



## PRODUCT GUIDE

### - WC DCL EXPLOSION PROOF - ELECTRIC ACTUATOR SERIES



**QUALITY CONTROL ASSURANCE AND  
CONTROL TESTED**  
(1/2 million cycles)

**EXPECT QUALITY AND RELIABILITY**

**using our brand name WC DCL EXPLOSION PROOF Series ELECTRIC ACTUATOR**

Version 4.0

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**Weir USA Inc.**

**DOMESTIC PRODUCTS MADE IN NORTH AMERICA**  
**Details are the difference between ordinary and EXCELLENCE**



**QUALITY CONTROL ASSURANCE  
AND CONTROL TESTED**

Used for Potential Explosive Environment

Match with Angle Stroke Valve

Explosion Proof Grade ExdIIBT4Gb

Protection Class IP67

It is made of high strength glass lens fitting technology, the visual performance is more artistic and smooth.

Made of round seam allowance to match flameproof joint, the performance of Exd is better and more reliable.

Micro Regulation Device of Electric Limit Stroke makes the adjustment of electric limit more simple and precise.

Patent Number#ZL201020214725.8

Protection grade IP67 it solves recurring illness of conventional Exd products in low protection grade and poor performance.

Explosion protection grade ExdIIBT4Gb, meets Exd requirements at more than 90% explosive gas atmosphere.

High quality cast aluminum body.

The connection of the direct installation type ISO5211 mounting plate with valve is more standard and simple.



**WC DCL EXPLOSION PROOF SERIES ELECTRIC ACTUATOR**

# Classification by Potential Explosive Environment

Electric equipment used in explosive gas atmosphere is usually divided into two categories:

- I Electric equipment designed for colliery;
- II Electric equipment designed for other explosive gas atmospheres except for colliery.

For example equipment II, it can be divided into three magnitudes of explosion of IIA, IIB, IIC according to MESG(Exd), and minimum experimental ignition current (intrinsic safety type) of detonating gas, and the equipment IIB is suitable for service conditions of equipment IIA, the equipment IIC is suitable for service conditions of equipments IIA and IIB.

More than 90% explosive gas are included in magnitudes of explosion explosion of IIA, IIB and temperature groups of T1-T4.

		TEMPERATURE GROUP					
		T1(450°C)	T2(300°C)	T3(200°C)	T4(135°C)	T5(100°C)	T6(85°C)
Magnitude of Explosive	IIA	Acetone, ethane, ammonia, benzene, acetic acid, carbinol, propane, methylbenzene	Alcohol, butane, butanol, ethene, dichloro ethan	Benzene, diesel oil, aviation gasoline, ethane fuel	Aldehyde		
	IIB	Gas	Ethene ethylen oxygen		Ether		
	IIC	Hydrogen	Ethyne				Carbon, disulfide

PRODUCT TYPE LIST OF WC-DCL EXPLOSION PROOF SERIES ELECTRIC ACTUATOR						
Actuator Type	Standard Time/ Torque	Optional Time/ Torque	Total Weight (max.range)	Total Weight	Power Supply	Selected Control Circuit
DCL-Ex05	20S/50Nm	4S/20Nm 10S/30Nm 60S/50Nm	0-360° Adjustable	3.0Kg	DC24V AC24V AC110V AC220V AC380V	Types of A/B/C/D/E/F/G/H
DCL-Ex10	30S/100Nm	15S/50Nm 60S/100Nm	0-90° Adjustable	5.0Kg	DC24V AC24V AC110V AC220V AC380V	Types of A/B/C/D/E/F/G/H
DCL-Ex20	30S/200Nm	15S/100Nm 60S/200Nm	0-90° Adjustable	5.5Kg	DC24V AC110V AC220V AC380V	
DCL-Ex40	30S/400Nm	15S/200Nm 60S/400Nm	0-90° Adjustable	9.5Kg	DC24V AC110V AC220V AC380V	Types of A/B/C/D/E/F/G/H
DCL-Ex60	45S/600Nm		0-90° Adjustable	10Kg		

