

Valves, Actuators, Accessories



# Electric Actuators



**VAA INTERNATIONAL INC.**

# WHY VAA ?

- More than 20 years experience with valves, actuators, accessories, worldwide
- High quality engineering solutions
- Focus on customer satisfaction
- R&D production, quality control, testing, certification and documents are carried out by safe hands - our hands
- Motivated, enthusiastic and skilled employees

VAA INTERNATIONAL INC was established in 1990 to provide solutions in Valves, Actuators, Accessories of valve engineering and production.

VAA INTERNATIONAL INC designs and produces standard and custom-build products in accordance with international and custom standards.

Our customers make also use of our great knowledge of engineering, concerning complicated projects and the maintenance service for all makes of V.A.A.



## CONSTRUCTION

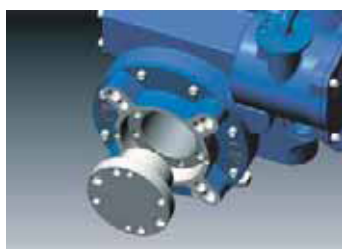


### External mechanical stopper

- 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



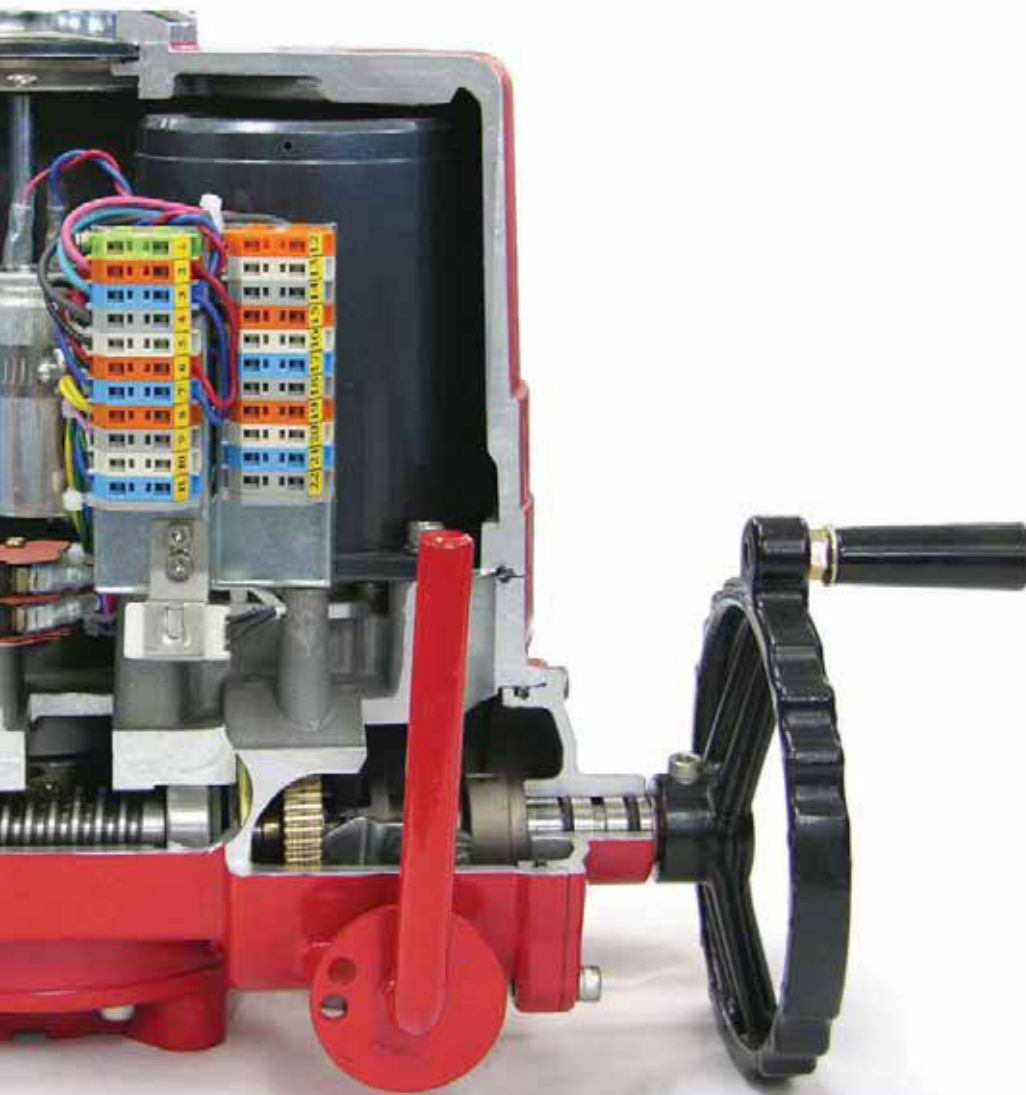
## Torque switches

- 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 ERT110



## 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

## TECHNICAL INFORMATION

Model	ERT110	ERT160	ERT255	ERT350	ERT500	ERT800	ERT1200	ERT2000	ERT3000	ERT5700	ERT8000
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	4.95	6.6	4.95	6.6
60Hz	1.10	1.70	1.72	1.80	3.90	4.20	4.30	4.55	6.1	4.55	6.1
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 ERT110)
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 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
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 ERT110
EXT	Extended travel angle (up to 120°, 135°, 180°, 270°, )	Except for ERT 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) 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) Zero / Span Adjustment Convertible DIP Switch (4 wire to 2 wire)	 CT
