and knob on handwheel for easy operation.

### ⑥ Motor

- Specially designed induction motor to generate high starting torque and high efficiency equipped with thermal protector to prevent damage from over heating.
- Insulation class F



### Tapered interface between cover and lower housing

- For easy lifting cover up from lower housing for wiring or maintenance.
- Standard: Short interface for providing easier access to internal component
- Explosion proof : Long interface for keeping the length of flame path



## Indicator

- Continuous mechanical position indicator and window with dial



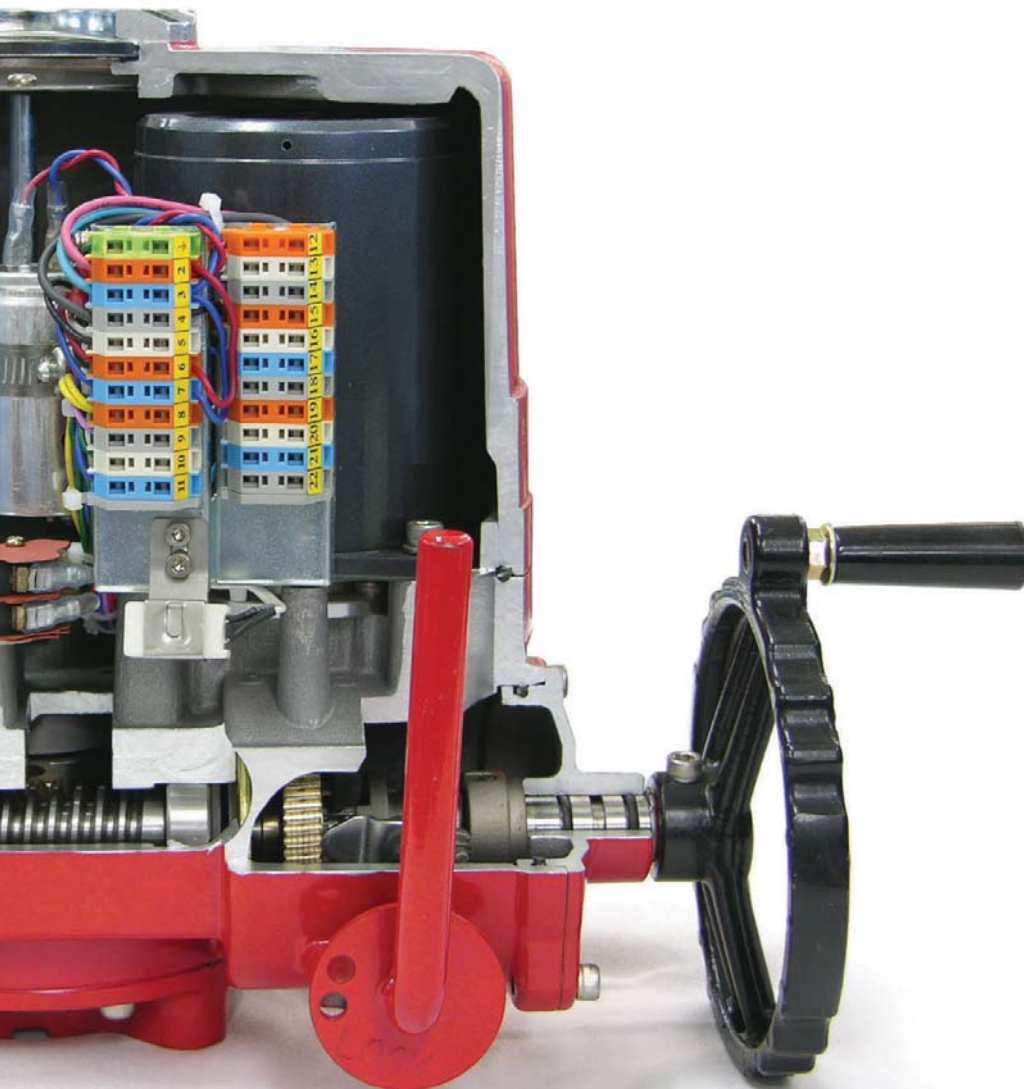
## Torque switches

- Protect actuator from damage caused by overload from the driven valve over the whole travel.
- 1 each for open / close



## Limit switches

- Directly engaged with driving shaft to set accurate position of valve.
- 2 ea for each travel end (open/close).
- Optional Extra Limit Switches (Max 4 ea for each end) : Except for ITQ0100



## Terminal

- Spring loaded push type terminal for tight wiring connection under severe vibration.



## Manual override

- Auto / Manual switchable lever and handwheel engagement for emergency manual operation.
- Drive force automatically resorted by motor start, unless lever padlocked to prevent this occurring.