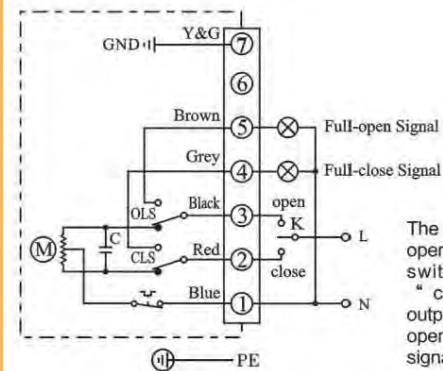


# Control Circuit

**Note:** The internal circuit of actuator is shown in the dotted frame.

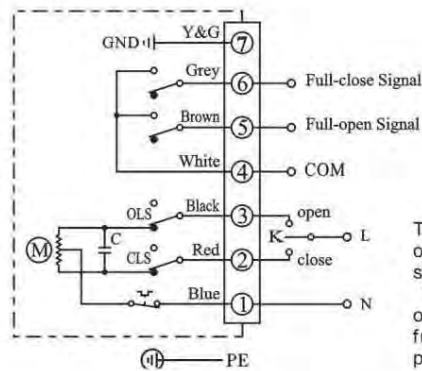
The circuit out of the dotted frame is customer reference.

**Type A: With Limit Position Switch (Active Contact)**



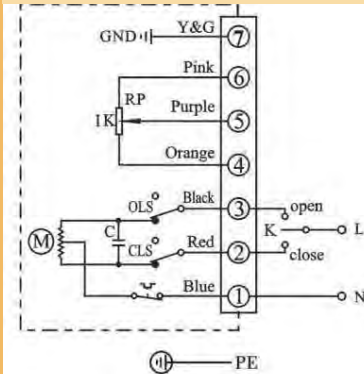
The opening or closing operation is realized by switching "open" or "close" the circuit, outputting a group of full open or full close active signals.

**Type B: Switch with Middle Position (Passive Contact)**



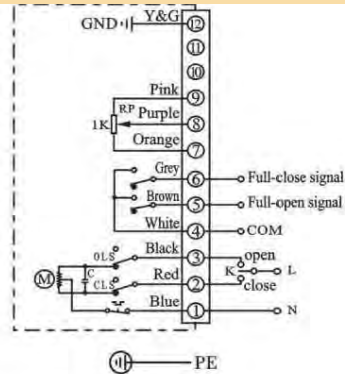
The opening or closing operation is realized by switching "open" or "close" the circuit, outputting a group of full open or close passive signals.

**Type C: with 1K  $\Omega$  (or 500  $\Omega$ ) Potentiometer**



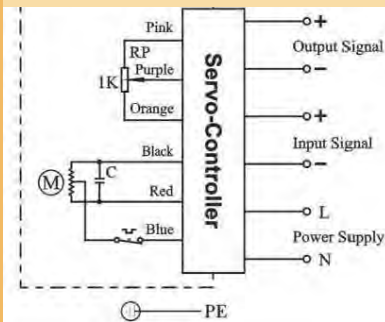
The opening or closing operation is realized by switching "open" or "close" circuit, outputting resistance signals corresponding to opening position.

**Type D: Position with Potentiometer and Passive Contact**



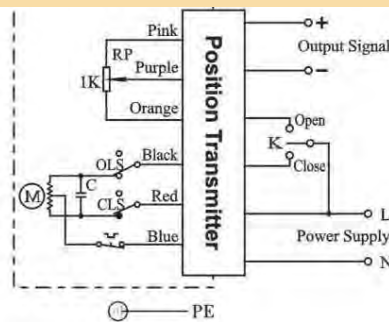
The opening or closing operation is realized by switching "open" or "close" circuit, outputting resistance signals corresponding to the opening position, and at the same time outputting a group of "Full-close" and "Full-open" passive signals.