RPC / Signal configuration	Remote position controller (by input and output signal) Input : 4-20mA, 0-10VDC, 2~10VDC, 1~5VDC, 0~5VDC Output : 4-20mA, 0-10VDC, 2~10VDC, 1~5VDC, 0~5VDC Auto-calibration Reverse operating direction	 RPC

### Local control



LP4 / LM4

#### LP4 for 1 & 3 Phase (ERT160~8000)

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 (ERT160~8000)

Including the same functions as LP4  
Reversing electric contactors, Transformer

## Local control



### ICM1 for 1 & 3 Phase (Integral Control Module) (ERT160~8000)

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

Control power : 24VDC, 5VDC

Magnetic selector switches

: Open/Close & Local/Stop/Remote

Reversing electric contactors, Transformer, Phase Detector

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 : only at Local Position)

: Full Open - Red(on), Opening - Red(flickering : only at Local Position)

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



ICM1

\* Options Available : Explosion Proof, IP68

### ICM2 for 1 & 3 phase (integral with LCD Display) (ERT160~8000)

Including the same functions as ICM1

Enclosure : Reversing electric contactors, Transformer,

Auto-Phase Discriminator, LCD Display

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

IP68, Bus Communication



### ICM3 for 1 & 3 phase (integral with LCD Display/IP68 Enclosure) (ERT160~8000)

Including the same functions as ICM2

Enclosure : Reversing electric contactors, Transformer,

Auto-Phase Discriminator, LCD Display, IP68, Explosion Proof,

RPC(Modulating), Bus Communication

34pins separate compartment for terminal block



ICM2

## Fail safe



### BP for 1 Phase (ERT110~500)

Rechargeable Battery back up - Fail safe function

When Main power is alive, actuator works as normally.

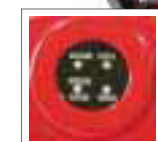
Once power fails, actuator will move to pre-set fail safe position.

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)