## Space Heater

- Anti-condensation

# ITQ ELECTRIC ACTUATOR

## TECHNICAL INFORMATION

| Model                    | ITQ 0100 | ITQ 0160 | ITQ 0240 | ITQ 0350 | ITQ 0500 | ITQ 0800 | ITQ 1100 | ITQ 2000 | ITQ 3000 | ITQ 6000 | ITQ 9000 |
|--------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Rated torque (Nm)        | 100      | 160      | 240      | 350      | 500      | 800      | 1100     | 2000     | 3000     | 6000     | 9000     |
| Duty cycle S4 (%)        | 50       | 50       | 50       | 50       | 30       | 25       | 25       | 25       | 25       | 25       | 25       |
| Operating time (second)  |          |          |          |          |          |          |          |          |          |          |          |
| 50Hz                     | 21       | 26       | 26       | 31       | 31       | 39       | 39       | 59       | 59       | 178      | 178      |
| 60Hz                     | 18       | 22       | 22       | 26       | 26       | 32       | 32       | 50       | 50       | 149      | 149      |
| Max bore Size (mm)       |          |          |          |          |          |          |          |          |          |          |          |
| Key(φ)                   | 22       | 25       | 25       | 40       | 40       | 48       | 48       | 75       | 75       | 120      | 120      |
| Square(φ)                | 20       | 23       | 23       | 34       | 34       | 40       | 40       | 64       | 64       | 100      | 100      |
| Rated current (A)        |          |          |          |          |          |          |          |          |          |          |          |
| 1Phase / 110V / 50Hz     | 0.98     | 1.60     | 1.62     | 1.72     | 3.60     | 3.90     | 3.90     | -        | -        | -        | -        |
| 60Hz                     | 1.10     | 1.70     | 1.72     | 1.80     | 3.90     | 4.20     | 4.30     | -        | -        | -        | -        |
| 1Phase / 220V / 50Hz     | 0.52     | 0.85     | 0.87     | 0.92     | 1.50     | 2.05     | 2.15     | 2.95     | 3.75     | 2.95     | 3.75     |
| 60Hz                     | 0.58     | 0.90     | 0.90     | 0.95     | 1.60     | 2.20     | 2.30     | 3.15     | 3.85     | 3.15     | 3.85     |
| 3Phase / 380V / 50Hz     | 0.43     | 0.30     | 0.32     | 0.32     | 0.52     | 0.82     | 0.84     | 1.5      | 1.6      | 1.5      | 1.6      |
| 60Hz                     | 0.33     | 0.30     | 0.32     | 0.32     | 0.56     | 0.88     | 0.90     | 1.8      | 2.0      | 1.8      | 2.0      |
| 3Phase / 440V / 50Hz     | 0.59     | 0.30     | 0.32     | 0.32     | 0.55     | 0.82     | 0.84     | 2.3      | 2.5      | 2.3      | 2.5      |
| 60Hz                     | 0.42     | 0.32     | 0.35     | 0.35     | 0.58     | 0.88     | 0.88     | 2.2      | 2.4      | 2.2      | 2.4      |
| AC / DC 24V              | 2.8      | 1.8      | 2.4      | 3.8      | 5.0      | -        | -        | -        | -        | -        | -        |
| Motor insulation class   | F        | F        | F        | F        | F        | F        | F        | F        | F        | F        | F        |
| ISO 5211 mounting flange | F07      | F07/F10  | F07/F10  | F10/F12  | F10/F12  | F12/F14  | F12/F14  | F16      | F16      | F25/F30  | F25/F30  |
| Weight (Kgs)             | 7        | 15       | 15       | 20       | 20       | 25       | 25       | 42       | 42       | 152      | 152      |
| No of handwheel turns    | 10       | 12       | 12       | 14       | 14       | 17       | 17       | 13       | 13       | 39       | 39       |

## STANDARD SPECIFICATION


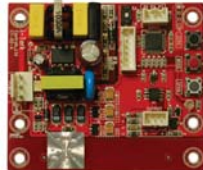

|                             |  |
|-----------------------------|--|
| Enclosure                   | Weatherproof IP67, NEMA4 4X and 6, O-ring sealed                       |
| Main Power supply           | 110/220VAC/1Ph/50/60Hz, 380/440/VAC/3Ph/50/60/Hz ±10%, 24VDC           |
| Control power supply        | 110/220VAC/1Ph/50/60Hz ±10%  |
| Duty cycle(on-off)          | S2: 10Min~30Min  |
| Duty cycle(modulating)      | S4, 30~50%, 300~1200 start/Hour  |
| Motor                       | Squirrel Cage induction motor  |
| Limit switches              | 2 each for Open and Close (SPDT 250VAC/10A rating)                     |
| Torque switches             | 1 each for Open and Close (SPDT 250VAC/10A rating except for ITQ 0100) |
| Stall protection/ set temp. | Built in Thermal protection, Open 150°C±5°C, Close 97°C±15°C           |
| Travel angle                | 90° ± 5° (0° ~ 100°)   |
| Position indicator          | Continuous mechanical indicator with arrow                             |
| Manual override             | De-clutchable  |
| Self locking                | Provided by double worm gearing (no brake)                             |
| Mechanical stopper          | 1 each for each travel end (Open and Close), external & adjustable     |
| Space Heater                | 5W(110/220VAC) for anti-condensation                                   |
| Cable entries               | 2 - PF 3/4" TAP  |
| Lubrication                 | EP type grease   |
| Terminal block              | Screw and Lever Push type (spring loaded)                              |
| Ambient temperature         | Basic actuator : -20°C~+70°C<br>c/w control options : -10°C~+60°C      |
| Ambient humidity            | 90%RH Max (Non-Condensing)   |
| Anti vibration              | XYZ 10g. 02~34Hz, 30 minutes   |
| External coating            | Dry powder (Polyester)   |

## OPTIONS AVAILABLE

### Mechanical

| Symbol | Description   | Remark                         |
|--------|---|--------------------------------|
| EX     | Explosion proof (Ex d II B T4)                        | Approved by KTL, ATEX, NEPSI   |
| WT     | Watertight (IP68), Temporary submersible              | 10M Head 100hours              |
| ALS    | Auxiliary limit switches (Max 2 for each travel end)  |                                |
| ATS    | Auxiliary torque switches (Max 2 for each travel end) | Except for ITQ 0100            |
| EXT    | Extended travel angle (up to 120°, 135°, 180°, 270°)  | Except for ITQ with Gear box   |
| SV     | Variation in torque and operating speed               | Please consult before ordering |

### Remote monitoring and control

|                                  |  |   |     |
|----------------------------------|--|---|-----|
| PK                               | Potentiometer kit (output signal : 0~1 Kohm)<br>High resolution potentiometer and precisely machined gearing are directly engaged with drive shaft to feedback continuous position of valve                                      |    | PK  |
| CT                               | Current transmitter (output signal : 4-20mA)<br>Zero / Span Adjustment   |   | CT  |
| RPC<br>/ Signal<br>configuration | Remote position controller (by input and output signal)<br>Input : 4-20mA, 0-10VDC, 2~10VDC, 1~5VDC, 0~5VDC<br>Output : 4-20mA<br>(Option : 0-10VDC, 2~10VDC, 1~5VDC, 0~5VDC)<br>Auto-calibration<br>Reverse operating direction |  | RPC |

