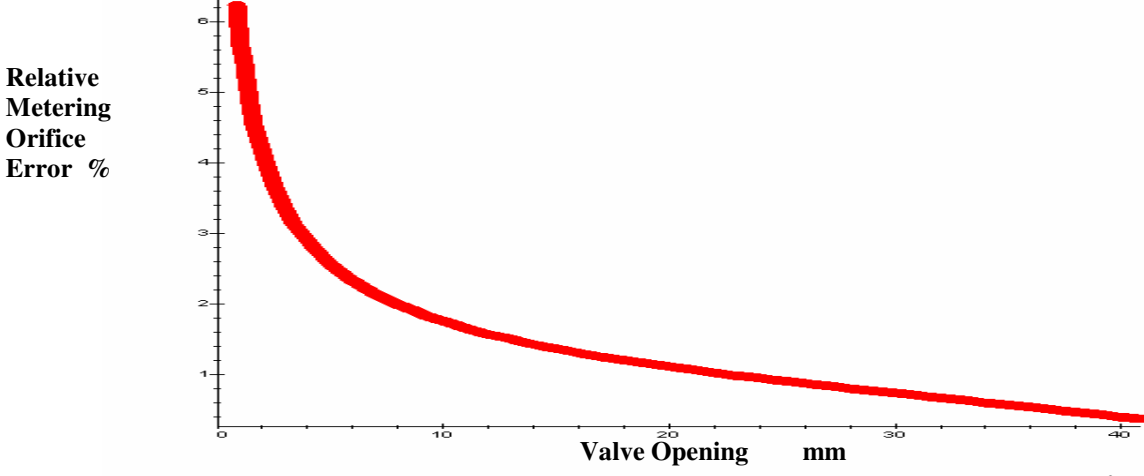
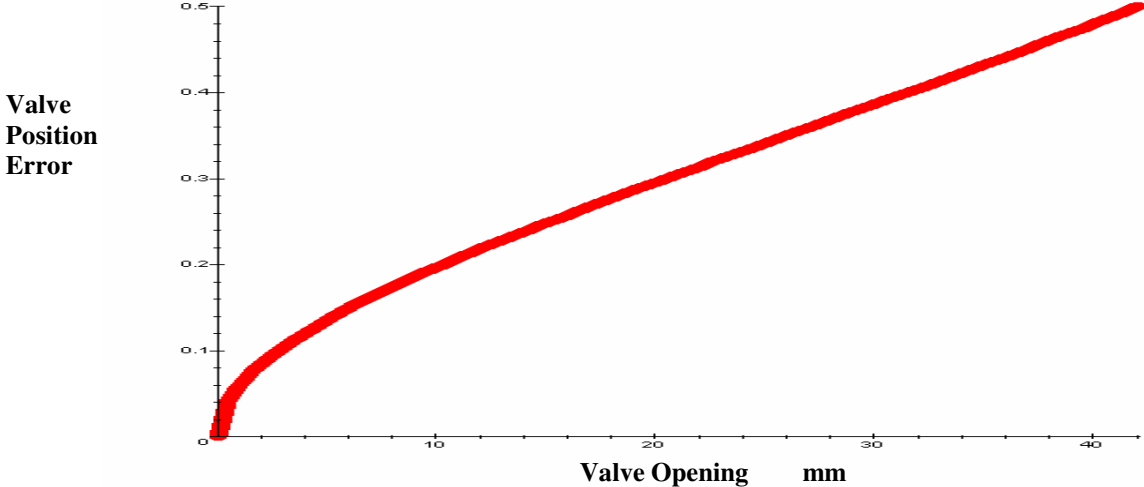
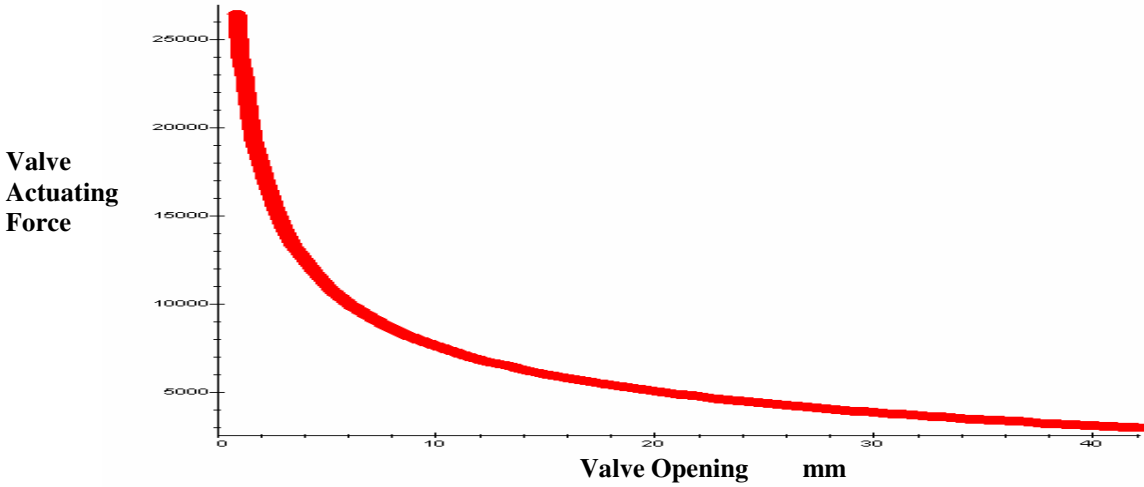