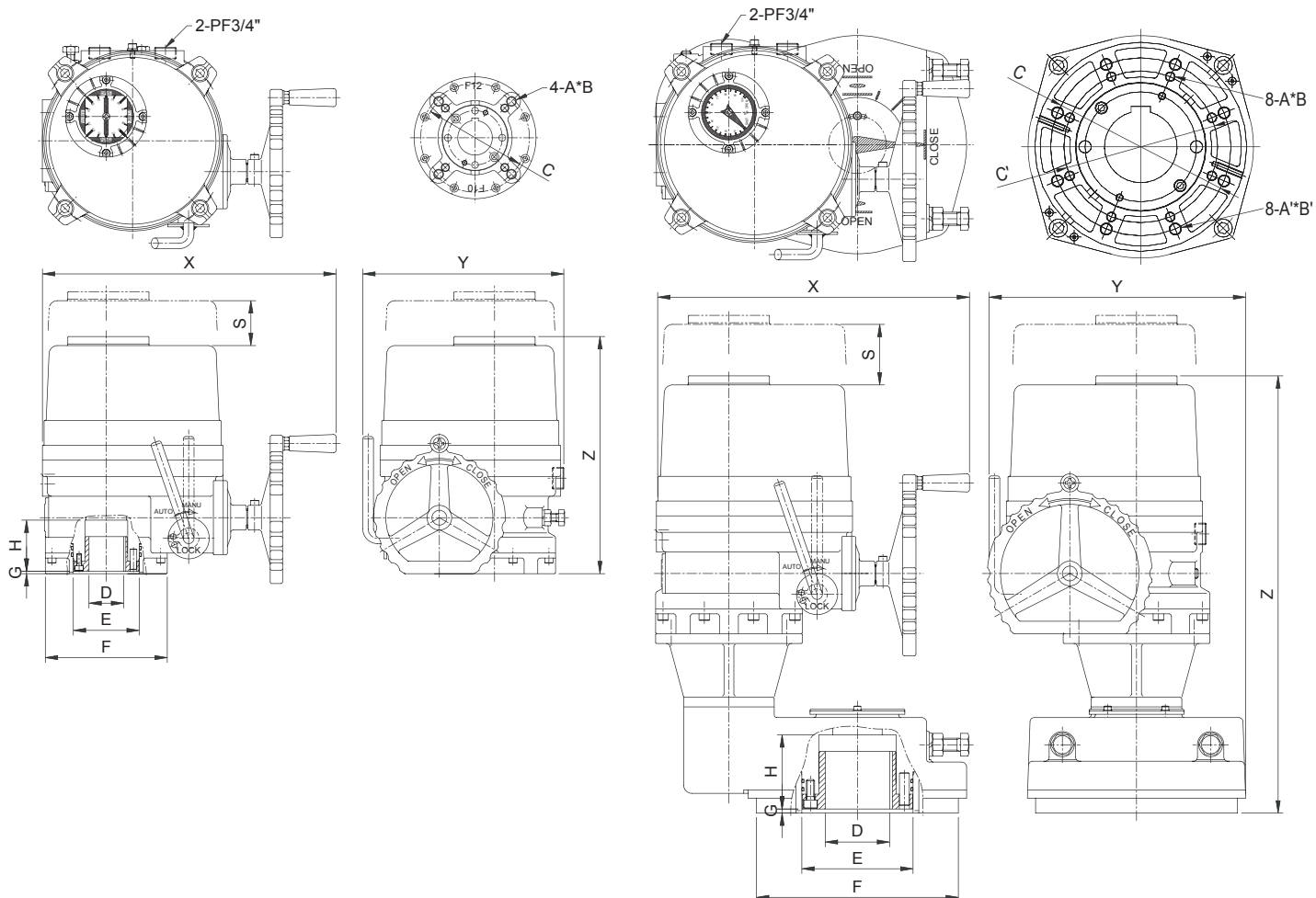
## BASIC ACTUATOR DIMENSIONS

### With Gear Box

Type	ERT110	ERT160	ERT255	ERT350	ERT500	ERT800	ERT1200	ERT2000	ERT3000	ERT5700	ERT8000
Flange	F07	F07	F07	F10	F10	F12	F12	F16	F16	F25	F25
ISO5211		F10	F10	F12	F12	F14	F14			F30	F30
C	∅ 70	∅ 70	∅ 70	∅ 102	∅ 102	∅ 125	∅ 125	∅ 165	∅ 165	∅ 254	∅ 254
		∅ 102	∅ 102	∅ 125	∅ 125	∅ 140	∅ 140			∅ 298	∅ 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	□ 34	□ 34	□ 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	100	115	115	145	145	170	170	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	220	259	259	288	288	313	313	385	385	668	668

(mm)

(mm)





## 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
ERT110	340	190	220	316	172	220	428	172	220	X			X		
ERT160 / 255	O			O			508	229	259	499	229	259	517	284	259
ERT350 / 500	O			O			527	244	288	518	244	288	536	284	288
ERT800 / 1200	O			O			X			541	284	313	559	284	313
ERT2000 / 3000	O			O			X			600	375	385	620	375	385
ERT5700 / 8000	O			O			X			677	417	668	697	417	668

