

# Flow Line *CONTROLS*



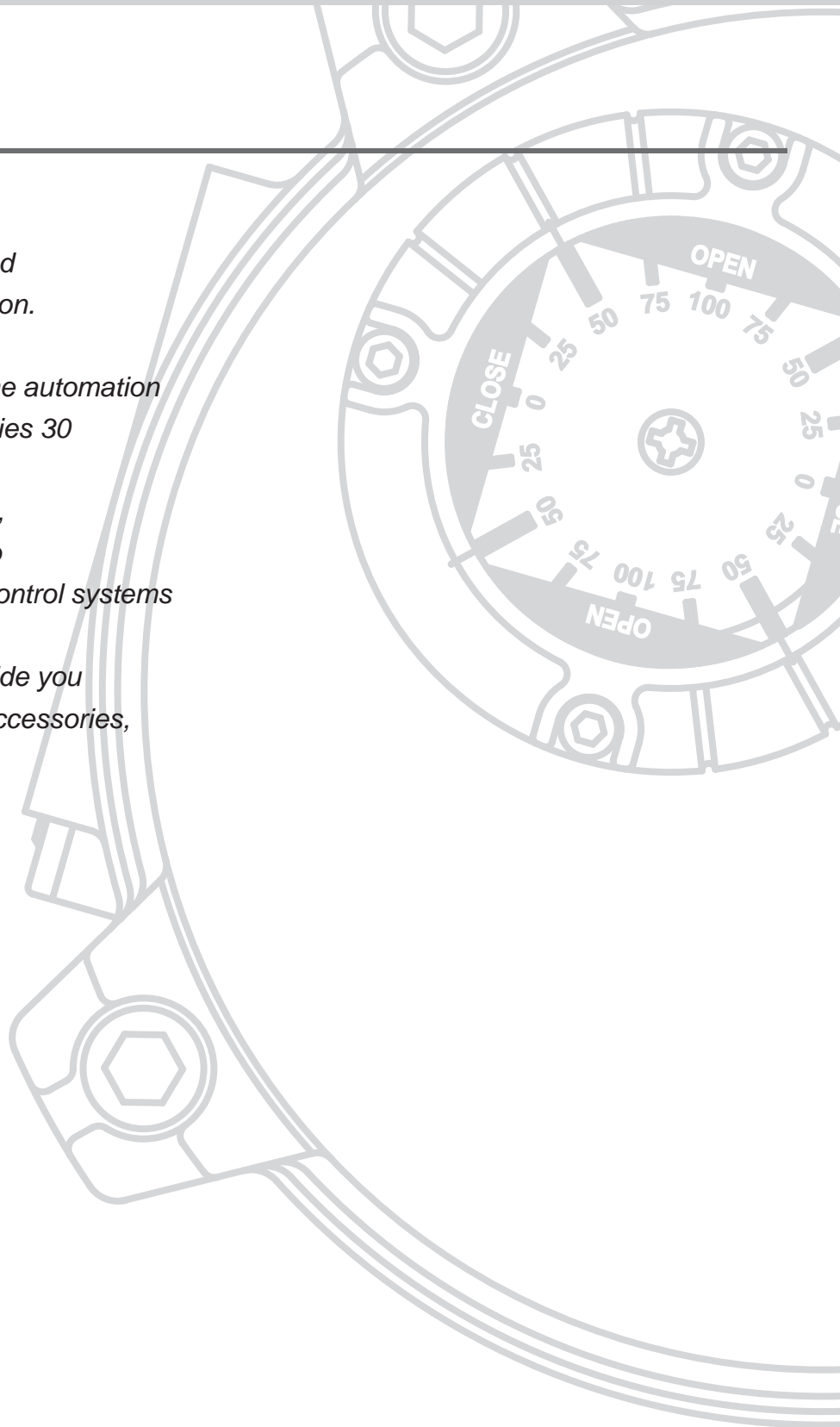
ELECTRIC ACTUATOR

# SERIES 30 ELECTRIC ACTUATOR

## INTRODUCTION

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- Flow Line designs, produces and provides high quality actuators and services related to valve automation.
- Our long years of experience in the automation field enables us to launch our Series 30 electric actuator which has compact size, robust construction, reliable performance and ability to integrate fully into sophisticated control systems .
- Flow Line is always ready to provide you with our Series 30 actuator and accessories, with quality service.





## FEATURES

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- Compact and robust construction, light weight providing high output torque (Max 78000 in-lb)
- Wide range of torque variation (From min 870 in-lb to max 78000 in-lb).
- 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.