### Local control



LP4 / LM4

#### LP4 for 1 & 3 Phase (ITQ 0100~9000)

Control power : Free Voltage (85~265VAC) 50/60Hz, Option : 24VDC  
Magnetic selector switches, SMPS (Switching Module Power Supply)  
: Open/Close & Local/Stop/Remote

Local lamp indication

- : Power - White(on), Remote : Blue(on),
- : In case of Close Torque Switch Trip -  
Yellow(on) + Green (flickering : only at Local Position)
- : In case of Open Torque Switch Trip -  
Yellow(on) + Red (flickering : only at Local Position)
- : Full Close - Green(on), Closing - Green(flickering : only at Local Position)
- : Full Open - Red(on), Opening - Red(flickering : only at Local Position)

\* Options Available : PK, CT, RPC(Modulating), IP68, Explosion proof

#### LM4 for 3 Phase (ITQ 0100~9000)

Including the same functions as LP4  
Reversing electric contactors, Transformer

## Local control



ICM1

### ICM1 for 1 & 3 Phase (Integral Control Module) (ITQ 0160~9000)

Main Power : 3Ph / 220/380/440 VAC  
1Ph / 110/220 VAC

Control power : 24 VDC (Internal Power)  
(Option : 110 VAC, 220 VAC (External Power))

Magnetic selector switches

: Open/Close & Local/Stop/Remote

Reversing electric contactors, Transformer, Phase Detector

Auto-Phase Discriminator

Local lamp indication

: Power - White(on), Remote : Blue(on),

: In case of Close Torque Switch Trip - Yellow(on) + Green(flickering)

: In case of Open Torque Switch Trip - Yellow(on) + Red(flickering)

: Full Close - Green(on), Closing - Green (flickering)

: Full Open - Red(on), Opening - Red (flickering)

Single & Reverse Phasing : (Yellow + Green + Red) all flickering

\* Options Available : Explosion Proof, IP68

### ICM2 for 1 & 3 phase (integral with LCD Display) (ITQ 0160~9000)

Including the same functions as ICM1

Reversing electric contactors, Transformer,

Auto-Phase Discriminator, LCD Display

\* Options Available : CT, RPC(Modulating),  
Explosion Proof,  
IP68, Bus Communication



ICM2

### ICM3 for 1 & 3 phase (integral with LCD Display/IP68 Enclosure) (ITQ 0160~9000)

Including the same functions as ICM2

Reversing electric contactors, Transformer, Auto-Phase Discriminator,

LCD Display, IP68, Explosion Proof, RPC(Modulating), Bus Communication,

34pins separate compartment for terminal block

## Fail safe

### BP for 1 Phase (ITQ 0160~0500)

Motor : 24 VDC

Rechargeable Battery back up - Fail safe function

When Main power is alive, actuator works as normally.

Once power fails, actuator will move to pre-set fail safe position.

Input power : Free Voltage (85~265 VAC) 50/60Hz

Output contacts : open/close/Alarm relay

LED signal indication : 4 LEDs (Full Open/Close, Over Torque and Power)

Rechargeable battery : 2.0AH 27.5VDC(Ni-Cd)