**Type E: With Servo Controller (Adjusting Type)**



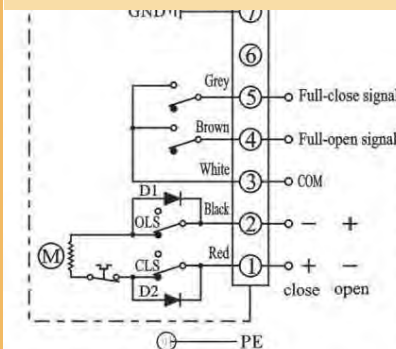
Input: 4~20mA DC or 1~5V DC;  
2~10V DC  
Output: 4~20mADC

**Type F: With Position Transmitter**



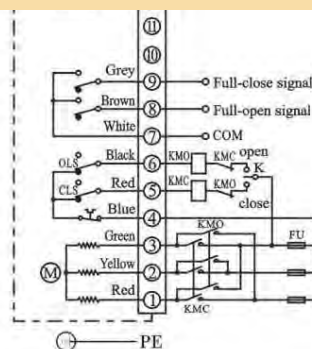
To output signal of 4~20mA DC for Valve (full-range feedback for valve)

**Type G: DC Control Circuit with Passive Contact Switch**



According to the single conductivity of diode, the opening and the closing operation can be realized by means of the exchange of the positive pole and the negative pole of DC Power Supply and output a group of full open and close passive signals.

**Type H: 3-Phase AC Control Circuit with Passive Contact**



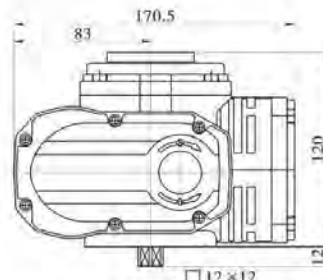
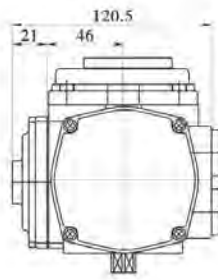
By means of the external phase-reversing circuit, the "open" or "close" operation can be realized for running normally or reversibly of motor and output a group of full open or close passive signal.



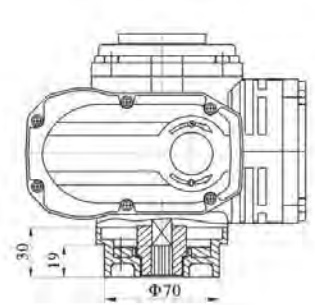
Explosion Proof Standard Type



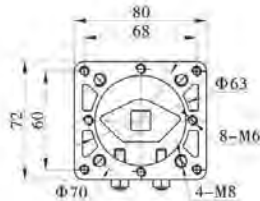
Explosion Proof Direct Installation Type



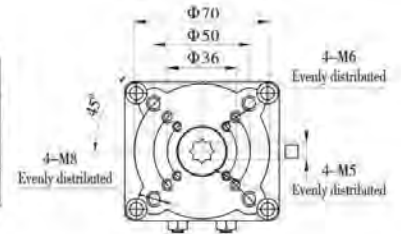
Explosion Proof Standard Type



Explosion Proof Direct Installation Type



Parameters for direct installation			
Square	□9 × 9	□11 × 11	□14 × 14
Flange	F03	F05	F07
Valve stem	Height ≤ 19mm		



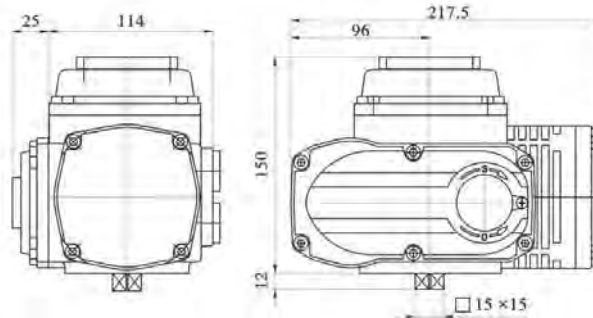
### OVERALL DIMENSIONS AND PERFORMANCE PARAMETERS OF WC DCL-EX05 EXPLOSION PROOF TYPE