# INNOVATIVE AND HIGH PERFORMING EXPRO Linear and Rotary Actuators



**Expro Engineering**

**Phone:** (315) 453-0515      **Fax:** (315) 451-5193

# Expro Engineering

**Expro Engineering** provides innovative and high performing linear and rotary valve actuators to many industry.

**Expro** actuators, when used for valve regulation control, can provide more accurate controlling of valve metering orifice in all valve travel range. These actuators can reduce absolute control errors even at initial valve closing positions where control accuracy is very difficult to achieve, and at the same time, they generate more force to control the valve traveling at the same locations, thereby providing more rangeability and stability in regulating valves.

**Expro** actuators, when used for on-off valve applications, provide reliable valve closing and opening movements. Even in the case of a power failure, the actuators will maintain the necessary force to hold the valves in the on or off positions. These actuators could be used for operations in remote areas where a large continuous power supply is not available such as underwater and desert applications.

**Expro** actuators, when used for fail-safe operations, can provide high speed, reliable, fail-safe operations and perform soft closings or openings. These soft operations results in a longer valve service life.

**Expro** has the necessary experience to meet your needs and specifications. The unique applications of **Expro** linear and rotary actuators will assist the automating production processes of your facilities.

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## **EXPRO LINEAR AND ROTARY ACTUATORS**

### **Innovative Designs**

The actuators designed and manufactured by Expro Engineering have the following innovative features:

1. The actuators have specially designed mechanisms which can provide larger forces and torques at valve close positions to ensure tight sealing.
2. The actuators can reduce the impact of hydraulic shock through slowing opening and closing of the valves
3. Moreover, the actuators can provide a full range of accurate control of valve metering orifices. The relative position errors are consistent in all the valve travel range.

## Full Range Control Position Error Reduction

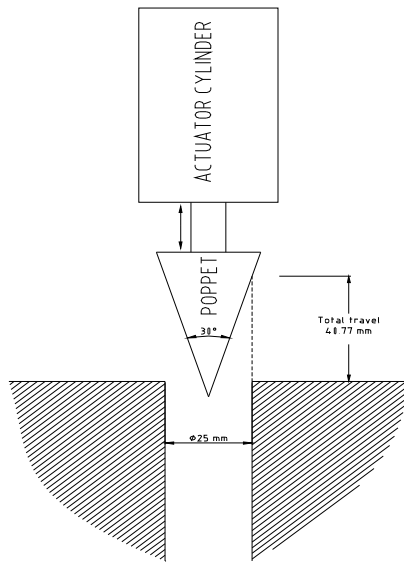
**Expro Engineering** valve actuators are able to provide accurate control of valve metering orifice in full valve travel range by reducing absolute position errors when the valve travel gradually reaches the valve close position.

Control valves actuated by most industrial standard actuators are subjected to large relative control position errors when a small metering orifice area is needed. The major reason is the actuators can only provide finite, near constant position errors.