# SERIES 30 ELECTRIC ACTUATOR

## CONSTRUCTION

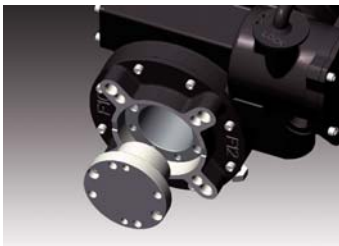


### Cable entries

- Standard 2-3/4" (Max 1") for various cable gland.

### External mechanical travel stop

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



### Removable drive bushing and ISO5211 mounting base

- (F07~F30) for easy mounting on valve.



### Captive cover bolt

- Designed to prevent loosening 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 provides 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(Nema4), and double o-ring for IP68(Nema6)

### 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

# SERIES 30 ELECTRIC ACTUATOR



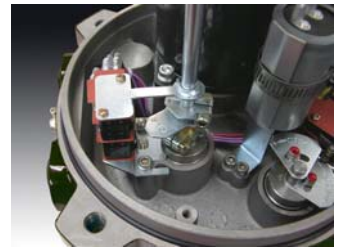
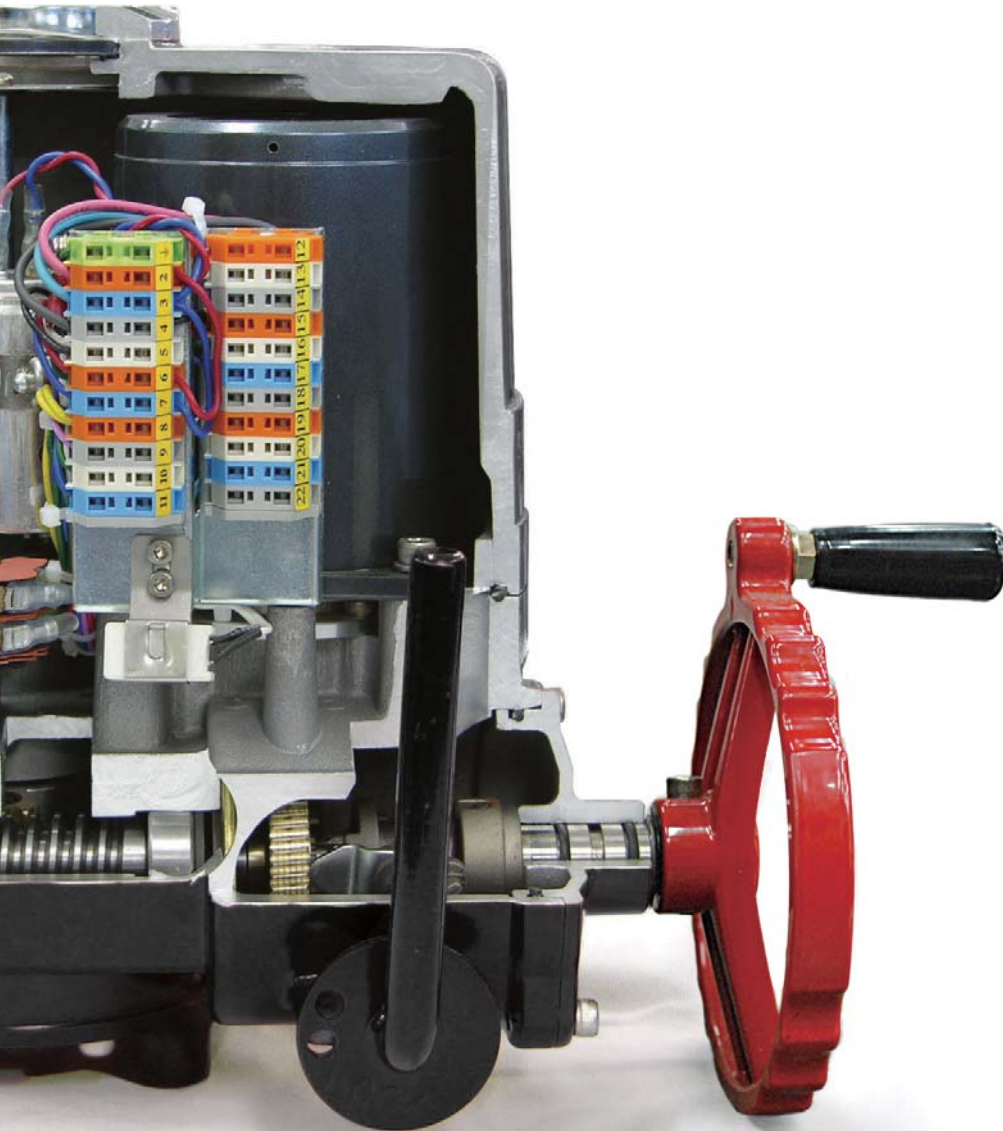
## Indicator