WC-DCL-Ex05 EXPLOSION PROOF TYPE						
Performance Parameters	Type Power	DCL-Ex05				
		DC24V	AC24V	AC110V	AC380V	AC220V
Motor Power		13W	10W	10W	6W	10W
Rated Current		1.82A	1.50A	0.24A	0.07A	0.15A
Standard Time/Torque		20S/50Nm				
Optional Time/Torque		4S/20Nm 10S/30Nm				
Turning Angle		0-360° Adjustable				
Available Control Circuit		Types of A, B, C, D, E, F, G, H				
Total Weight		3.0kg				
Insulating Resistance		DC24/AC24AV: 100MΩ/250VDC / AC110V/AC220V/aC380V: 100MΩ/500VDC				
Withstand Voltage Class		DC24/AC24V / 500MVAC 1 min. / AC100V/AC220V: 1500VAC 1 min. / AC380V:1800VAC 1 min.				
Protection Class		IP67				
Explosive-Proof Grade		Exd II BT4Gb				
Installation Angle		360° at any angle				
Electric Interface		2-M20x1.5 Explosion Proof Plug, clients should install corresponding explosion proof cable connector when using according to the cable selected.				
Ambient Temperature		-4 to 140F				
Optional Function		◆				

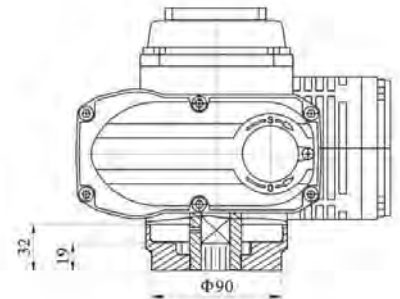




Explosion Proof Standard Type



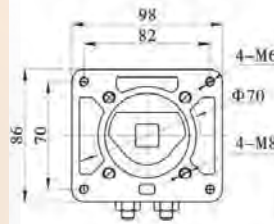
Explosion Proof Standard Type



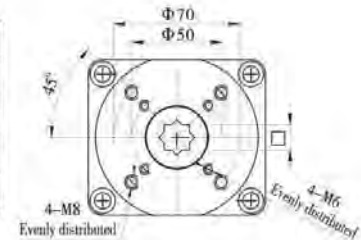
Explosion Proof Direct Installation Type



Explosion Proof Direct Installation Type



Parameters for direct installation		
	Ex10	Ex20
Square	□9×9 □14×14 □17×17	□14×14 □17×17
Flange	F05 F07	
Valve stem	Height ≤ 19mm	

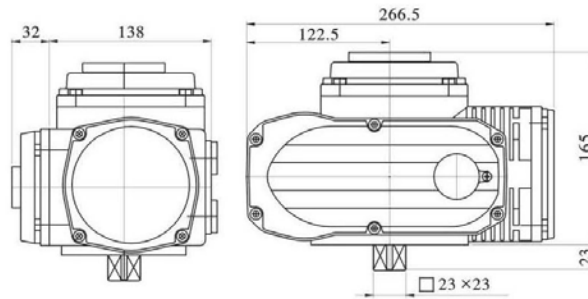


### OVERALL DIMENSIONS AND PERFORMANCE PARAMETERS OF WC DCL-EX 10/20 EXPLOSION PROOF TYPE

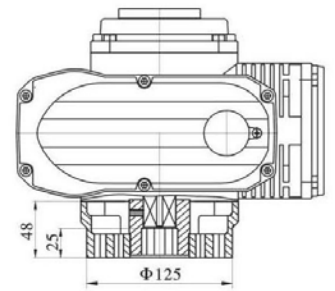
Performance Parameters	Type Power	WC-DCL-Ex10					WC-DCL-Ex20			
		DC24V	AC24V	AC110V	AC380V	AC220V	DC24V	AC110V	AC380V	AC220V
Motor Power		25W	25W	25W	15W	25W	25W	40W	30W	40W
Rated Current		2.20A	2.12A	0.57A	0.10A	0.30A	3.12A	0.63A	0.19A	0.35A
Standard Time/Torque		30S/100Nm					60S/200Nm	30S/200Nm		
Optional Time/Torque		15S/50Nm				15S/50Nm 60S/100Nm	30S/100Nm	15S/100Nm	15S/100Nm 60S/200Nm	
Turning Angle		0-90° Adjustable								
Available Control Circuit		Types of A, B, C, D, E, F, G, H								
Total Weight		5.0kg					5.5kg			
Insulating Resistance		DC24/AC24V: 100MΩ/250VDC AC100V/AC220V/AC380V: 100MΩ/500VDC								
Withstand Voltage Class		DC24/AC24V: 500VAC 1min. / AC110V/AC220V: 1500VAC 1 min. AC350V: 1800VAC 1 min.								
Protection Class		IP67								
Explosive-Proof Grade		Exd II BT4Gb								
Installation Angle		360° at any angle								
Electric Interface		2-M20x1.5 Explosion Proof Plug, clients should install corresponding explosion proof cable connector when using according to the cable selected.								
Ambient Temperature		-4 to 140F								
Optional Function		◆ Over Torque Protector					◆ Heater for Eliminating Moisture			