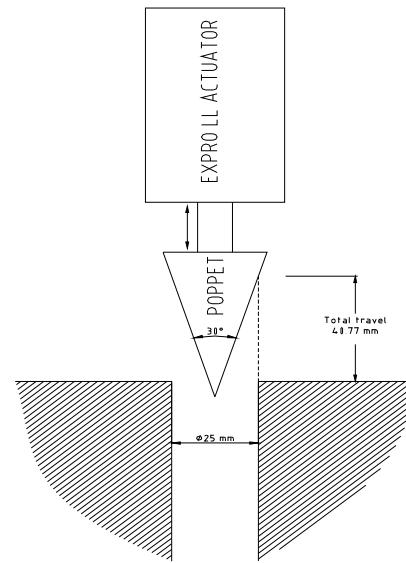
For example, a poppet valve with a conical 30° angle poppet and a sharp edge seat is actuated by a standard hydraulic cylinder actuator with 0.5 mm position error, the valve inside diameter is 25 mm, the valve travel is 40.77 mm. When the valve is full open, the relative position error is  $0.5 \text{ mm}/40.77 \text{ mm} \times 100\% = 1.2\%$ ; the metering orifice is  $490.9 \text{ mm}^2$  and the relative metering orifice error is 0.38%. When the valve travel is 2.48 mm from full close position, the relative position error is  $0.5 \text{ mm}/2.48 \text{ mm} \times 100\% = 20.2\%$ ; the metering orifice is  $49.2 \text{ mm}^2$  and the relative metering orifice error is 19.6%. When the valve travel is 1.00 mm from full close position, the relative position error is  $0.5 \text{ mm}/1.00 \text{ mm} \times 100\% = 50\%$ ; the metering orifice is  $20.1 \text{ mm}^2$  and the relative metering orifice error is 49.5%. See the red curves in figures 3 and 4.

If the same poppet valve is actuated by a standard **Expro LL** actuator with an input hydraulic cylinder of 0.5 mm position error, when the valve is full open, the relative position error is  $0.487 \text{ mm}/40.77 \text{ mm} \times 100\% = 1.2\%$ ; the metering orifice is  $490.9 \text{ mm}^2$  and the relative metering orifice error is 0.37%. When the valve travel is 2.48 mm from full close position, the relative position error is  $0.094 \text{ mm}/2.48 \text{ mm} \times 100\% = 3.8\%$ ; the metering orifice is  $49.2 \text{ mm}^2$  and the relative metering orifice error is 3.7%. When the valve travel is 1.00 mm from full close position, the relative position error is  $0.059 \text{ mm}/1.00 \text{ mm} \times 100\% = 5.9\%$ ; the metering orifice is  $20.1 \text{ mm}^2$  and the relative metering orifice error is 5.9%. See the blue curves in figure 3 and 4.

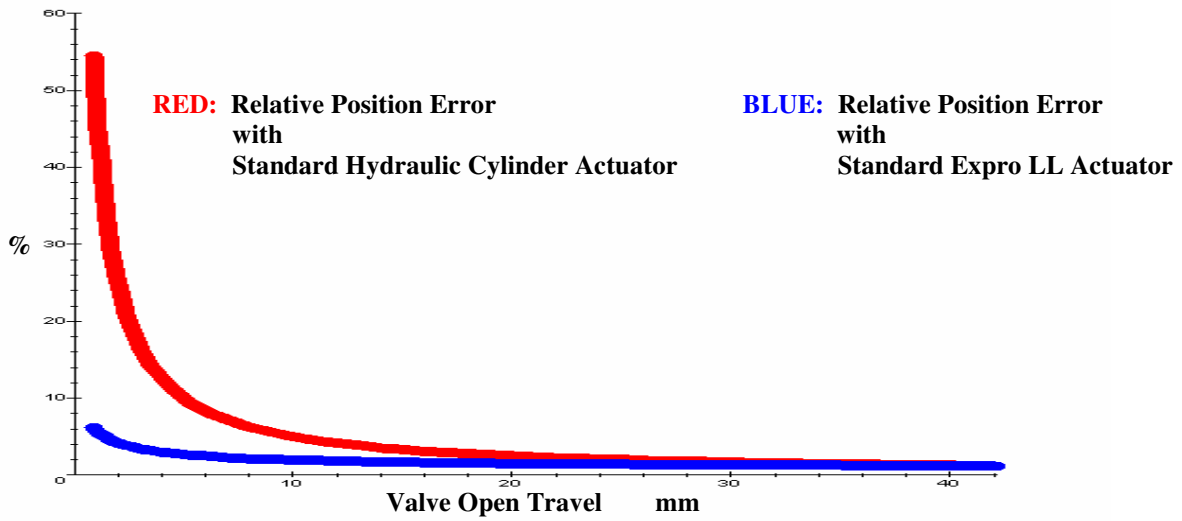
The advantage of using **Expro Engineering** valve actuators to regulate flow is obvious. They increase accuracy and rangeability.



