

PRATT[®]
INDUSTRIAL

Electric Actuator EQ Series



Engineering Creative Solutions
for Fluid Systems Since 1901

INTRODUCTION

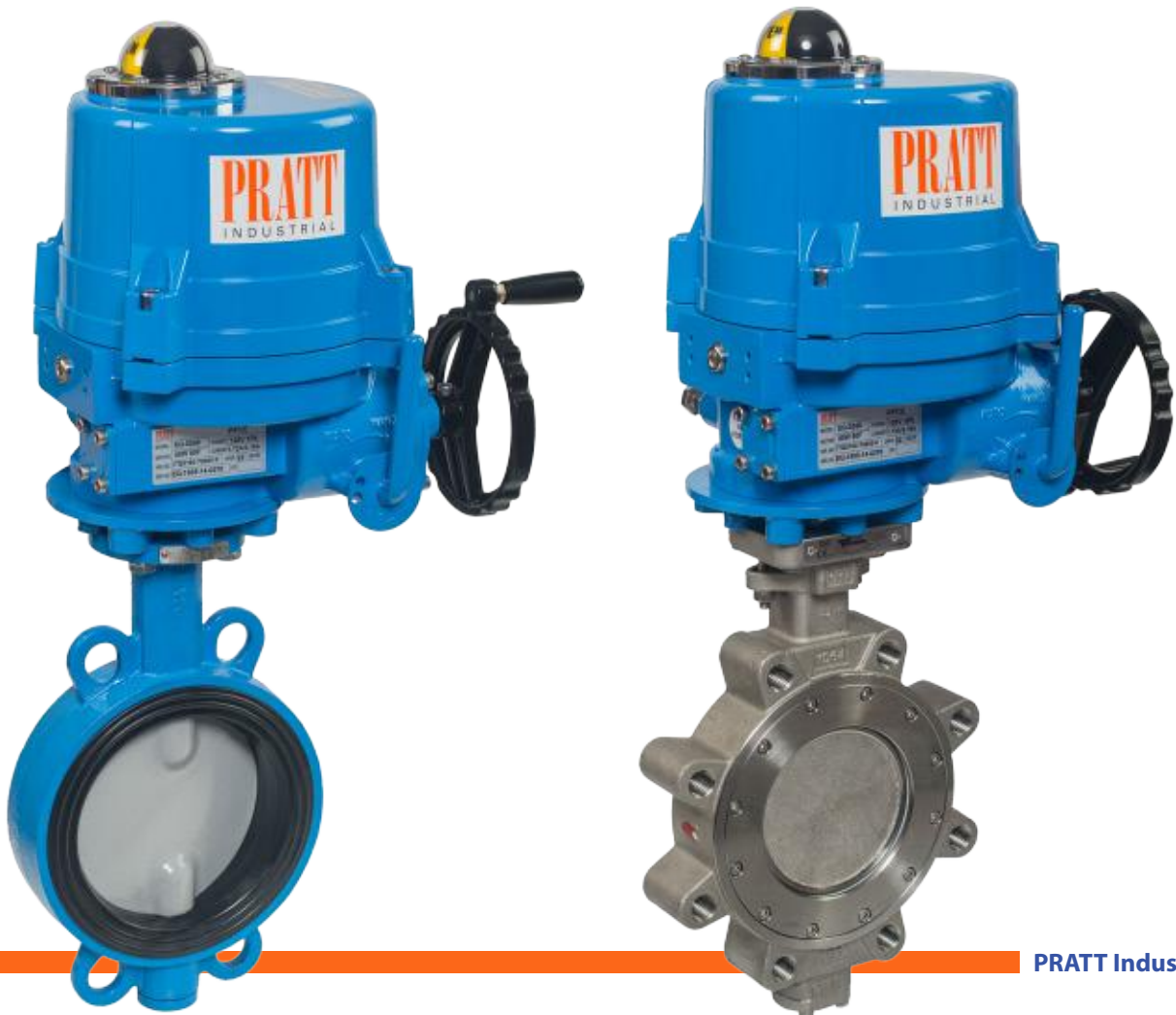
- Pratt Industrial designs and provides high quality actuators and services related to valve automation.
- Our many years of experience in the automation field enables us to launch our EQ series electric actuator which has compact size, robust construction, reliable performance and ability to integrate fully into sophisticated control systems.



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FEATURES

- Compact and robust construction, lightweight while providing high output torque (Max 79,500in/lbs).
- Wide range of torque variation (From min 800in/lbs to max 79,500in/lbs).
- Hard anodized aluminum housing inside and outside with external powder coating for use against severe industrial environment.
- Enclosure uses radial seals & O-rings that provide protection to waterproof IP67 (NEMA 4 & 6) and optional watertight IP68
- Dual mounting base ISO5211 standard and KV 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.
- Number of Local Position Control options to provide easy commissioning and field operation.
- Digitalized control component.



CONSTRUCTION



External mechanical stops

- 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 dual-drilled mounting base



Captive cover bolts

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



Standard short

Long (Explosion proof)

① Housing

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

② Gearing

- Precisely machined double worm gear with minimum back-lash, low noise, and 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 using o-rings in all interfaces IP67 (standard), and double o-ring for IP68 (option).