- Continuous mechanical position indicator window with dial



## Torque switches

- Protect actuator from damage caused by overload and over travel.
- 1 each for open / close
- Except for 0080



## 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 30-0080



## 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 disengages handwheel with motor starter



## Space Heater

- Anti-condensation
- Standard on all units

# SERIES 30 ELECTRIC ACTUATOR

## TECHNICAL INFORMATION

Model	0080	0100	0200	0300	0400	0700	0900	1700	2600	5300	7900
Rated torque (in-lb)	870	1390	2090	3045	4350	6960	9570	17000	26000	52000	78000
Duty cycle (%)	40	30	30	30	30	30	30	30	30	30	30
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 (inch)											
Key(φ)	0.87	0.98	0.98	1.57	1.57	1.87	1.87	2.95	2.95	4.72	4.72
Square(φ)	0.79	0.91	0.91	1.34	1.34	1.57	1.57	2.52	2.95	3.94	3.94
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
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	F10/F12	F10/F12	F12/F14	F12/F14	F12/14	F16	F16	F25/F30	F25/F30
Weight (lbs)	16	35	35	46	46	58	58	95	95	345	345
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 Caged 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)
Stall protection/ set temp.	Built in Thermal protection, Open 302°F±40°F, Close 206°F±40°F
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)
Travel stop	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 : -4°F~+158°F c/w control options : -14°F~+130°F
Ambient humidity	90%RH Max (Non-Condensing)
Anti vibration	XYZ 10g. 02~34Hz, 30 minutes
External coating	Dry powder (Polyester)

## OPTION AVAILABILITY

### Mechanical

Symbol	Description	Remark
EX	Explosion proof (Ex d II B T4 : Equivalent to class 1, group C&D, division 1)	Approved by ATEX, CSA, KTL
WT	Watertight (IP68), Temporary submersible	33 Feet Head 100 hours
ALS	Auxiliary limit switches (Max 2 for each travel end)	
ATS	Auxiliary torque switches (Max 2 for each travel end)	
EXT	Extended travel angle (up to 120°, 135°, 180°, 270°, )	
SV	Variation in torque and operating speed	Please consult before order

### 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 (Option : 0-10VDC, 2~10VDC, 1~5VDC, 0~5VDC) Auto-calibration Reverse operating direction		RPC

### Local control



LP4 / LM4

#### LP4 for 1 & 3 Phase (0080 ~ 7900)

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 (0080 ~ 7900)

Including the same functions as LP4  
Reversing electric contactors, Transformer

# SERIES 30 ELECTRIC ACTUATOR

## Local control

### ICM1 for 1 & 3 Phase (Integral Control Module) (0100 ~ 7900)



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



ICM1

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) (0100 ~ 7900)

Including the same functions as ICM1  
Reversing electric contactors, Transformer,  
Auto-Phase Discriminator, LCD Display  
\* Options Available : CT, RPC(Modulating),  
Explosion Proof



ICM2

### ICM3 for 1 & 3 phase (integral with LCD Display/IP68 Enclosure) (0100 ~ 7900)

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 (0100 ~ 0400)



Motor : 24 VDC  
Rechargeable Battery back up - Fail safe function  
When Main power is alive, actuator works as normal.  
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)