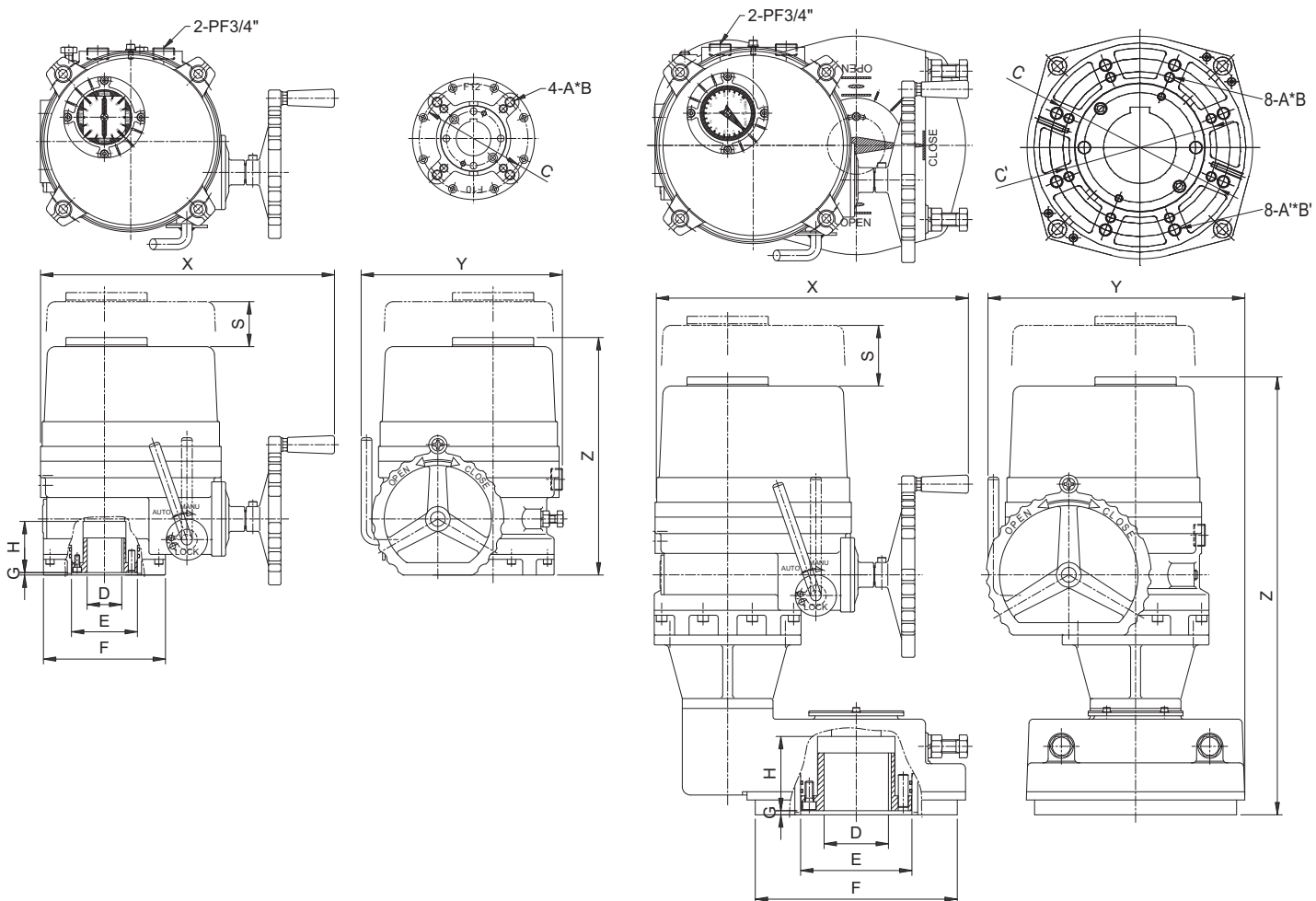
## BASIC ACTUATOR DIMENSIONS

With Gear Box

| Type    | ITQ 0100 | ITQ 0160      | ITQ 0240      | ITQ 0350       | ITQ 0500       | ITQ 0800       | ITQ 1100       | ITQ 2000 | ITQ 3000 | ITQ 6000       | ITQ 9000       |
|---------|----------|---------------|---------------|----------------|----------------|----------------|----------------|----------|----------|----------------|----------------|
| Flange  | F07      | F07           | F07           | F10            | F10            | F12            | F12            | F16      | F16      | F25            | F25            |
| ISO5211 |          | F10           | F10           | F12            | F12            | F14            | F14            |          |          | F30            | F30            |
| C       | ∅ 70     | ∅ 70<br>∅ 102 | ∅ 70<br>∅ 102 | ∅ 102<br>∅ 125 | ∅ 102<br>∅ 125 | ∅ 125<br>∅ 140 | ∅ 125<br>∅ 140 | ∅ 165    | ∅ 165    | ∅ 254<br>∅ 298 | ∅ 254<br>∅ 298 |
| A       | M8       | M8/M10        | M8/M10        | M10/M12        | M10/M12        | M12/M16        | M12/M16        | M20      | M20      | M16/M20        | M16/M20        |
| B       | 14       | 14/17         | 14/17         | 17/21          | 17/21          | 20/25          | 20/25          | 32       | 32       | 30/35          | 30/35          |
| D(Key)  | ∅ 22     | ∅ 25          | ∅ 25          | ∅ 40           | ∅ 40           | ∅ 48           | ∅ 48           | ∅ 75     | ∅ 75     | ∅ 120          | ∅ 120          |
| D(Squ.) | □ 20     | □ 23          | □ 23          | □ 38           | □ 38           | □ 40           | □ 40           | □ 64     | □ 64     | □ 100          | □ 100          |
| E       | ∅ 50     | ∅ 58.5        | ∅ 58.5        | ∅ 80           | ∅ 80           | ∅ 95           | ∅ 95           | ∅ 135    | ∅ 135    | ∅ 216          | ∅ 216          |
| F       | ∅ 88     | ∅ 125         | ∅ 125         | ∅ 148          | ∅ 148          | ∅ 178          | ∅ 178          | ∅ 226    | ∅ 226    | ∅ 350          | ∅ 350          |
| G       | 3        | 3             | 3             | 3              | 3              | 3              | 3              | 5        | 5        | 5              | 5              |
| H       | 37       | 57            | 57            | 62             | 62             | 67             | 67             | 90       | 90       | 114            | 114            |
| S       | 125      | 140           | 140           | 170            | 170            | 195            | 195            | 225      | 225      | 225            | 225            |
| X       | 258      | 338           | 338           | 357            | 357            | 380            | 380            | 440      | 440      | 516            | 516            |
| Y       | 172      | 229           | 229           | 244            | 244            | 287            | 287            | 375      | 375      | 417            | 417            |
| Z       | 245      | 284           | 284           | 313            | 313            | 338            | 338            | 385      | 385      | 668            | 668            |

(mm)

(mm)



# ITQ ELECTRIC ACTUATOR

## CONTROL OPTION DIMENSIONS

(mm)

| Type            | RPC |     |     | CT  |     |     | BP  |     |     | LP4 / LM4 / ICM1 / ICM2 |     |     | ICM3 |     |     |
|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------------------|-----|-----|------|-----|-----|
|                 | X   | Y   | Z   | X   | Y   | Z   | X   | Y   | Z   | X                       | Y   | Z   | X    | Y   | Z   |
| ITQ 0100        | 340 | 190 | 220 | 316 | 172 | 220 | 428 | 172 | 220 | X                       |     |     | X    |     |     |
| ITQ 0160 / 0240 | O   |     |     | O   |     |     | 508 | 229 | 259 | 499                     | 229 | 259 | 517  | 284 | 259 |
| ITQ 0350 / 0500 | O   |     |     | O   |     |     | 527 | 244 | 288 | 518                     | 244 | 288 | 536  | 284 | 288 |
| ITQ 0800 / 1100 | O   |     |     | O   |     |     | X   |     |     | 541                     | 284 | 313 | 559  | 284 | 313 |
| ITQ 2000 / 3000 | O   |     |     | O   |     |     | X   |     |     | 600                     | 375 | 385 | 620  | 375 | 385 |
| ITQ 6000 / 9000 | O   |     |     | O   |     |     | X   |     |     | 677                     | 417 | 668 | 697  | 417 | 668 |