⑤ Handwheel

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

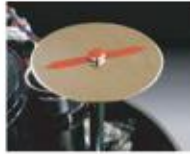
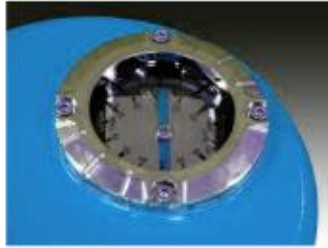
⑥ Motor

- Specially designed induction motor to generate high starting torque and high efficiency 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 flame path contained.



Indicator

- Continuous mechanical position indicator and window with dial.



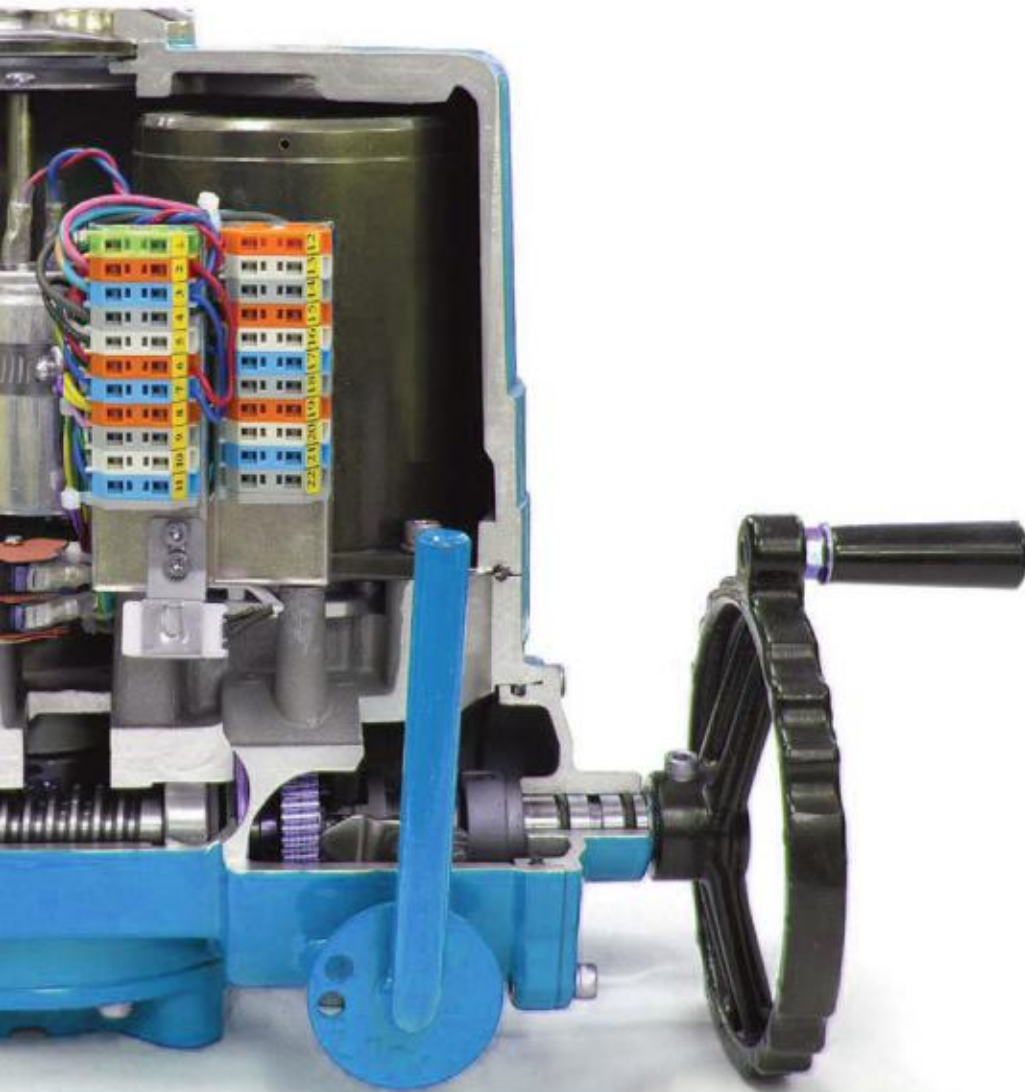
Torque switches

- Protects actuator from damage caused by overload from flow torque during valve travel.
- 1 each for open/close.



Limit switches

- Directly engaged with drive 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 EQ 0100.



Terminal

- Spring loaded push-type terminal for tight wiring connection, good for severe vibration applications.



Manual override

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



Space Heater

- Anti-condensation.