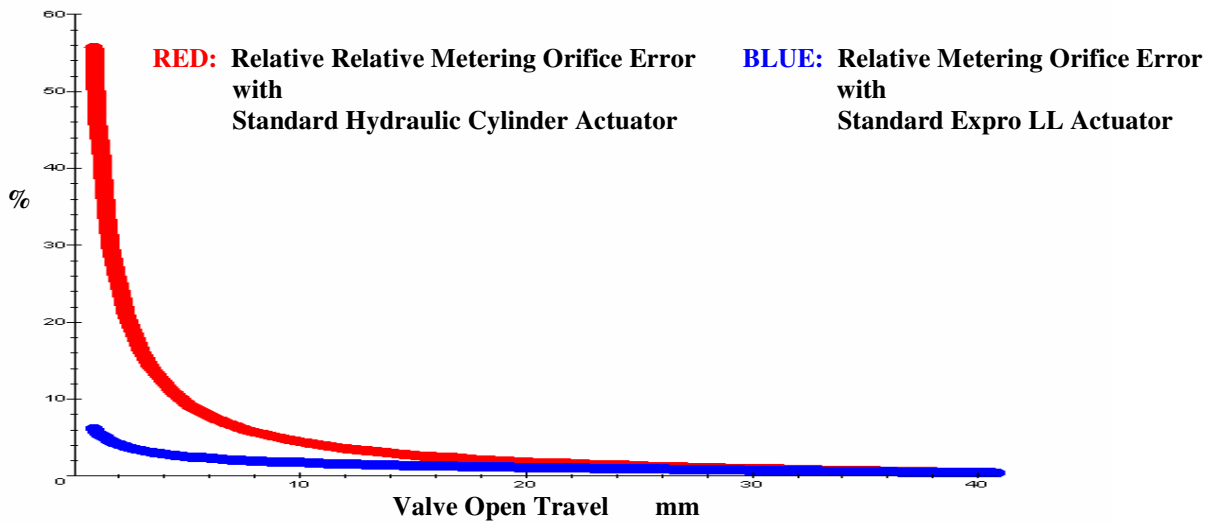
**Fig. 1**



**Fig. 2**



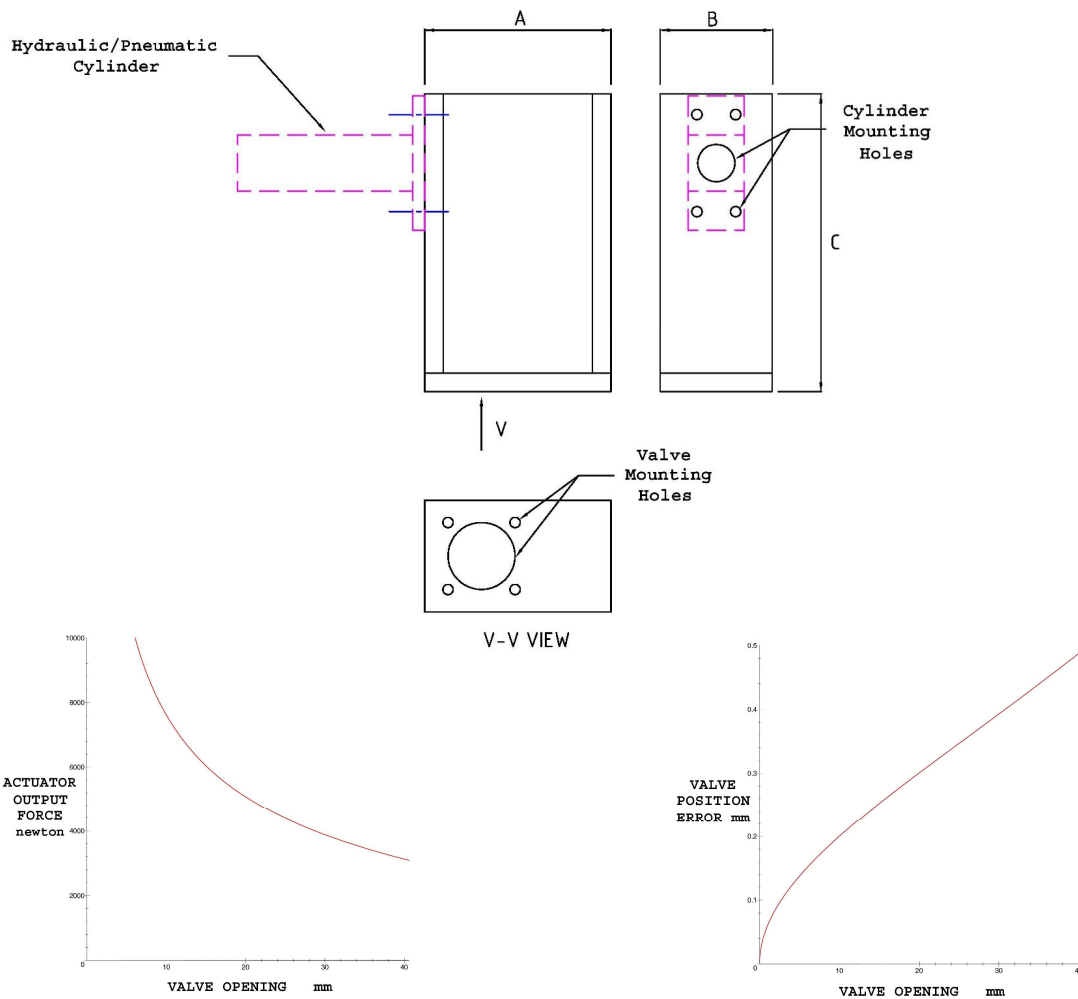
**Fig. 3**



**Fig. 4**

## Expro Type LL Linear to Linear Actuators Actuator Parameters

Model	Output Force Newton(Lbs)	A Length mm(inch)	B Width mm(inch)	C Height mm(inch)	Cylinder Bore mm(inch)	Cylinder Stroke mm(inch)	Hydraulic Pressure Mpa(PSI)	Output Stroke mm(inch)
LL3000	3000 (700)	250 (10")	120 (4")	400 (16")	25 (1.0")	100 (4")	10 (1500)	38 (1.5")
LL15000	15000 (3500)	250 (10")	150 (6")	400 (16")	50 (2.0")	100 (4")	10 (1500)	38 (1.5")
LL35000	35000 (8000)	250 (10")	175 (7")	450 (18")	75 (3.0")	100 (4")	10 (1500)	38 (1.5")