# SERIES 30 ELECTRIC ACTUATOR

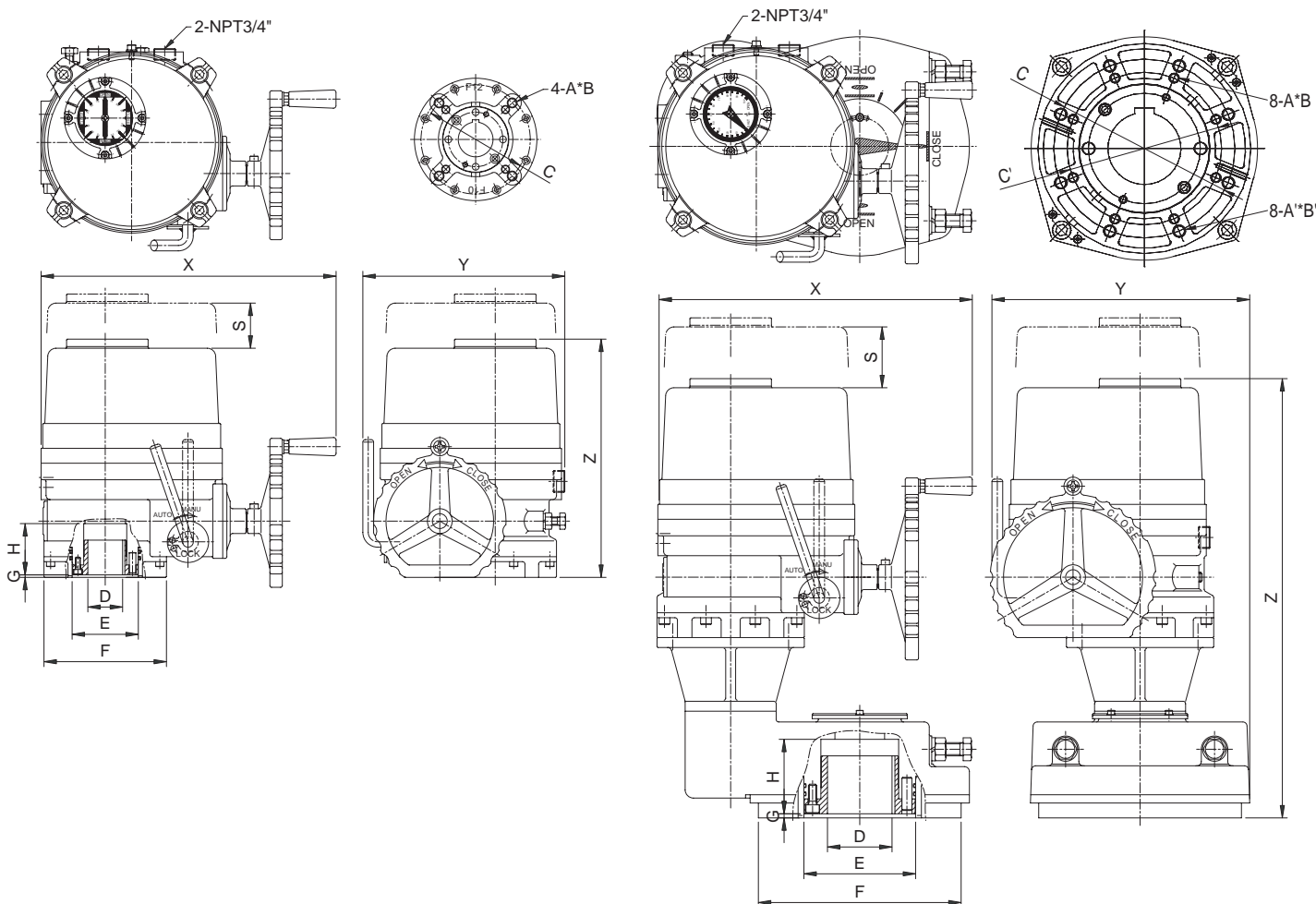
## BASIC ACTUATOR DIMENSION

With Gear Box

Type	0080	0100	0200	0300	0400	0700	0900	1700	2600	5300	7900
Flange	F07	F07	F07	F10	F10	F12	F12	F16	F16	F25	F25
ISO5211		F10	F10	F12	F12	F14	F14			F30	F30
C	∅ 2.76	∅ 2.76 ∅ 4.02	∅ 2.76 ∅ 4.02	∅ 4.02 ∅ 4.92	∅ 4.02 ∅ 4.92	∅ 4.92 ∅ 5.51	∅ 4.92 ∅ 5.51	∅ 6.50	∅ 6.50	∅ 10.00 ∅ 11.70	∅ 10.00 ∅ 11.70
A	M8	M8/M10	M8/M10	M10/M12	M10/M12	M12/M16	M12/M16	M20	M20	M16/M20	M16/M20
B	0.55	0.55/0.67	0.55/0.67	0.67/0.83	0.67/0.83	0.79/0.98	0.79/0.98	1.26	1.26	1.18/1.37	1.18/1.37
D(Key)	∅ 0.87	∅ 0.98	∅ 0.98	∅ 1.57	∅ 1.57	∅ 1.89	∅ 1.89	∅ 2.95	∅ 2.95	∅ 4.72	∅ 4.72
D(Squ.)	□ 0.79	□ 0.91	□ 0.91	□ 1.34	□ 1.34	□ 1.57	□ 1.57	□ 2.52	□ 2.52	□ 3.93	□ 3.93
E	∅ 1.97	∅ 2.30	∅ 2.30	∅ 3.15	∅ 3.15	∅ 3.74	∅ 3.74	∅ 5.31	∅ 5.31	∅ 8.50	∅ 8.50
F	∅ 3.46	∅ 4.92	∅ 4.92	∅ 5.83	∅ 5.83	∅ 7.01	∅ 7.01	∅ 8.89	∅ 8.89	∅ 13.78	∅ 13.78
G	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.2	0.2	0.2	0.2
H	1.46	2.24	2.24	2.44	2.44	2.64	2.64	3.54	3.54	4.49	4.49
S	3.94	4.53	4.53	5.71	5.71	6.69	6.69	8.86	8.86	8.86	8.86
X	10.16	13.31	13.31	14.06	14.06	14.86	14.86	17.32	17.32	20.31	20.31
Y	6.77	9.02	9.02	9.61	9.61	11.18	11.18	14.76	14.76	16.41	16.41
Z	8.66	10.20	10.20	11.34	11.34	12.32	12.32	15.16	15.16	26.30	26.30