TECHNICAL INFORMATION

Model	EQ 100	EQ 160	EQ 240	EQ 350	EQ 500	EQ 800	EQ 1100	EQ 2000	EQ 3000	EQ 6000	EQ 9000
Rated Torque (Nm)	100	160	240	350	500	800	1,100	2,000	3,000	6,000	9,000
Rated Torque (In / Lbs)	885	1,416	2,125	3,098	4,425	7,080	9,735	17,700	26,500	53,105	79,656
Duty Cycle (%)	50	50	50	50	30	25	25	25	25	25	25
Operating Time (Sec)											
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 (∅)	22	25	25	40	40	48	48	75	75	120	120
Square (□)	20	23	23	34	34	40	40	64	64	100	100
Rated Current (A)											
1 Phase / 110 Volt / 50Hz	0.98	1.60	1.62	1.72	3.60	3.90	3.90	4.95	6.6	4.95	6.6
1 Phase / 110 Volt / 60Hz	1.10	1.70	1.72	1.80	3.90	4.20	4.30	4.55	6.1	4.55	6.1
1 Phase / 220 Volt / 50Hz	0.52	0.85	0.87	0.92	1.50	2.05	2.15	2.95	3.75	2.95	3.75
1 Phase / 220 Volt / 60Hz	0.58	0.90	0.90	0.95	1.60	2.20	2.30	3.15	3.52	3.15	3.85
3 Phase / 380 Volt / 50Hz	0.43	0.30	0.32	0.32	0.52	0.82	0.84	1.5	1.6	1.5	1.6
3 Phase / 380 Volt / 60Hz	0.33	0.30	0.32	0.32	0.56	0.88	0.90	1.8	2.0	1.8	2.0
3 Phase / 440 Volt / 50Hz	0.59	0.30	0.32	0.32	0.55	0.82	0.84	2.3	2.5	2.3	2.5
3 Phase / 440 Volt / 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	2.80	1.80	2.40	3.80	5.00	-	-	-	-	-	-
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
KV Mounting Flange	3.25/5.00	3.25/5.00	3.25/5.00	5.00/6.50	5.00/6.50	5.00/6.50	5.00/6.50	6.50/10.00	6.50/10.00	F25/F30	F25/F30
Weight (Kgs)	7	15	15	20	20	25	25	42	42	152	152
Weight (Lbs)	15	33	33	44	44	55	55	93	93	335	335
No. of Handwheel Turns	10	12	12	14	14	17	17	13	13	39	39

STANDARD SPECIFICATION

Enclosure	Weather proof IP67, NEMA 4 / 4X and 6, O-ring sealed
Main Power Supply	110/220VAC/1Ph/50/60Hz, 380/440/VAC/3Ph/50/60/Hz ±
Control Power Supply	110/220VAC/1Ph/50/60Hz ± 1 0%
Duty Cycle (on-off)	S2: 10 min. – 30 min.
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 EQ 0100)
Stall Protection/Set Temp.	Built in Thermal protection, Open 150°C±5°C, Close 97°C±1 5°C
Travel Angle	90°± 5° (0%-100%)
Position Indicator	Continuous mechanical indicator with arrow
Manual Override	Declutchable
Self-locking	Provided by double worm gearing (no brake)
Mechanical Stops	1 each for each travel end (Open and Close),external & adjustable
Space Heater	5W(110/220VAC) for anti-condensation
Lubrications	EP type grease
Cable Entries	Screw and Lever Push type (spring loaded)
Terminal Block	Basic actuator: -20°C ± 60°C
Ambient Temperature	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 100 hours
ALS	Auxiliary limit switches (Max 2 for each travel end)	
ATS	Auxiliary torque switches (Max 2 for each travel end)	Except for EQ 0100
EXT	Extended travel angle (up to 120°, 135°, 180°, 270°)	Except for EQ 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 K ohm) High resolution potentiometer and precisely machined gearing Are directly engaged with drive shaft to feedback Continuous position of valve
CT	Current transmitter (output signal: 4-20mA) Zero/Span Adjustment
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 (Option: 0-10VDC, 2-10VDC, 1-5VDC, 0-5VDC) Auto-calibration Reverse operating direction



PK



CT



RPC

Local Control



LP4 / LM4

LP4 for 1 & 3 Phase (EQ 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 (EQ 0100-9000)

- Including the same functions as LP4
- Reversing electric contactors, Transformer

LOCAL CONTROL



ICM1 for 1 & 3 Phase (Integral Control Module) (EQ 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) (EQ 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



ICM3 for 1 & 3 phase (integral with LCD Display/IP68 Enclosure) (EQ 0160-9000)

Including the same functions as ICM2

Reversing electric contactors, Transformer, Auto-Phasing Discriminator,
LCD Display, IP68, Explosion Proof, RPC(Modulating), Bus Communication,
34pins separate compartment for terminal block

FAIL SAFE



BP for 1 Phase (EQ 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)