LL100000	100000 (22500)	250 (10")	200 (8")	450 (18") <td 125 (5.0")	100 (4")	10 (1500)	38 (1.5")	

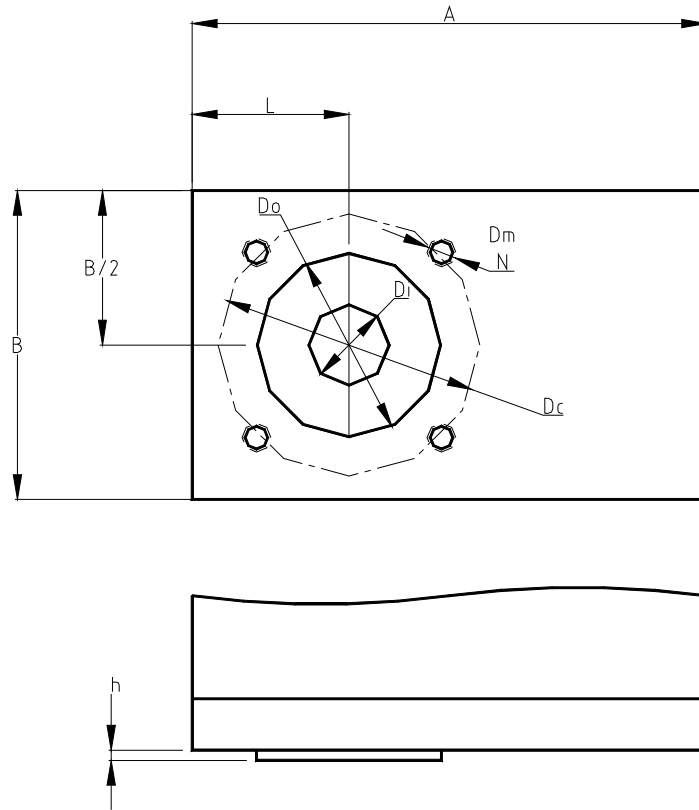


### Notes:

1. The actuator nominal speed is 38 mm/s. Output force is minimum force.
2. The valve position errors are calculated under assumed cylinder 0.5 mm position error.
3. Different output strokes, speed and cylinder strokes are available.
4. Configurations can be modified to meet customers' specifications.
5. Contact **Expro Engineering** to discuss your specifications. **Expro** will make it work for you.