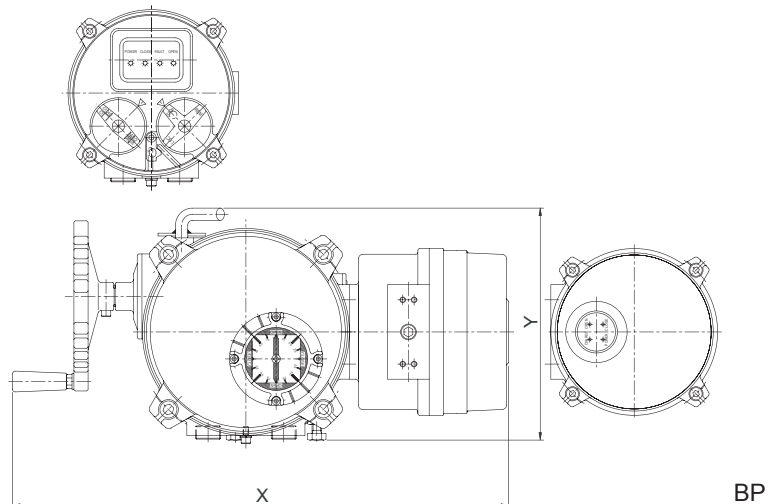
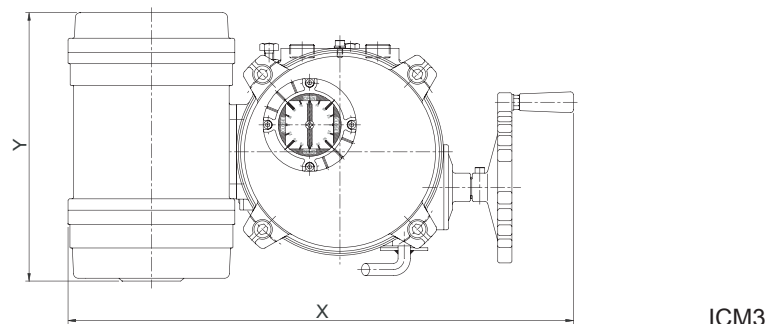
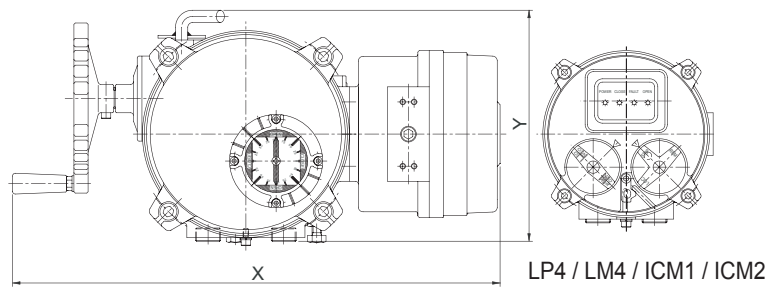
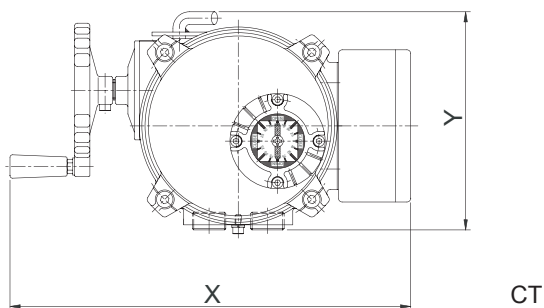
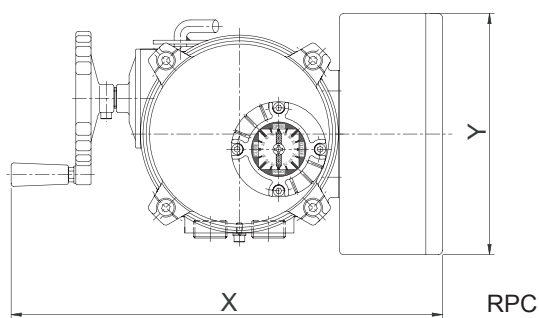
\* O : Installed inside of actuator