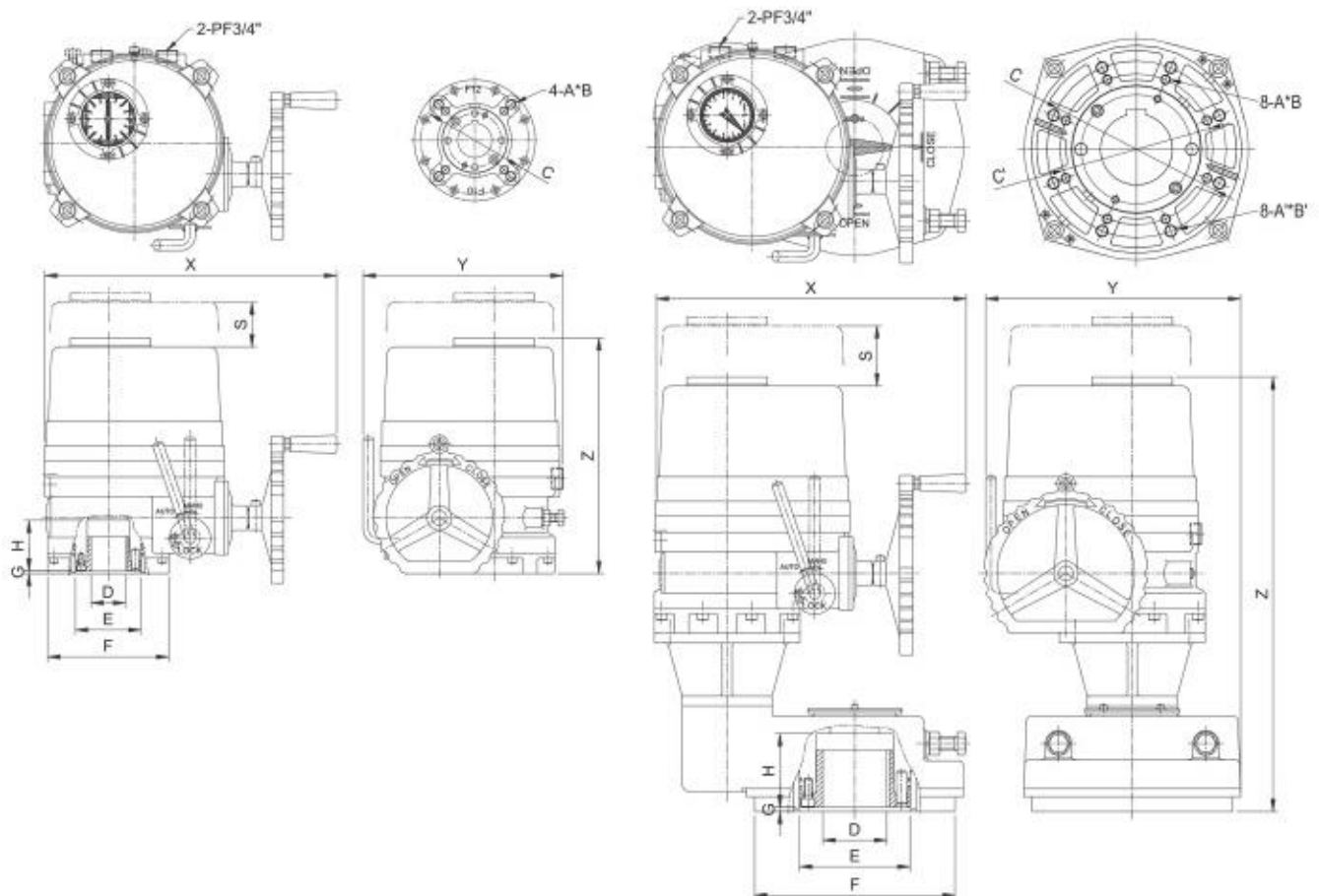
ACTUATOR DIMENSIONS

With Gear Box

Type	EQ 100	EQ 160	EQ 0240	EQ 0350	EQ 0500	EQ 0800	EQ 1100	EQ 2000	EQ 3000	EQ 6000	EQ 9000
KV Mounting	3.25/5.00	3.25/5.00	3.25/5.00	5.00/6.50	5.00/6.50	5.00/6.50	5.00/6.50	6.50/10.00	6.50/10.00		
ISO5211	F07	F07/F10	F07/F10	F10/12	F10/F12	F12/F14	F12/F14	F16	F16	F25/F30	F25/F30
C	ø 70	ø 70 ø 102	ø 70 ø 102	ø 102 ø 125	ø 102 ø 125	ø 125 ø 140	ø 125 ø 140	ø 165	ø 165	ø 254 ø 298	ø 254 ø 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)	ø 22	ø 25	ø 25	ø 40	ø 40	ø 48	ø 48	ø 75	ø 75	ø 120	ø 120
D(Squ.)	□ 20	□ 23	□ 23	□ 38	□ 38	□ 40	□ 40	□ 64	□ 64	□ 100	□ 100
E	ø 50	ø 58.5	ø 58.5	ø 80	ø 80	ø 95	ø 95	ø 135	ø 135	ø 216	ø 216
Flange	ø 88	ø 125	ø 125	ø 148	ø 148	ø 178	ø 178	ø 226	ø 226	ø 350	ø 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	532	532
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)