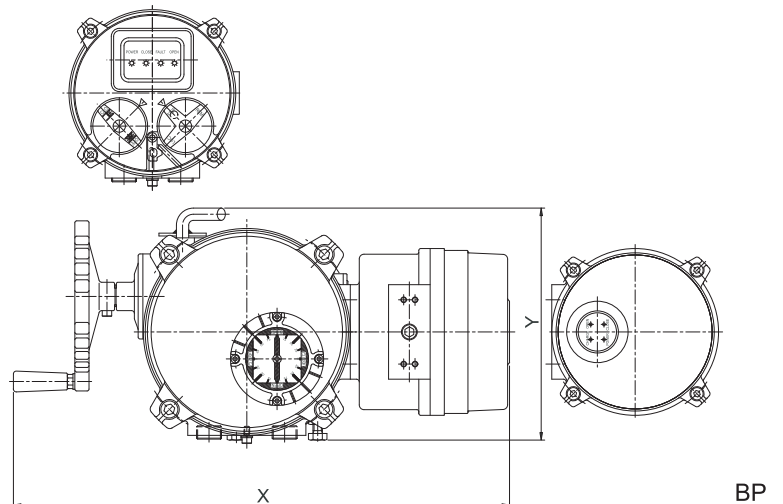
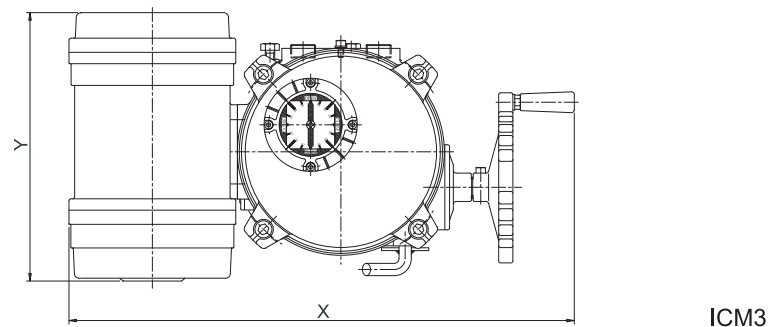
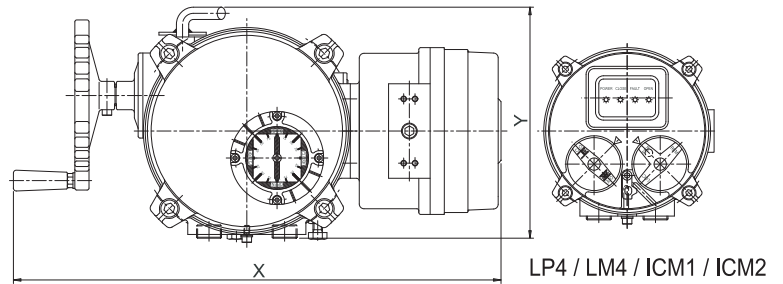
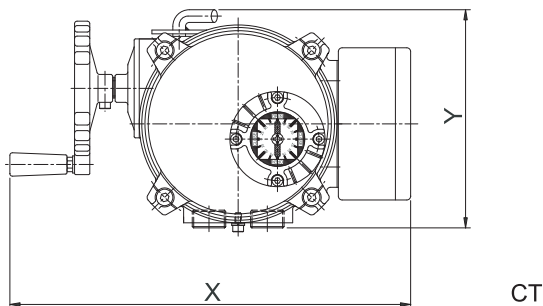
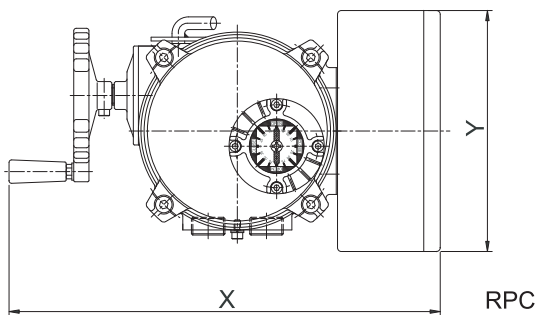
\* O : Installed inside of actuator