\* X : Not available

\* Z : Height of basic actuator

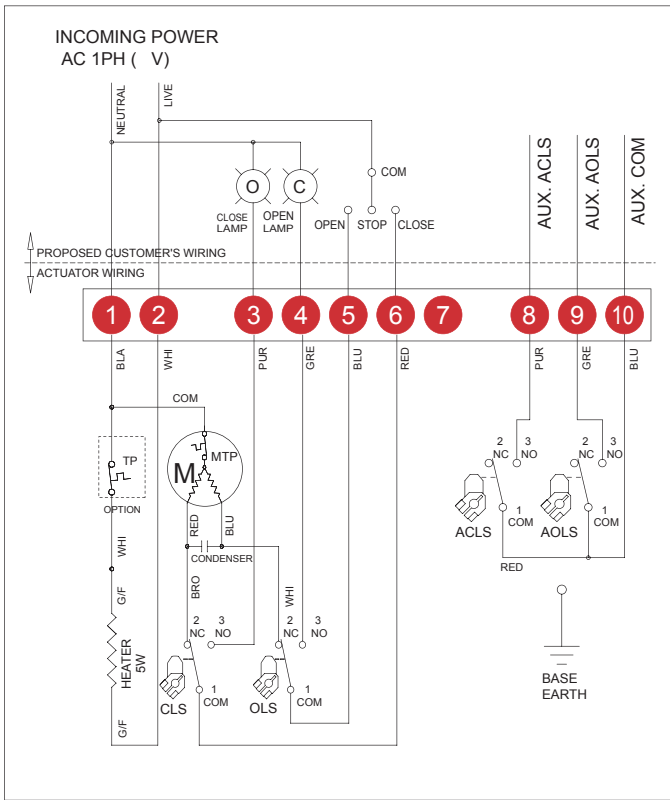
### ERT110

### ERT160 ~ 8000

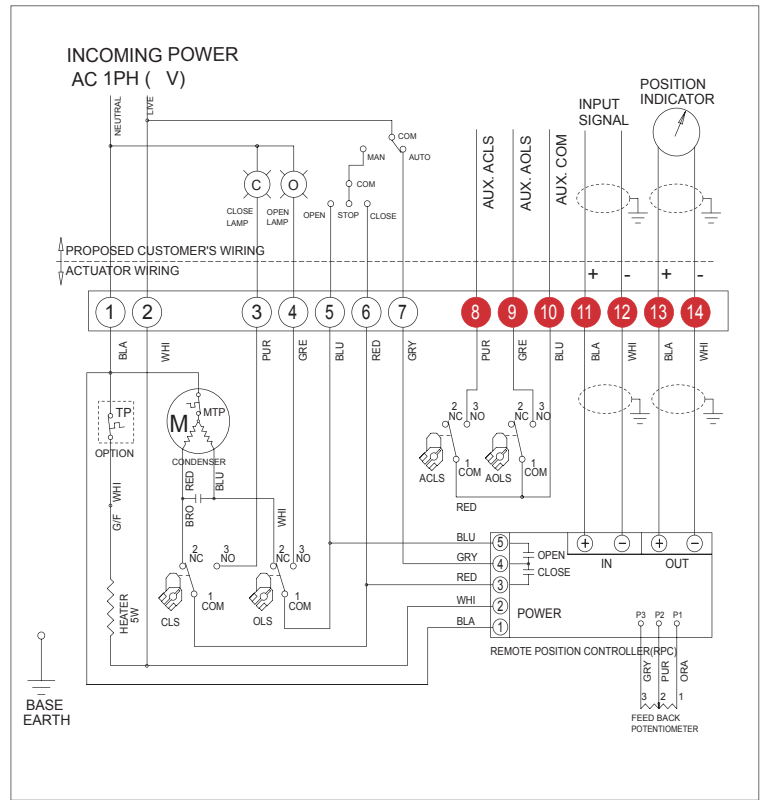


## TYPICAL WIRING (ERT110)

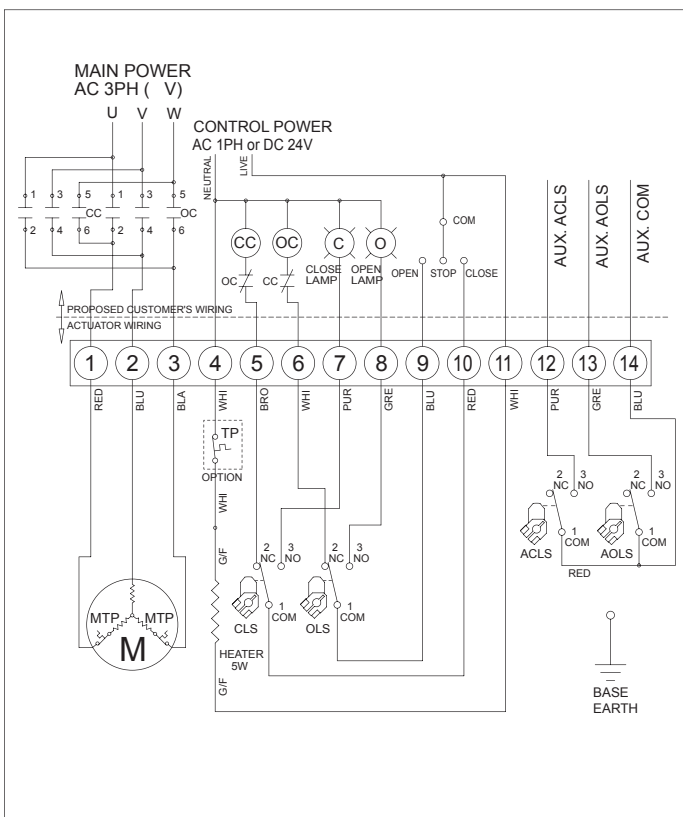
110/220VAC/50/60Hz, 1Ph(On-Off)