CONTROL OPTION DIMENSIONS

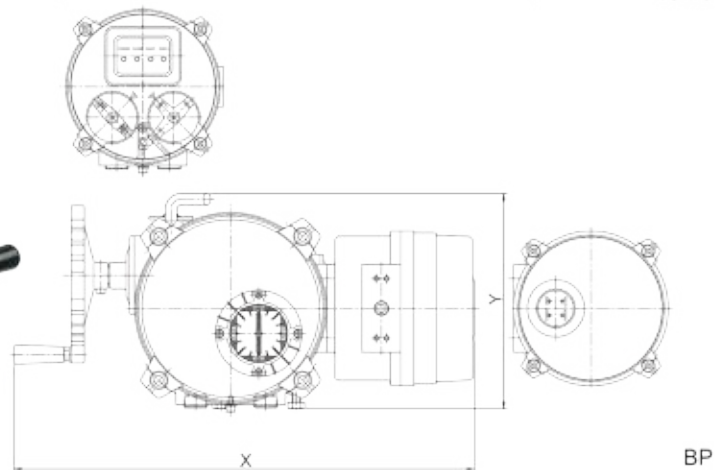
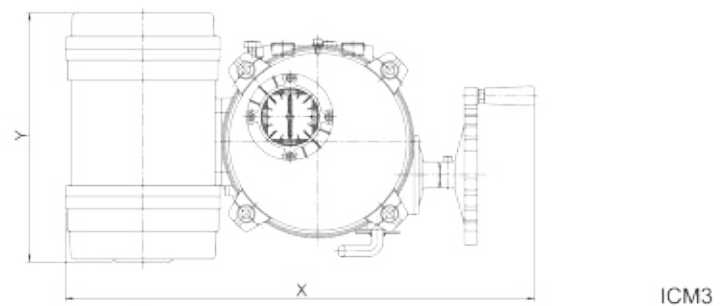
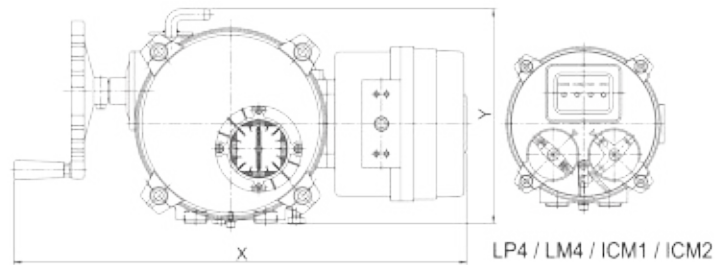
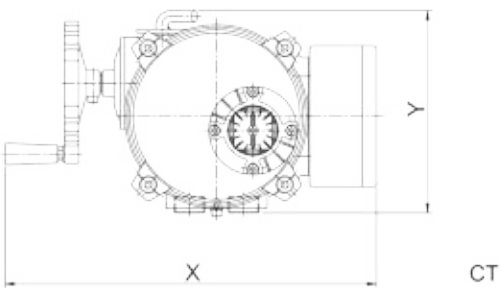
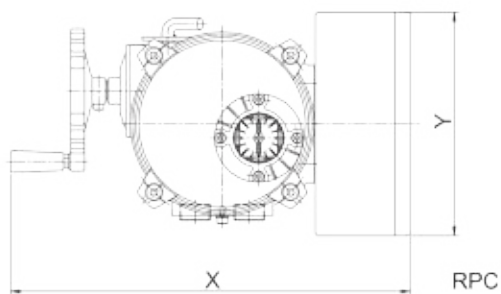
(mm)

Type	RPC			CT			BP			LP4/LM4/ICM1/ICM2			ICM3		
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
EQ0100	340	190	220	316	172	220	428	172	220	X			X		
EQ01060 / 0240		O			O		508	229	259	499	229	259	517	284	259
EQ0350 / 0500		O			O		527	244	288	518	244	288	536	284	288
EQ0800 / 1100		O			O			X		541	284	313	559	284	313
EQ2000 / 3000		O			O			X		600	375	385	620	375	385
EQ6000 / 9000		O			O			X		677	417	668	697	417	668