(inch)

(inch)



# SERIES 30 ELECTRIC ACTUATOR

## CONTROL OPTION DIMENSION

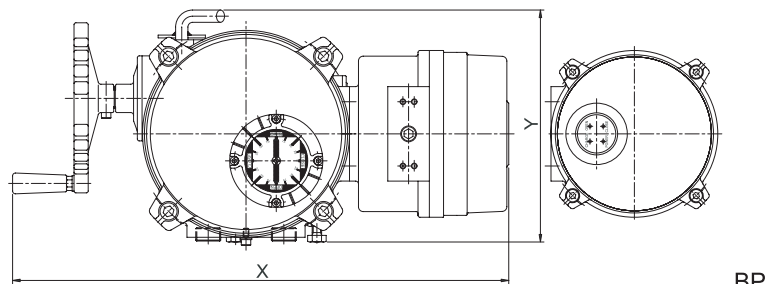
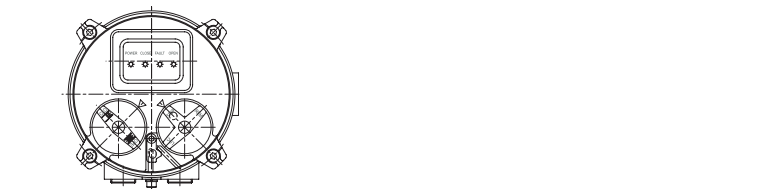
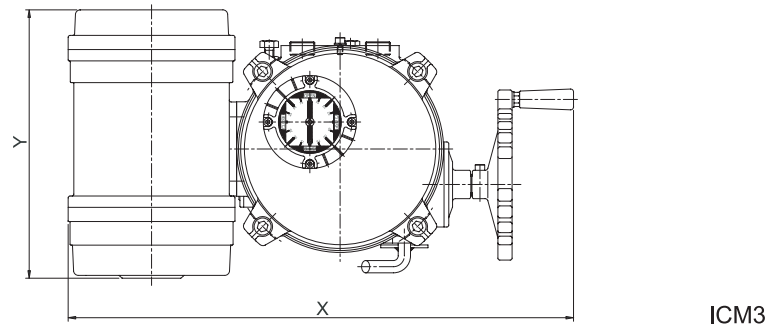
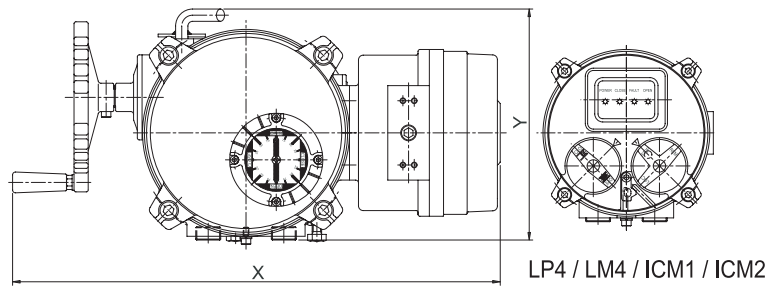
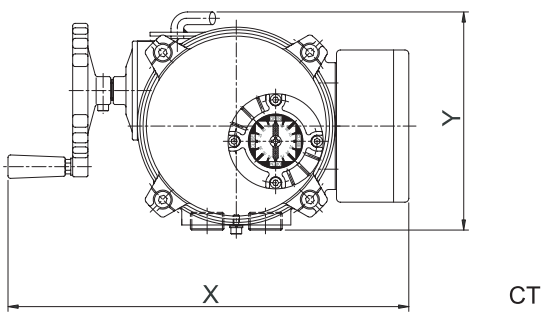
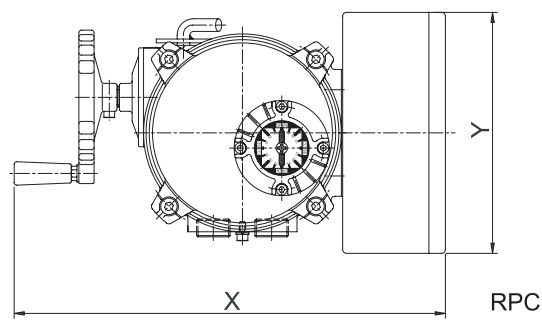
(inch)