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## Mounting Dimensions for LL Actuators

### Dimension Data

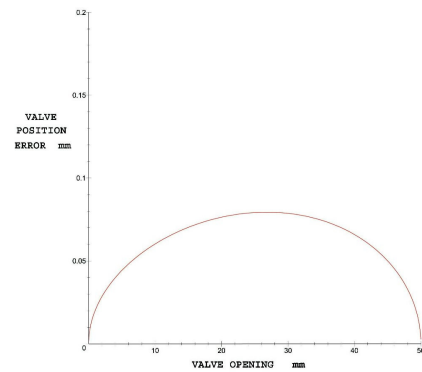
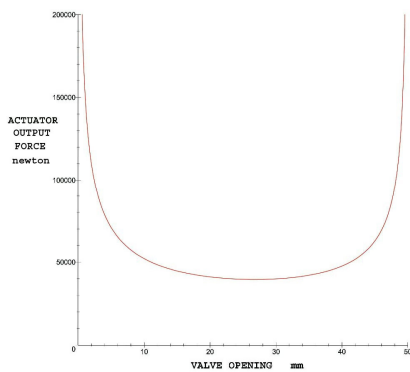
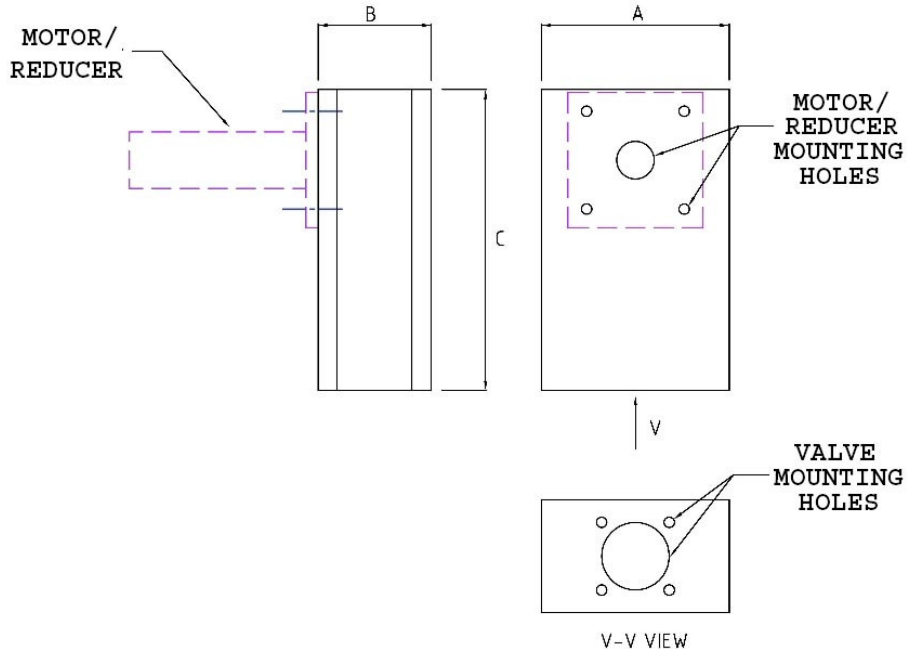
Model Type	A	B	L	Do f8	h max	Dc	Dm	No. of bolts N
LL3000	250	120	65	30	3	42	M5	4
LL15000	250	150	80	55	3	70	M8	4
LL35000	250	175	95	85	3	125	M12	4
LL100000	250	200	110	130	5	165	M20	4

#### Notes:

1. The standard dimensions meet ISO 5211:2001(E)
2. Configurations can be modified to meet customers' specifications.

## Expro Type RL Rotary to Linear Actuators Actuator Parameters

Model	Output Force Newton(Lbs)	A Length mm(inch)	B Width mm(inch)	C Height mm(inch)	Motor Power KW(HP)	Reducer Ratio	Motor Speed RPM	Output Stroke mm(inch)
RL3000	3000 (700)	250 (10")	120 (4")	400 (16")	0.2 (0.24)	100 : 1	3000	50 (2.0")
RL15000	15000 (3500)	250 (10")	150 (6")	400 (16")	0.9 (1.2)	100 : 1	3000	50 (2.0")
RL35000	35000 (8000)	250 (10")	175 (7")	450 (18")	2.1 (2.8)	100 : 1	3000	50 (2.0")
RL100000	100000 (22500)	250 (10")	200 (8")	450 (18")	6.0 (8.0)	100 : 1	3000	50 (2.0")