* O : Installed Inside of actuator * X : Not available * Z : Height of actuator

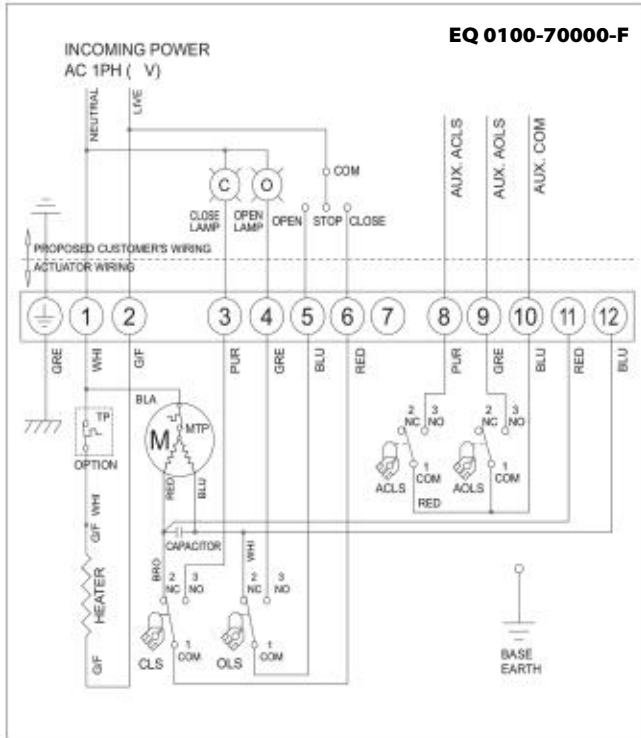
EQ 0100

EQ 0160 / 9000

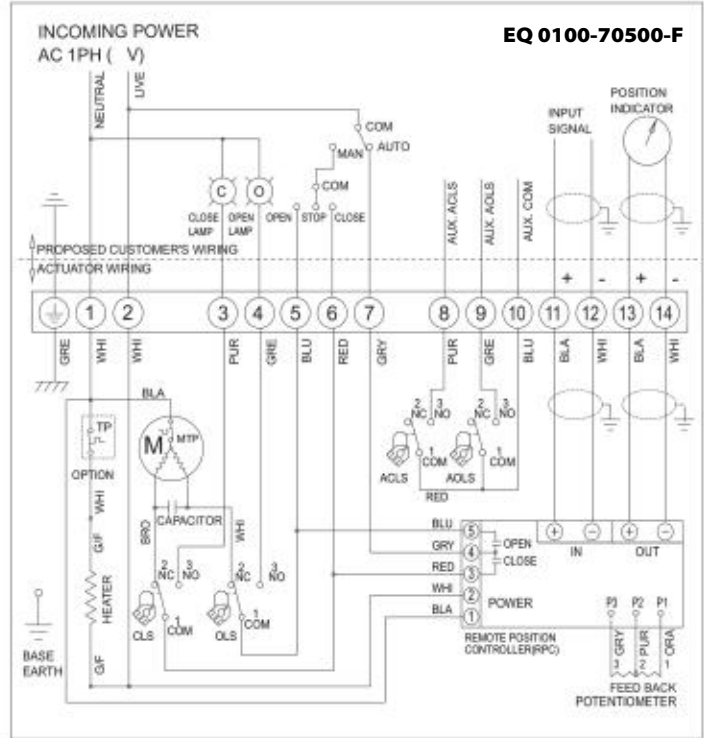


TYPICAL WIRING (EQ 0100)

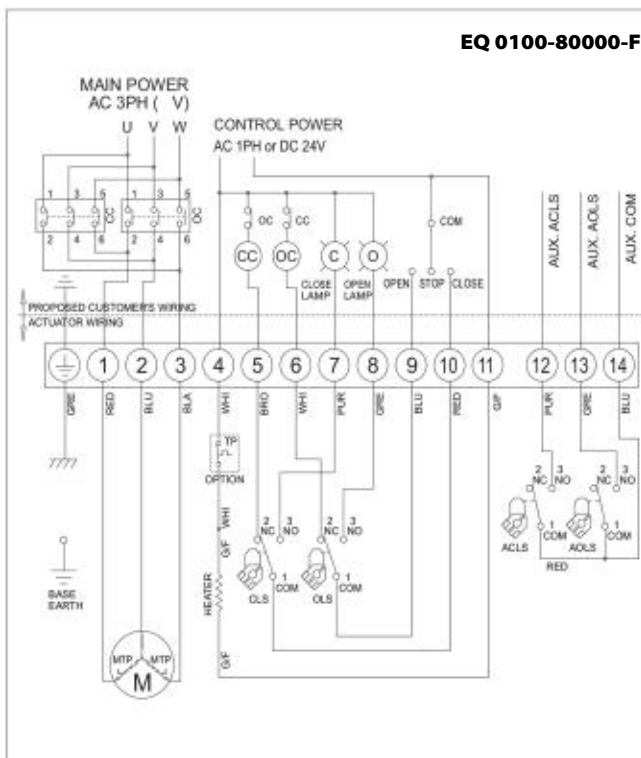
110/220VAC/50/60Hz, 1Ph(On-Off)