Explosion Proof Standard Type



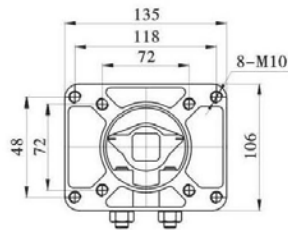
Explosion Proof Standard Type



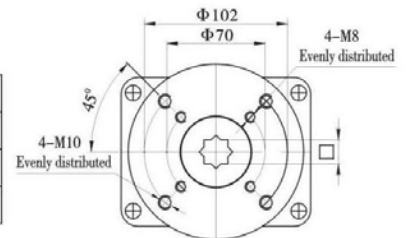
Explosion Proof Direct Installation Type



Explosion Proof Direct Installation Type



Parameters for direct installation		
Square	□17 × 17	□22 × 22
Flange	F07 F10	
Valve stem	Height ≤ 25mm	



### OVERALL DIMENSIONS AND PERFORMANCE PARAMETERS OF WC DCL-EX 40/60 EXPLOSION PROOF TYPE

Performance Parameters	Type Power	WC-DCL-Ex40				WC-DCL-Ex60			
		DC24V	AC110V	AC380V	AC220V	DC24V	AC110V	AC380V	AC220V
Motor Power		70W	90W	40W	90W	70W	90W	40W	90W
Rated Current		7.80A	1.12A	0.29A	0.64A	8.00A	1.18A	0.29A	0.67A
Standard Time/Torque		30S/400Nm				45S/600Nm			
Optional Time/Torque		15S/200Nm			15S/200Nm 60S/400Nm				
Turning Angle		0-90° Adjustable							
Available Control Circuit		Types of A, B, C, D, E, F, G, H							
Total Weight		9.5kg				10.0kg			
Insulating Resistance		DC24V: 100MΩ/250VDC AC100V/AC220V/AC380V: 100MΩ/500VDC							
Withstand Voltage Class		DC24V: 500VAC 1 Min. AC110V/AC200V: 1500VAC 1 Min. AC380V: 1800VAC 1 Min.							
Protection Class		IP67							
Explosive-Proof Grade		Exd II BT4Gb							
Installation Angle		360° at any angle							
Electric Interface		2-M20x1.5 Explosion Proof Plug, clients should install corresponding explosion proof cable connector when using according to the cable selected.							
Ambient Temperature		-4 to 140F							
Optional Function		◆ Over Torque Protector				◆ Heater for Eliminating Moisture			

## Performance Parameters of Explosion Proof Adjusting (Type E)

Performance Parameters	Type Power	Ex05E	Ex10E	Ex20E	Ex40E	Ex60E
		AC110V/AC220V				
Output Torque		50Nm	100Nm	200Nm	400Nm	600Nm
Acting Time		20S	30S	30S	30S	45S
Turning Angle		0~90°	0~90°	0~90°	0~90°	0~90°
Motor Power		10W	25W	40W	90W	90W
Rated Current		0.24/0.15A	0.57/0.30A	0.63/0.35A	1.12/0.64A	1.18/0.67A
Total Weight		3.0kg	5.0kg	5.5kg	9.5kg	10.0kg
Input Signal		4~20mADC, 1~5VDC, 2~10VDC				
Output Signal		4~20mADC				
Basic Error		not more than $\pm 1\%$				
Reciprocating Error		not more than 1%				
Dead Space		0.5% - 5.0% adjustable				
Damping Characteristics		0 times				
Repeating Error in Actuator		equal to or less than 1%				
Insulating Resistance		100M $\Omega$ / 500VDC				
Withstand Voltage Class		1500VAC 1 min.				
Protection Class		IP67				
Explosive-proof Grade		Exd II BT4Gb				
Installation Angle		360° at any angle				
Electric Interface		2-M20x1.5 explosion proof plug, clients should install corresponding explosion proof cable connector when using according to cable selected				
Ambient Temperature		-4 to 140F				
Optional Function		Over Torque Protector    Dehumidity Heater    Passive Contact Switch				
Remark		Any other input or output signal needed, please specify in purchase order.				