Type	RPC			CT			BP			LP4/LM4/ICM1/ICM2			ICM3		
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
0080	13.39	7.48	8.66	12.44	6.77	8.66	16.85	6.77	8.66	X			X		
0100/ 0200	O			O			20.00	9.02	10.20	19.65	9.02	10.20	20.35	11.18	10.20
0300/ 0400	O			O			20.75	9.61	11.34	20.39	9.61	11.34	21.10	11.18	11.34
0700/ 0900	O			O			X			21.29	11.18	12.32	22.01	11.18	12.32
1700/ 2600	O			O			X			23.62	14.76	15.15	24.41	14.76	15.15
5300/ 7900	O			O			X			26.65	16.42	26.30	27.44	16.42	26.30

\* O : Installed inside of actuator

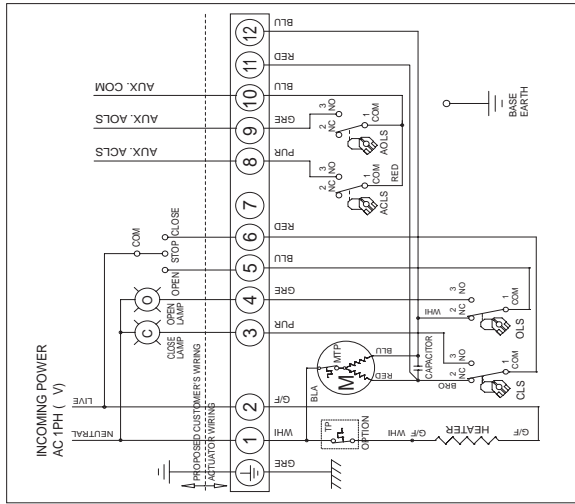
\* X : Not available

**0080** \_\_\_\_\_ **0100 ~ 7900**

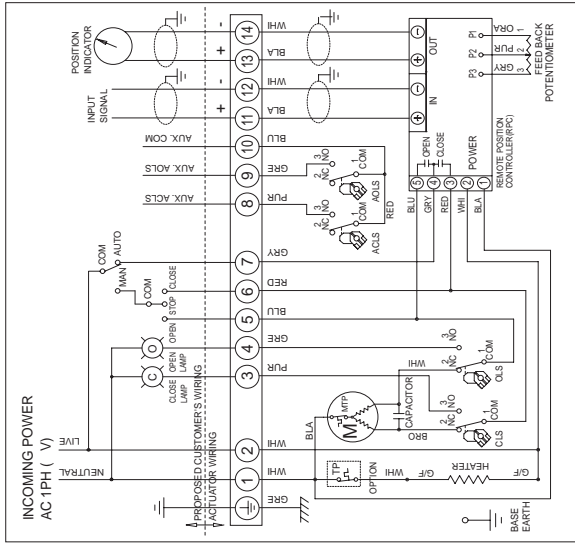


**TYPICAL WIRING (0080)**

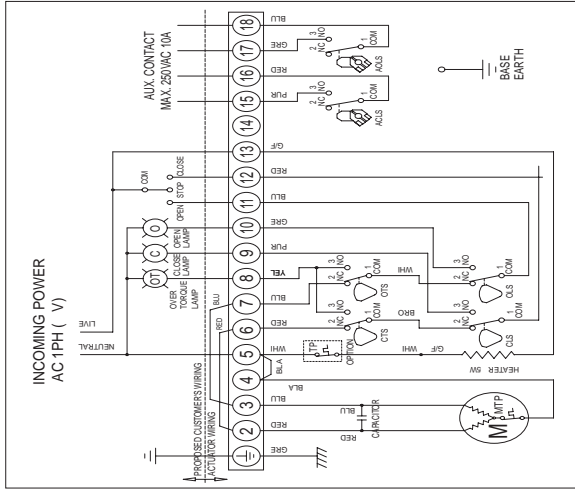
**110/220VAC/50/60Hz, 1Ph(On-Off)**



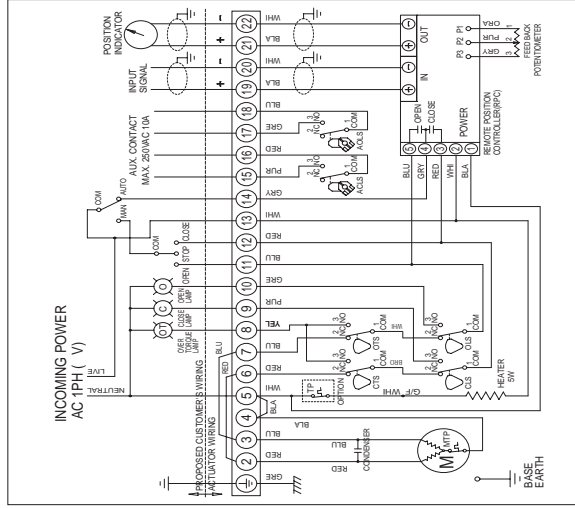