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



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

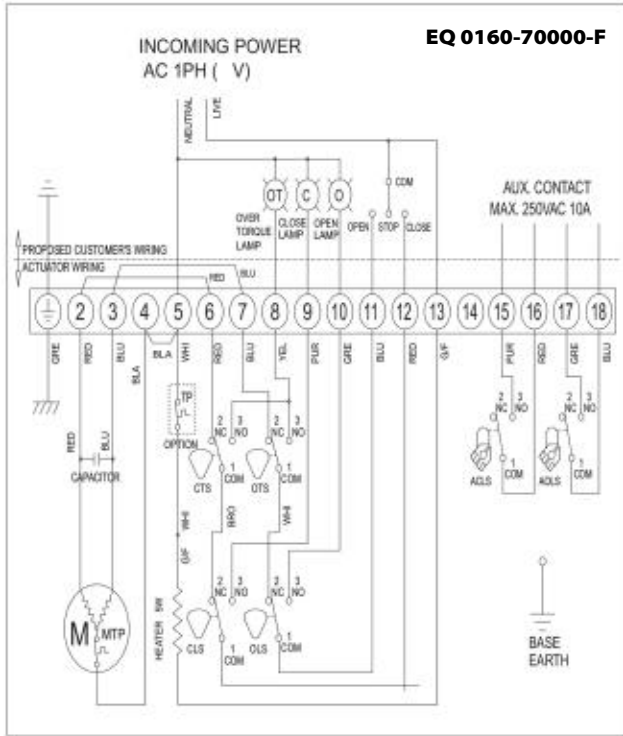


TORQUE AND LIMIT SWITCHES OPERATION

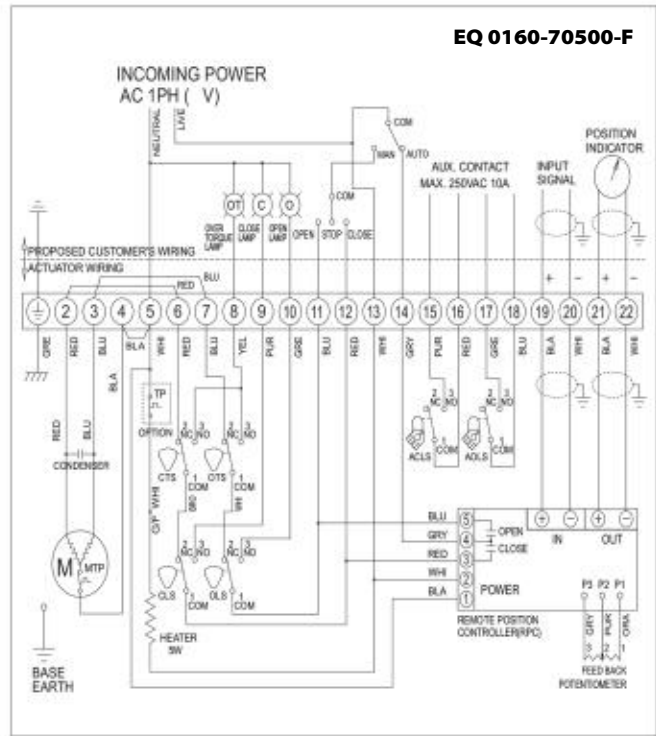
SWITCH	CLOSE ←	INTERMEDIATE	→ OPEN
CLS 1-2		████████████████████	
CLS 1-3	████████████████████		
OLS 1-2		████████████████████	
OLS 1-3	████████████████████		
ACLS1-2		████████████████████	
ACLS1-3	████████████████████		
AOLS1-2		████████████████████	
AOLS1-3			████████████████████
CTS 1-3	Closing Torque 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		

TYPICAL WIRING (EQ 0160 – EQ 9000)

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



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



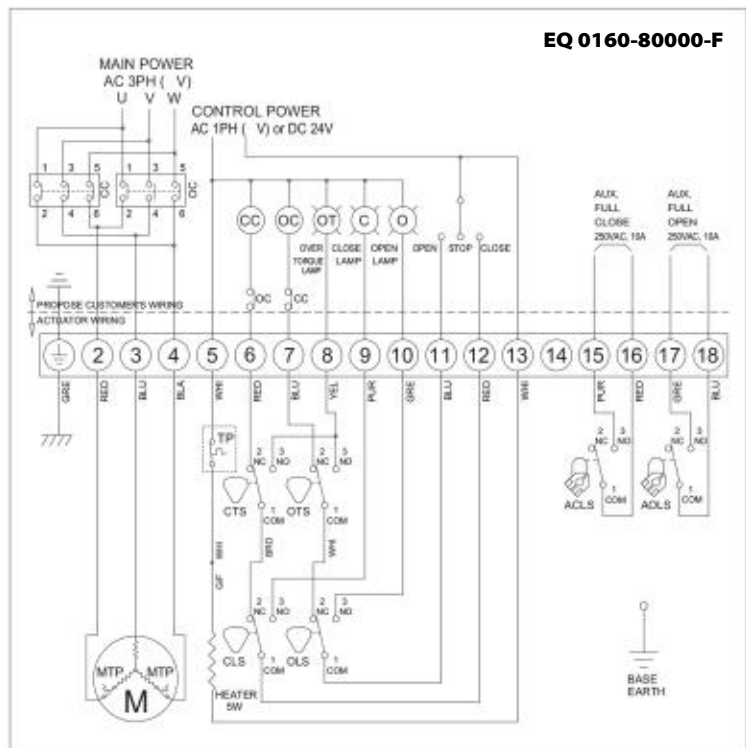
380/440VAC/50/60Hz, 3Ph(On-Off)

- 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: Close 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