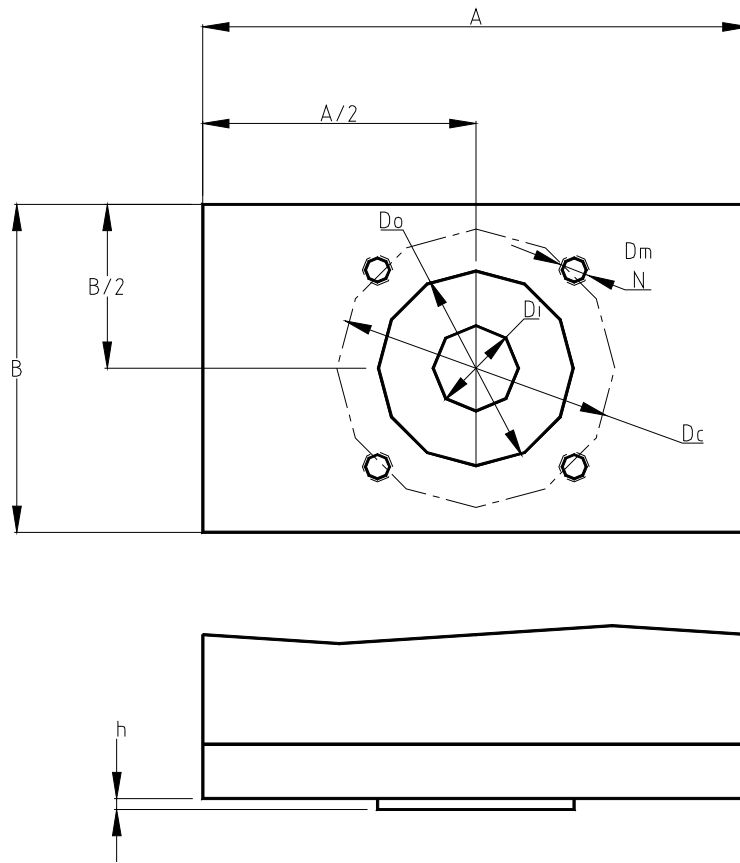
### Notes:

1. The actuator nominal speed is 50 mm/s. Output force is minimum force.
2. The valve position errors are calculated under assumed reducer 0.5 degree position error.
3. Different output strokes, speed and cylinder strokes are available.
4. Configurations can be modified to meet customers' specifications.
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## Mounting Dimensions for RL Actuators

### Dimension Data

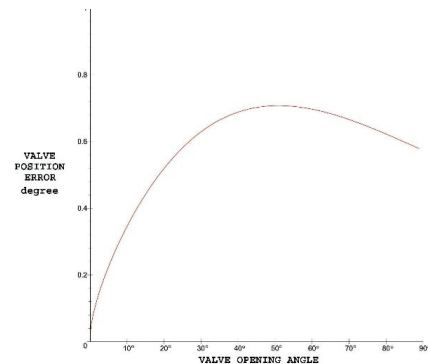
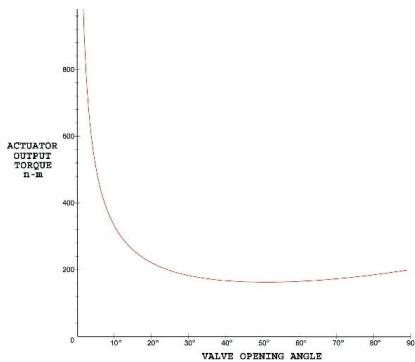
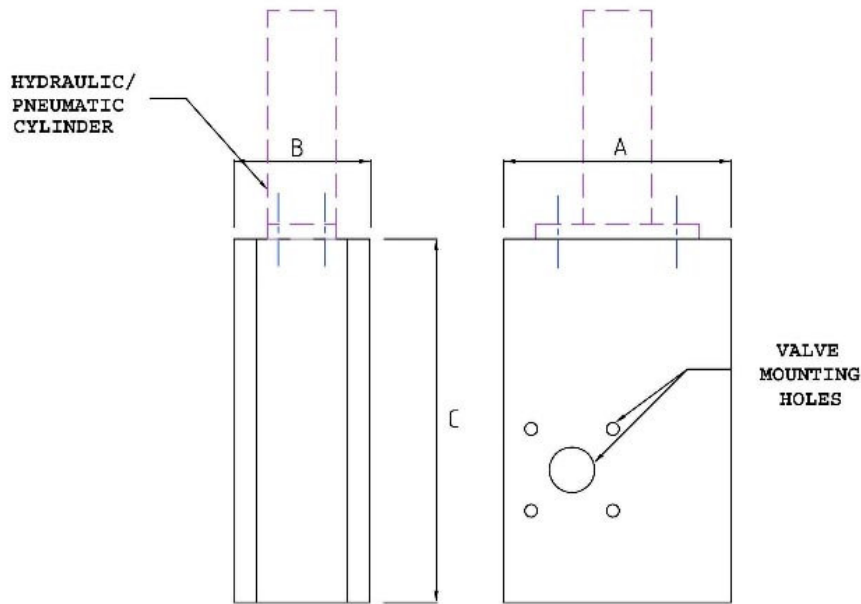
Model Type	A	B	Do f8	h max	Dc	Dm	No. of bolts N
<b>RL3000</b>	<b>250</b>	<b>120</b>	<b>30</b>	<b>3</b>	<b>42</b>	<b>M5</b>	<b>4</b>
<b>RL15000</b>	<b>250</b>	<b>150</b>	<b>55</b>	<b>3</b>	<b>70</b>	<b>M8</b>	<b>4</b>
<b>RL35000</b>	<b>250</b>	<b>175</b>	<b>85</b>	<b>3</b>	<b>125</b>	<b>M12</b>	<b>4</b>
<b>RL100000</b>	<b>250</b>	<b>200</b>	<b>130</b>	<b>5</b>	<b>165</b>	<b>M20</b>	<b>4</b>