\* X : Not available

\* Z : Height of basic actuator

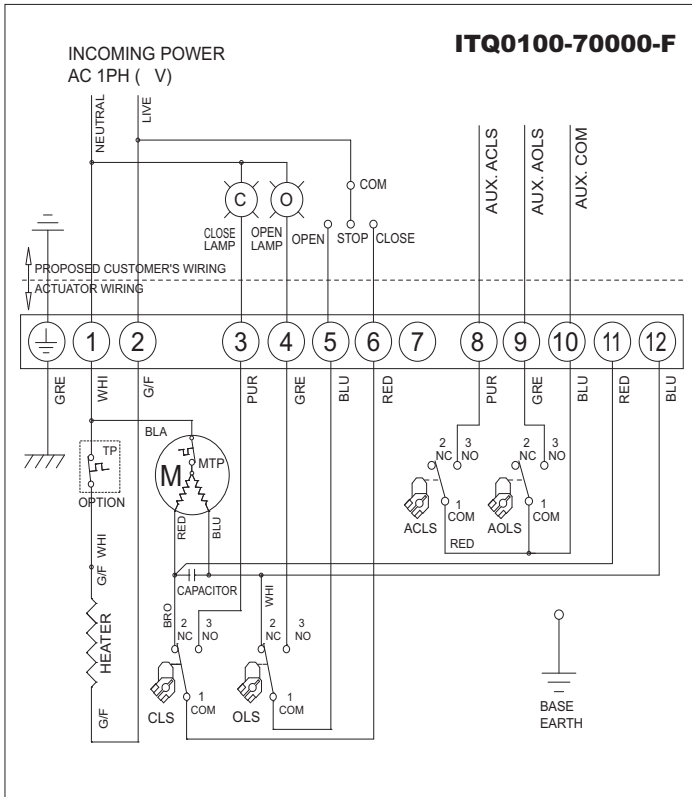
ITQ 0100

ITQ 0160 ~ 9000

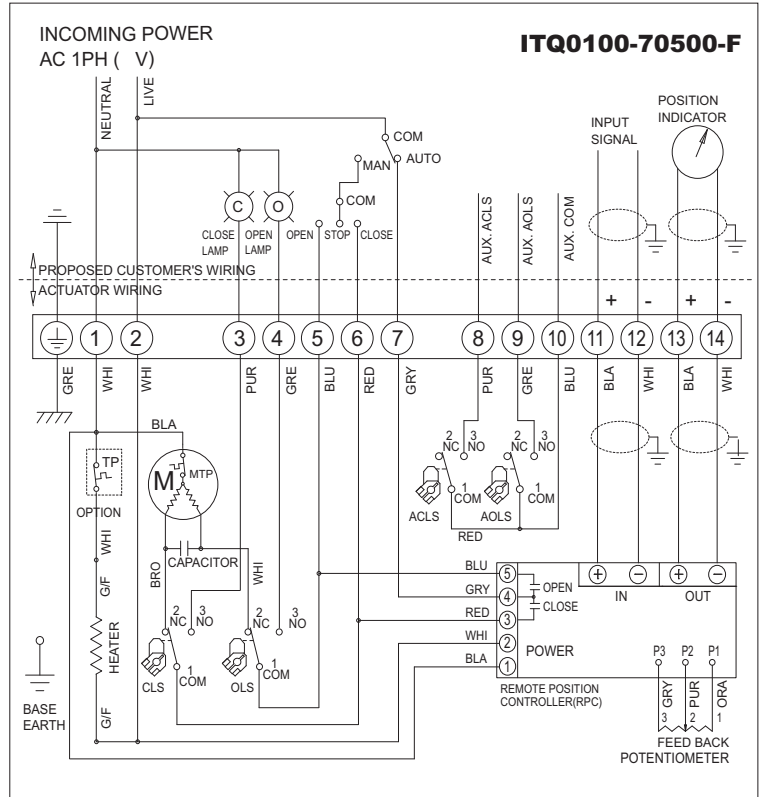


## TYPICAL WIRING (ITQ 0100)

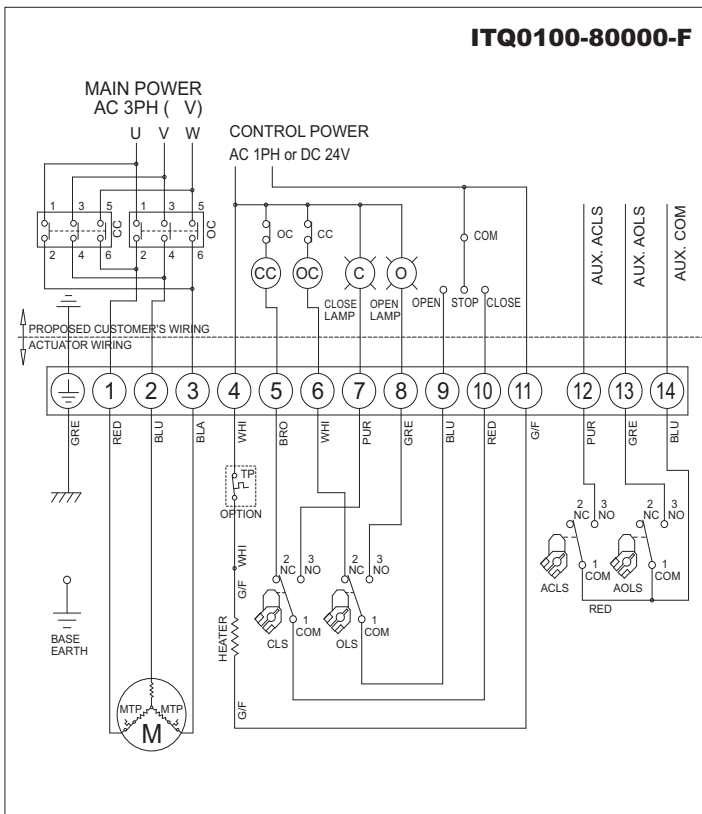
### 110/220VAC/50/60Hz, 1Ph(On-Off)



### 110/220VAC/50/60Hz, 1Ph(Modulating : RPC)



### 380/440VAC/50/60Hz, 3Ph(On-Off)



### TORQUE AND LIMIT SWITCHES OPERATION

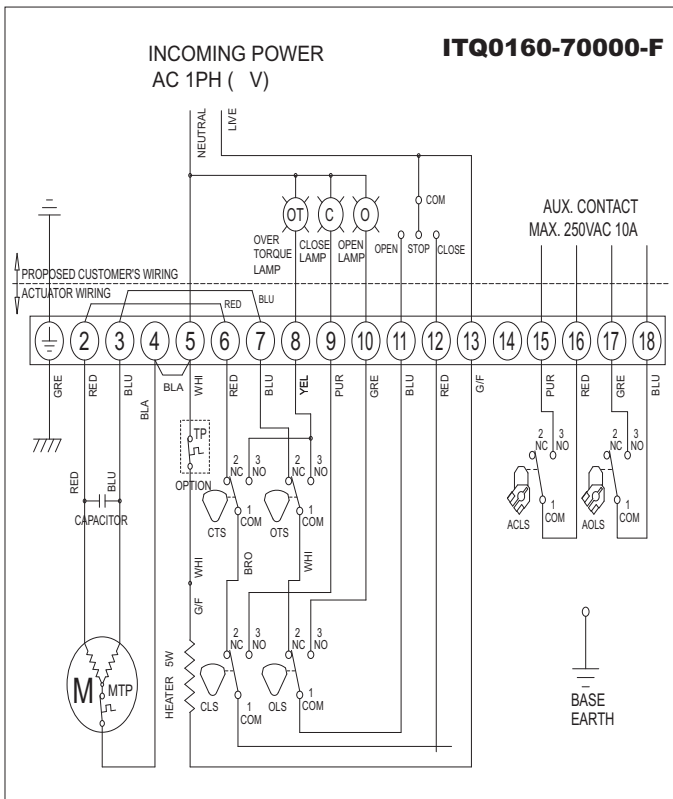
| SWITCH  | CLOSE ←   | INTERMEDIATE | → OPEN |
|---------|---|--------------|--------|
| CLS 1-2 | █   |              |        |
| CLS 1-3 | █   |              |        |
| OLS 1-2 |   | █            |        |
| OLS 1-3 |   | █            |        |
| ACLS1-2 |   | █            |        |
| ACLS1-3 | █   |              |        |
| AOLS1-2 |   | █            |        |
| AOLS1-3 |   |              | █      |
| CTS 1-3 | Closing Torque Switch interrupts control if Mechanical overload occurs during closing cycle |              |        |
| OTS 1-3 | Opening Torque Switch interrupts control if Mechanical overload occurs during opening cycle |              |        |