**110/220VAC/50/60Hz, 1Ph(Modulating : RPC)**



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

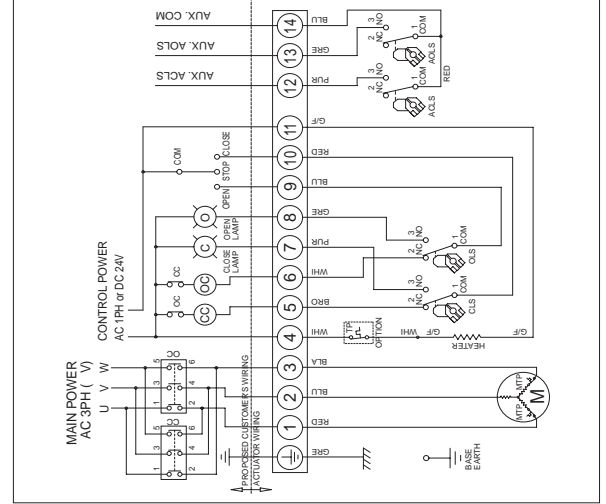


**110/220VAC/50/60Hz, 1Ph(Modulating : RPC)**

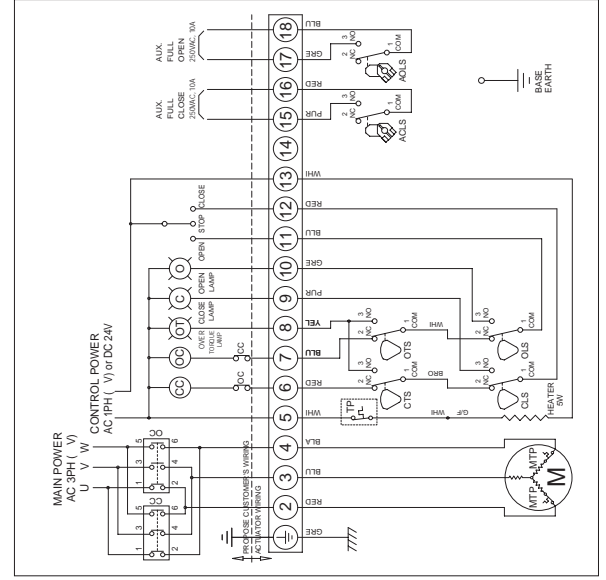


**TYPICAL WIRING (0100 ~ 7900)**

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



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



**TORQUE AND LIMIT SWITCHES OPERATION**

SWITCH	CLOSE	INTERMEDIATE	OPEN
CLS 1-2	[Diagram showing switch closed]		
CLS 1-3	[Diagram showing switch closed]		
OLS 1-2	[Diagram showing switch closed]		
OLS 1-3	[Diagram showing switch closed]		
ACLS1-2	[Diagram showing switch closed]		
ACLS1-3	[Diagram showing switch closed]		
AOLS1-2	[Diagram showing switch closed]		
AOLS1-3	[Diagram showing switch closed]		
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. 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.**