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		

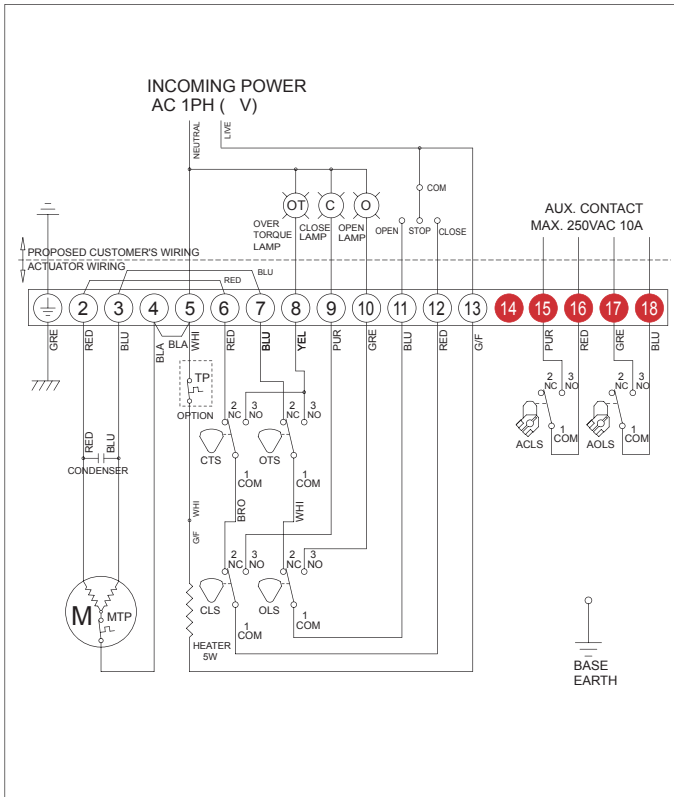
### \*\* Important Notice \*\*

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

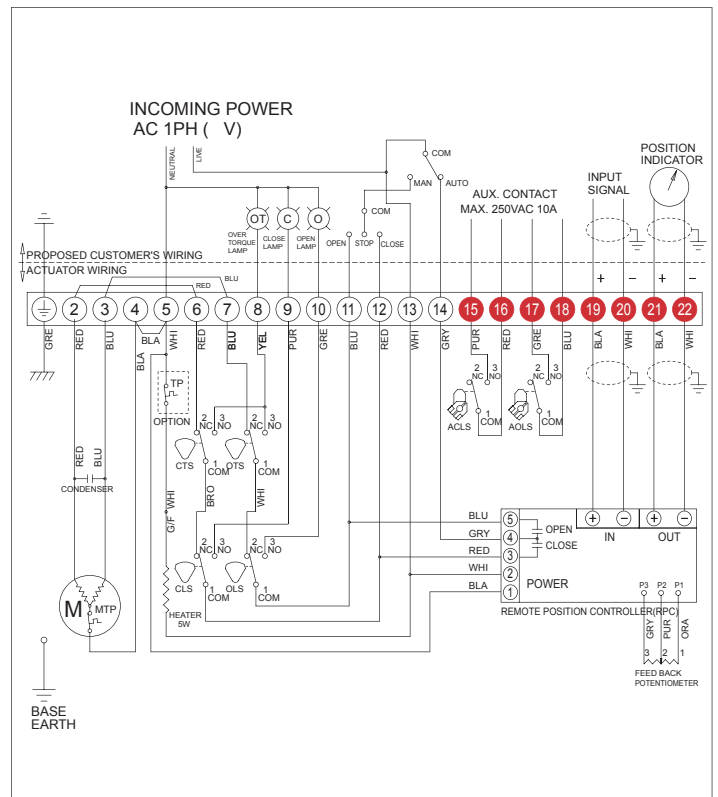
# VAA INTERNATIONAL INC.

## TYPICAL WIRING (ERT160 ~ ERT8000)

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



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