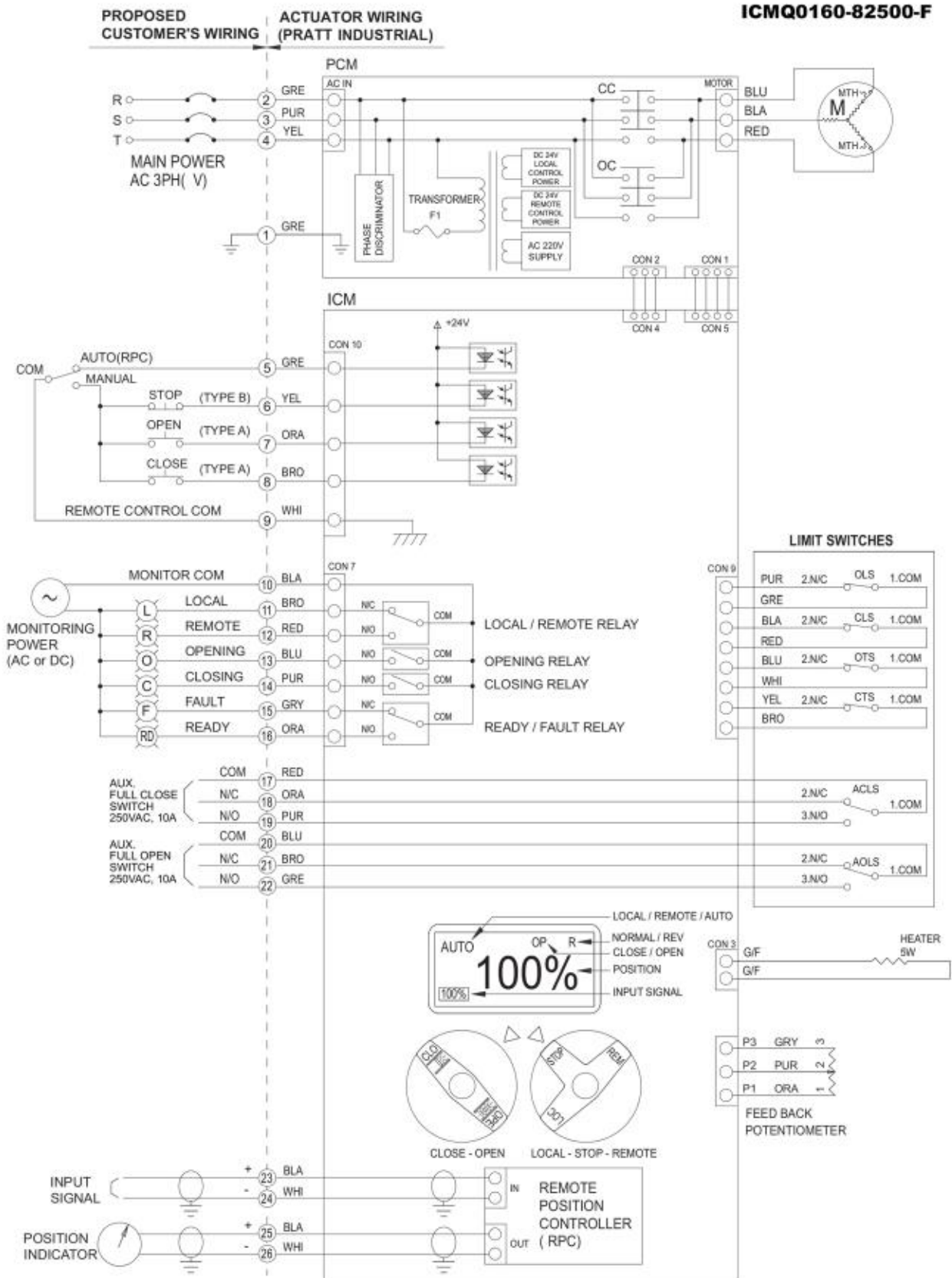
*Each actuator should be powered through its own individual switch or relay contacts to prevent cross feed between two or more actuators.

*In case of 3ph actuator, make sure to place actuator or the middle of travel angle before electrical operation to avoid damage.

*All internal wiring is done as color coding.



TYPICAL WIRING (ICM2 FOR 3 Phase)



ELECTRIC ACTUATOR EQ SERIES ORDERING INFORMATION

Electric Actuator

Series		Actuator Size		Power		Voltage		Phase		NEMA	
XX		XXX		XXX		XXX		X		XX	
EQ	Electric	0100	100	024	24	VAC	AC	BLANK=1		BLANK=N4	
		0160	160	120	120	VDC	DC	1	Single Phase	EX	Exp. Proof
		0240	240	220	220			3	Three Phase	WT	IP 68
		0350	350	380	380						
		0500	500	440	440						
		0800	800								
		1100	1100								
		2000	2000								
		3000	3000								
		6000	6000								
		9000	9000								

Electric Actuator Ordering Examples

Example Part #: EQ-0160-120VAC (Standard N4 unit)
 Example Part #: EQ-0160-120VAC-EX (Explosion Proof)
 Example Part #: EQ-0160-440VAC-3 (440 volt 3 phase unit)

- Standard Product
- Special Order Product
- Part Number Varies Based on Size

Electric Actuator Accessories

Series		Part		Actuator Size	
XX		XXX		XXX	
EQ	Elec. Acc	LP4	L.C.U.	0000	100~9000
		RPC	Servo	0100	100
		PK	Pot Kit	9000	160~9000
		CT	Trans		

Electric Actuator Accessories Ordering Examples

Example Part #: EQ-RPC-0100 (RPC unit for EQ-100 1PH 120VAC)
 Example Part #: EQ-RPC-9000 (RPC unit to fit EQ-160~9000 1PH 120VAC)
 Example Part #: EQ-LP4-0000 (LP4 unit to fit EQ-100~9000 1PH 120VAC)



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