**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**

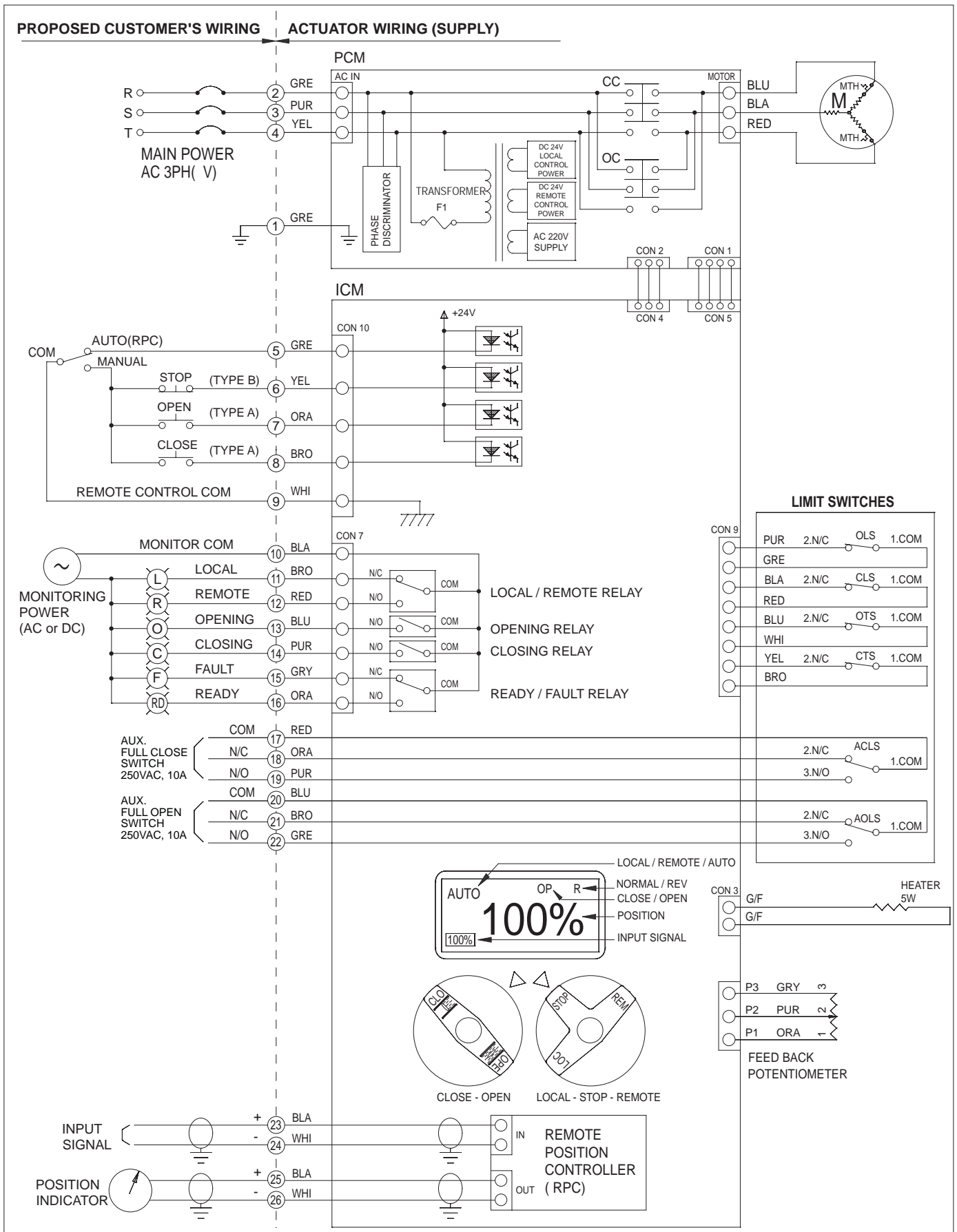
\* Each actuator should be powered through its own individual switch or relay contacts to prevent cross feed between two or more actuators.

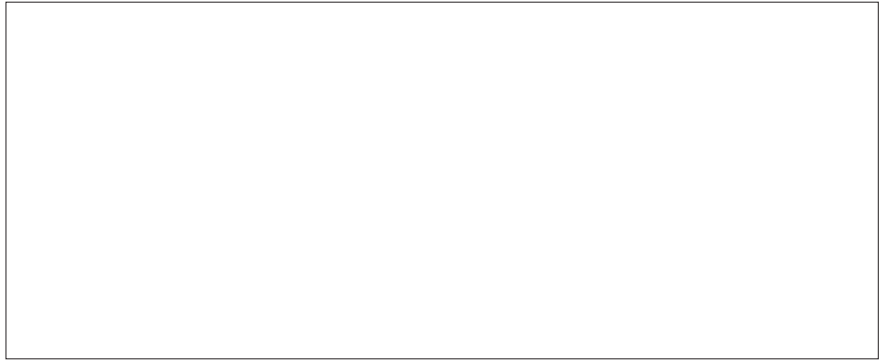
\* In case of 3ph actuator, make sure to place actuator on the middle of travel angle before electrical operation to avoid "Jamming"

\* All internal wiring is done as color coding.

# SERIES 30 ELECTRIC ACTUATOR

## TYPICAL WIRING (ICM2 for 3phase)





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