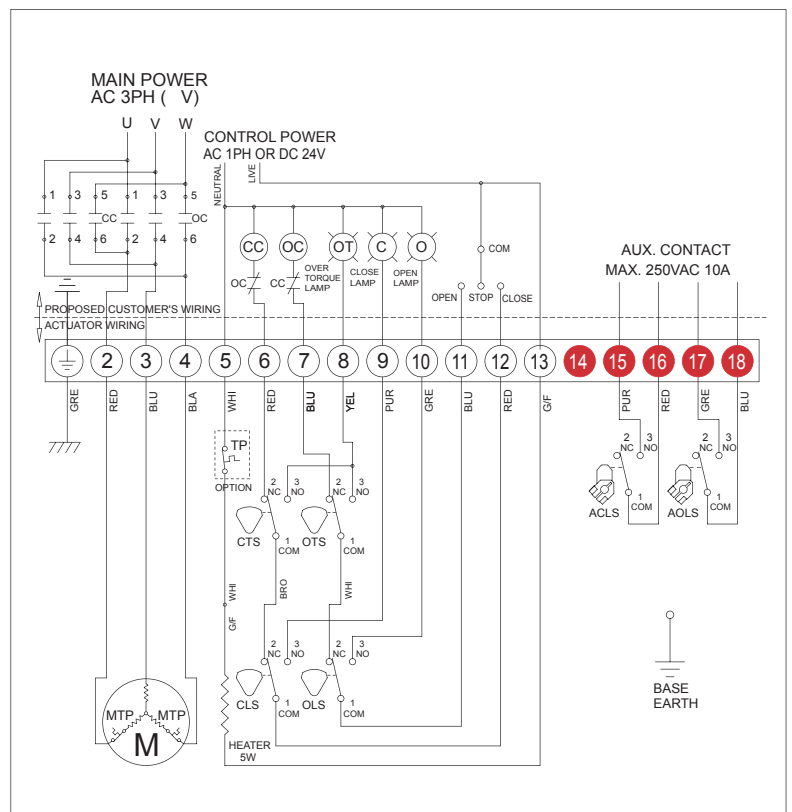
- ALS : Auxiliary Limit Switch
- AOLS : Auxiliary Open Limit Switch (Dry contact)
- ACLS : Auxiliary Close Limit Switch (Dry contact)
- O : Open Lamp
- C : Close Lamp
- OT : Over Torque Lamp
- CLS : Close Limit Switch (250VAC 10A)
- OLS : Open Limit Switch (250VAC 10A)
- CTS : Close Torque Switch (250VAC 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