Explosion Proof Electric Control

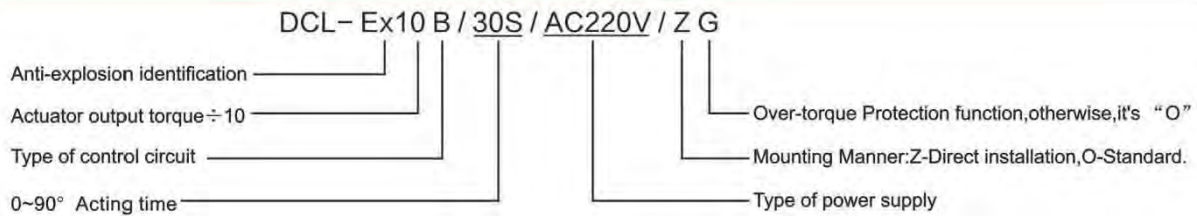


Explosion Proof Electrically Actuated  
Butterfly Valve



# Equipment & Function

## DESIGN OF MODEL

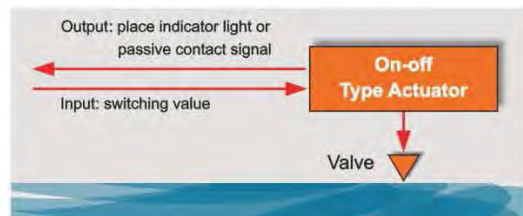


## ON-OFF TYPE ACTUATOR

### Control circuit of Type A, B, D, G, H

On-off type has only Full-open and Full-close limit positions. You can preset middle position (type B, D, G, H) if you need. Actuator will drive valve to Full-open or Full-close or middle position etc. when receiving proper command.

Adopt the S2 short-time duty, the time of continuous operate less than 15 minutes.

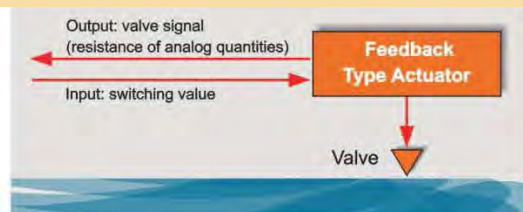


## FEEDBACK TYPE ACTUATOR

### Control circuit of Type C, D, F

During the actuator drives valve, It will full-range feedback valve signal to Central Control System at the same time, type C, D feedbacks valve signal of resistance quantity, type F feedbacks valve signal of analog quantity.

Adopt the S2 short-time duty, the time of continuous operate less than 15 minutes.

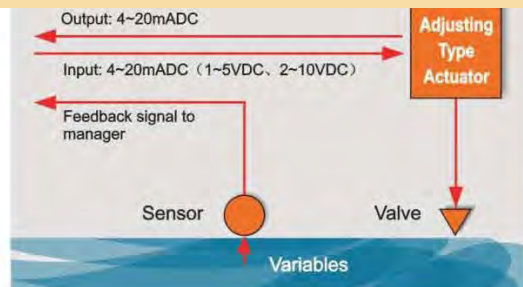


## ADJUSTING TYPE ACTUATOR

### Control Circuit of Type E

The Servo-Controller is located inside of the actuator. It receives command of the Central Control System and drives valve to proper opening Position according to varying conditions of Variables (Flow, Pressure, Temperature, Fluid level) in the pipe.

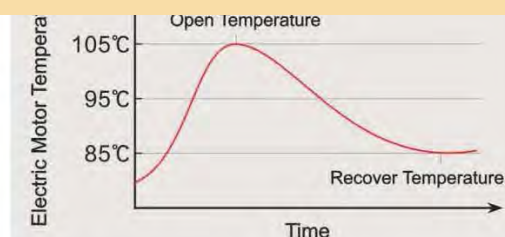
Adopt character of service of S4 Intermittent Type, working frequency reaches 1200 times /hour.