#### \*\*Important Notice\*\*

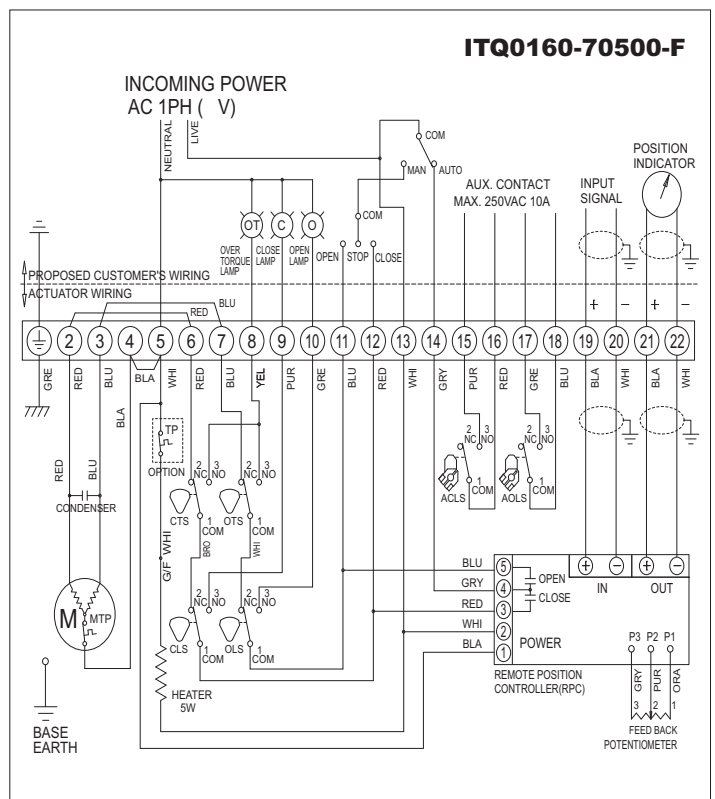
1. The Electric Wiring Diagrams shall be modified with terminal no and wires in Red Color for our customers' convenience from 1st of June 2009.
2. Please only refer to the Wiring Diagram Sticker or separate Wiring Diagram inside of each actuator. If there is any confusion please contact our distributor.

## TYPICAL WIRING (ITQ 0160 ~ ITQ 9000)

110/220VAC/50/60Hz, 1Ph(On-Off)

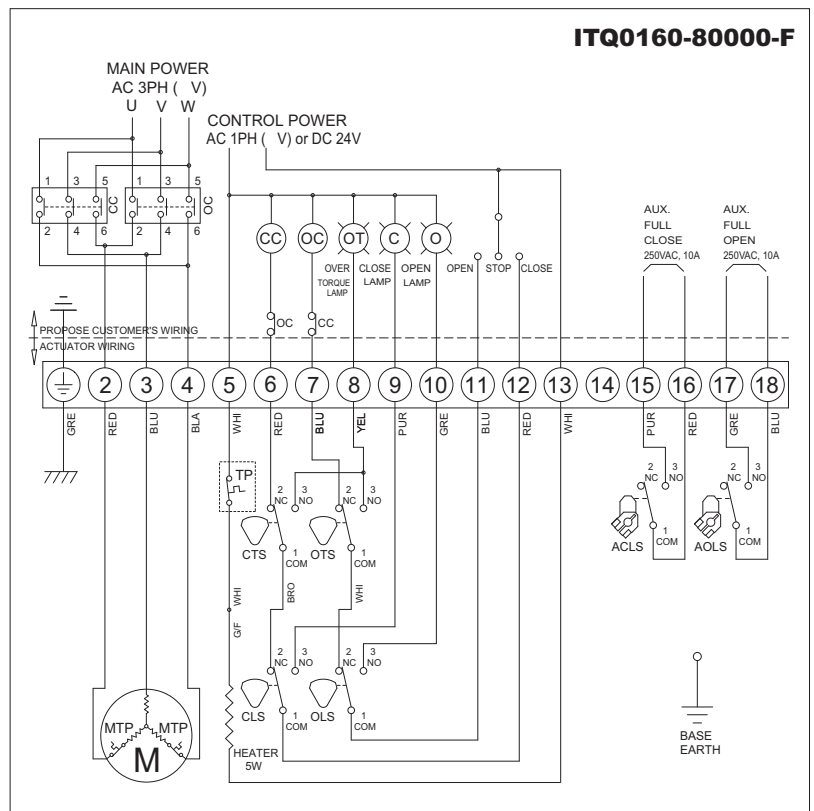


110/220VAC/50/60Hz, 1Ph(Modulating : RPC)