\* 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"

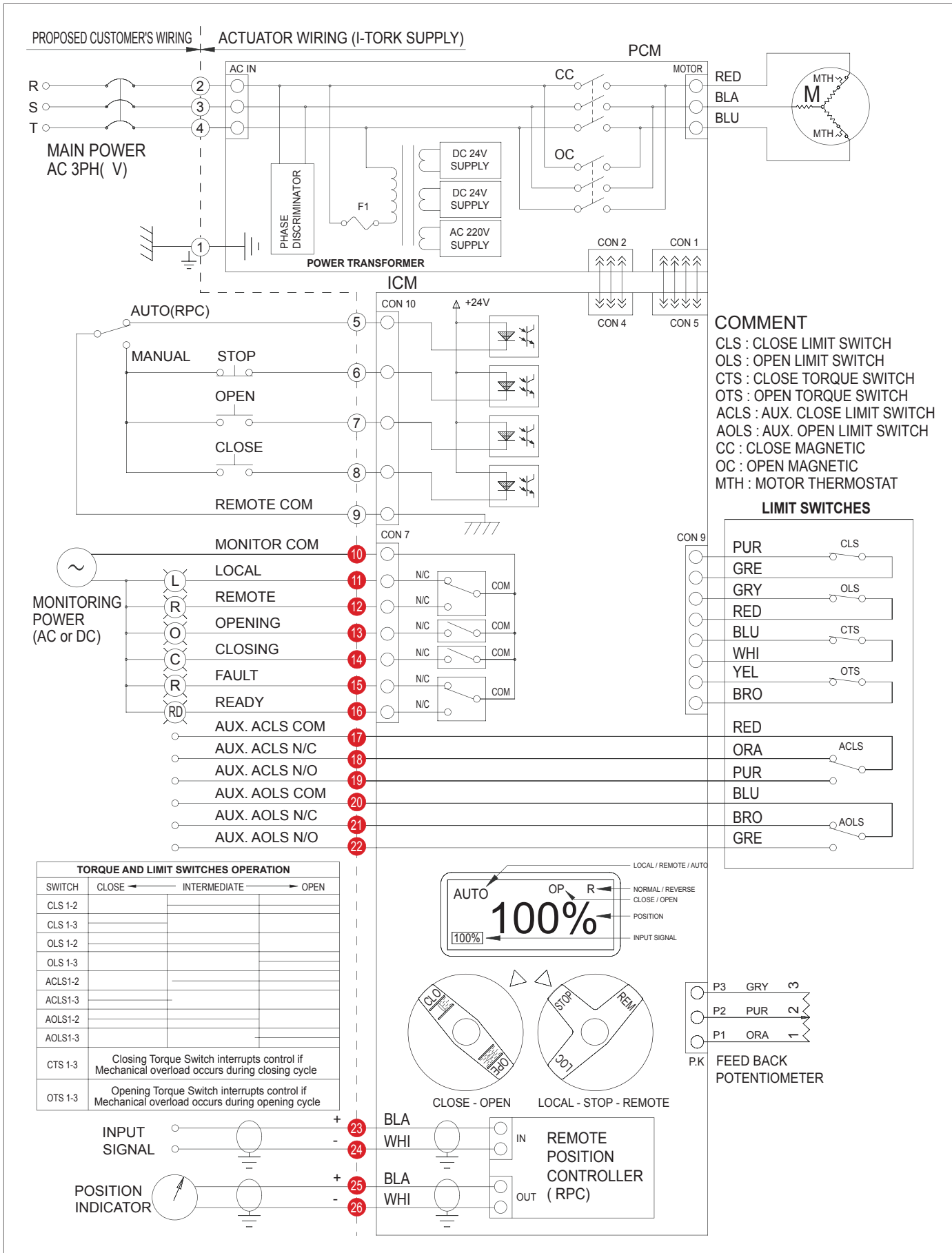
\* All internal wiring is done as color coding.

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



# VAA INTERNATIONAL INC.

## TYPICAL WIRING (ICM2 for 3phase)





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