## ELECTRIC MOTOR

Due to the working characteristic of valve, the actuator is required to have full-load starting ability at the opening, closing and any other intermediate positions. At the same time, electric motor of actuator has less rotation inertia because of the need for adjustment of the flow (opening range).

Actuator stilled causes a rapid rise in temperature of the motor. For protecting electric motor and control system, PTC overheating protector located in electric motor winding will switch off the circuit when the temperature up to 105°C, the circuit will recover through when temp. drops to 80~90°C.



# Equipment & Function

## SERVO-CONTROLLER

The unique circuit design, imported technical grade electronic parts and components and modern making technology of circuit board of the DCL ensures high quality and reliability of the Servo-Controller. The circuit board with resin plastic package makes shock and humidity resistance better. The unique electronic brake function makes actuator dead-beat when position is fixed, the period of damping character is zero times (Standard: less than 3.5 times).



## MICRO REGULATION DEVICE OF ELECTRIC LIMIT STROKE

It is very easy to adjust open-direction and close-direction electric limit strokes of actuator with a hexagon spanner because of unique patent technology of DCL. Meanwhile, the unique micro regulation function makes adjustment of electric limit stroke more precise.

Patent NO. : ZL201020214725.8

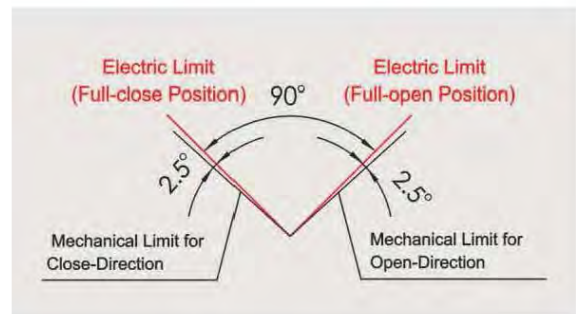


## ELECTRIC & MAINTENANCE LIMIT FUNCTION

The function of electric limit: The electric limit switch located inside the actuator will switch off the circuit to protect actuator when actuator reaches Full-open and Full-close limit positions or any given position between them.

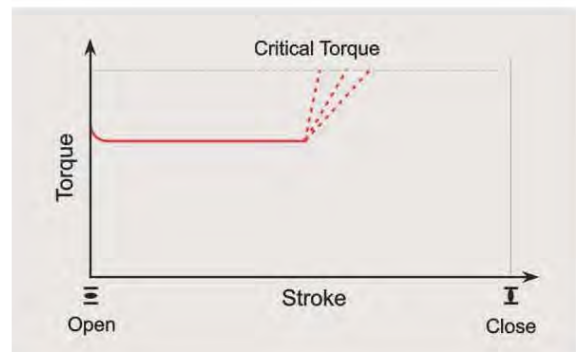
Mechanical limit function of output shaft: When the electric limit function is out of work, the output shaft of actuator will be lock-in by mechanical limit device to protect valve from damage.

Graphical representation is position relation of electric limit and mechanical limit.



## OVER-TORQUE PROTECTION FUNCTION (OPTIONAL)

When valve is stuck in the working because of impurity and foreign matters in the pipe or other causes, the output torque of the actuator will rise rapidly to a critical value (preset), the torque switch will switch off the circuit to protect valve and actuator from damage.



## HEATING & DEHUMIDIFICATION FUNCTION (OPTIONAL)

The electric Cavity of DCL Series actuator can be equipped with PTC electronic heating component to prevent electronic component from damage resulting from condensation. It's used at the area relatively moist and when difference in temperature of day and night is bigish. The heater will operate continuously and it always electriferous no matter when the actuator works or not.



# PRODUCT GUIDE

WEIR WC DCL EXPLOSION PROOF  
Series ELECTRIC ACTUATOR



**QUALITY CONTROL ASSURANCE AND  
CONTROL TESTED**  
(1/2 million cycles)

Technical Library



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