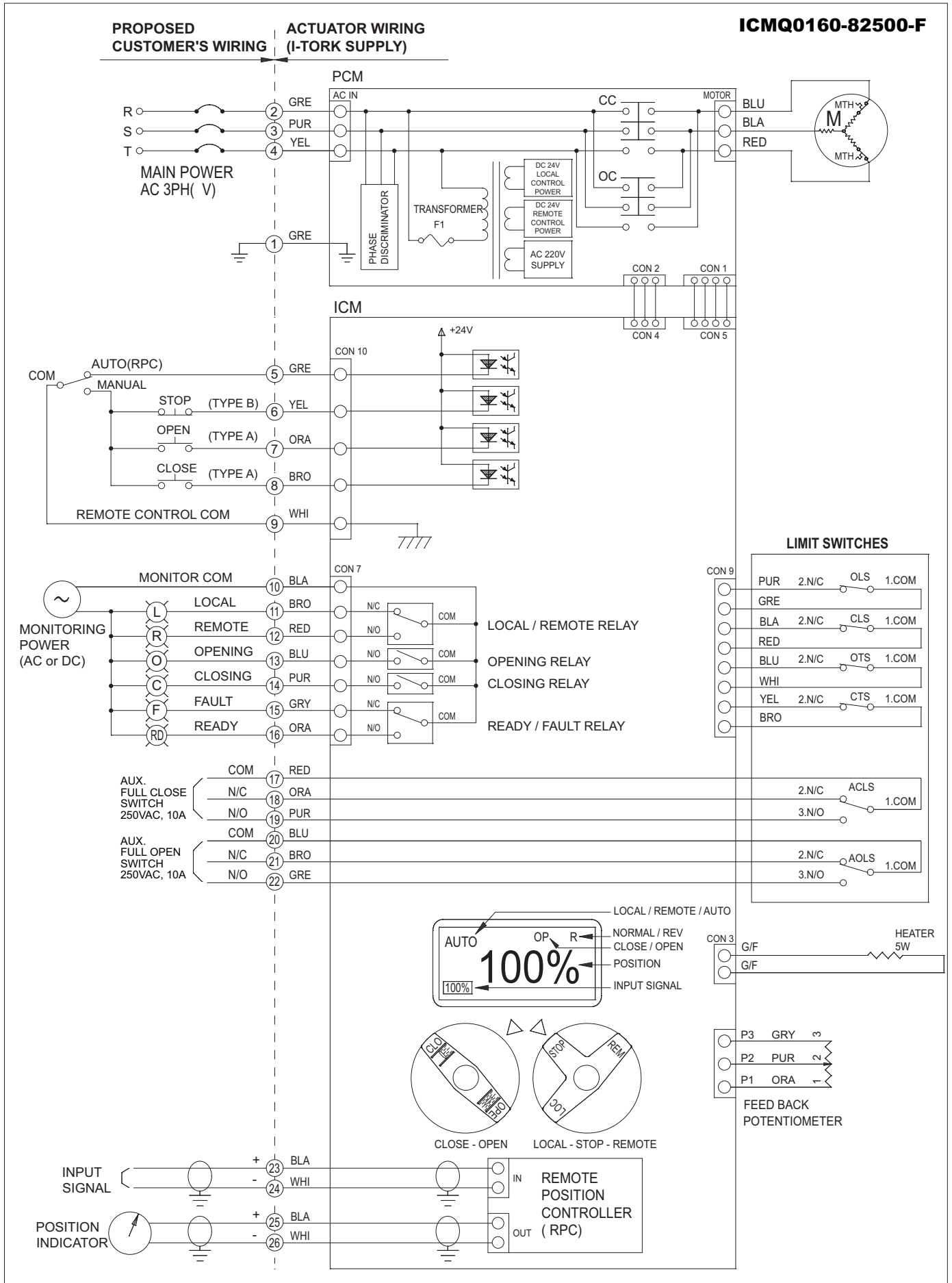
- ALS : Auxiliary Limit Switch
- AOLS : Auxiliary Open Limit Switch (Dry contact)
- ACLS : Auxiliary Close Limit Switch (Dry contact)
- O : Open Lamp
- C : Close Lamp
- OT : Over Torque Lamp
- CLS : Close Limit Switch (250VAC 10A)
- OLS : Open Limit Switch (250VAC 10A)
- CTS : Close Torque Switch (250VAC 10A)
- OTS : Open Torque Switch (250VAC 10A)
- CC : Close Magnetic Coil
- OC : Open Magnetic Coil
- M : Motor
- TP : Thermal Protector (250VAC 15A option)
- MTP : Thermal Protector built in motor

380/440VAC/50/60Hz, 3Ph(On-Off)



- \* Each actuator should be powered through its own individual switch or relay contacts to prevent cross feed between two or more actuators.
- \* In case of 3ph actuator, make sure to place actuator on the middle of travel angle before electrical operation to avoid "Jamming"
- \* All internal wiring is done as color coding.

## TYPICAL WIRING (ICM2 for 3phase)



# ITQ ELECTRIC ACTUATOR

## ITQ Electric Actuator Standard selection guide for valves

| Valve<br>Actuator | Butterfly<br>valve 10K<br>ANSI 150# | 2-Way Ball<br>valve 10K<br>ANSI 150# | 3-Way Ball<br>valve 10K<br>ANSI 150# |
|-------------------|-------------------------------------|--------------------------------------|--------------------------------------|
| ITQ 0100          | 100A (4")                           | 40A (1 1/2")                         | 40A (1 1/2")                         |
| ITQ 0160          | 125A (5")                           | 50/65A (2",2 1/2")                   | 50/65A (2",2 1/2")                   |
| ITQ 0240          | 150A (6")                           | 80A (3")                             | 80A (3")                             |
| ITQ 0350          | 200A (8")                           | 100A (4")                            |                                      |
| ITQ 0500          | 250A (10")                          | 125A (5")                            | 100A (4")                            |
| ITQ 0800          | 300A (12")                          | 150A (6")                            | 125A (5")                            |
| ITQ 1100          | 350A (14")                          |                                      |                                      |
| ITQ 2000          | 450A (18")                          | 250A (10")                           | 200A (8")                            |
| ITQ 3000          | 500A (20")                          | 300A (12")                           | 250A (10")                           |
| ITQ 6000          | 600/750A (24",30")                  | 350/400A (14",16")                   | 300A (12")                           |
| ITQ 9000          | 800/900A (32",36")                  | 450/500A (18",20")                   | 350A (14")                           |

\* The above table is just reference without I-TORK's responsibility.

\* Actuator sizing must be done based on actual valve torque.

The details of this catalog are subject to change without prior notification.

 **CONTROLS Co., Ltd.**

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