#### Notes:

1. The standard dimensions meet ISO 5211:2001(E)
2. Configurations can be modified to meet customers' specifications.

## Expro Type LR Linear to Rotary Actuators Actuator Parameters

Model	Output Torque n-m(lbs-in)	A Length mm(inch)	B Width mm(inch)	C Height mm(inch)	Cylinder Bore mm(inch)	Cylinder Stroke mm(inch)	Hydraulic Pressure Mpa(PSI)	Output Stroke
LR120	120 (1050)	250 (10")	120 (4")	400 (16")	25 (1.0")	100 (4")	10 (1500)	90°
LR620	620 (5400)	250 (10")	150 (6")	400 (16")	50 (2.0")	100 (4")	10 (1500)	90°
LR1400	1400 (12400)	250 (10")	200 (8")	500 (20")	75 (3.0")	100 (4")	10 (1500)	90°
LR4000	4000 (35400)	300 (12")	250 (10")	500 (20")	125 (5.0")	100 (4")	10 (1500)	90°



### Notes:

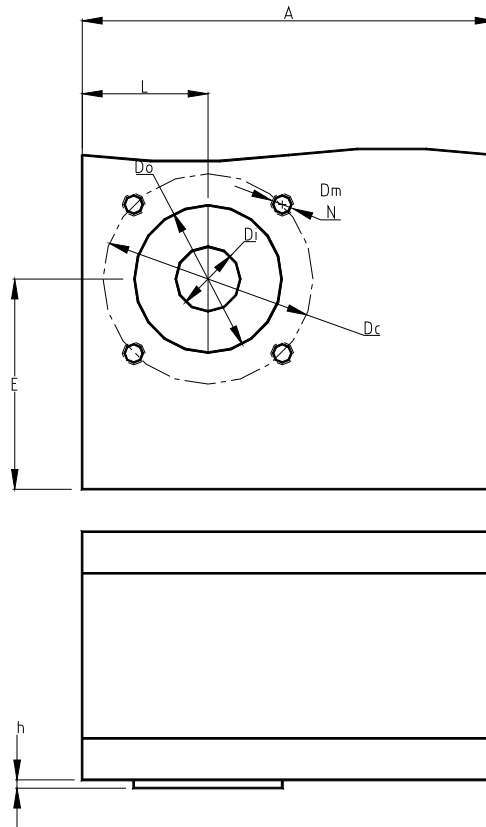
1. The actuator nominal speed is 90°/s. Output torque is minimum torque.
2. The valve position errors are calculated under assumed cylinder 0.5 mm position error.
3. Different output strokes, speed and cylinder strokes are available.
4. Configurations can be modified to meet customers' specifications.
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## Mounting Dimensions for LR Actuators

### Dimension Data

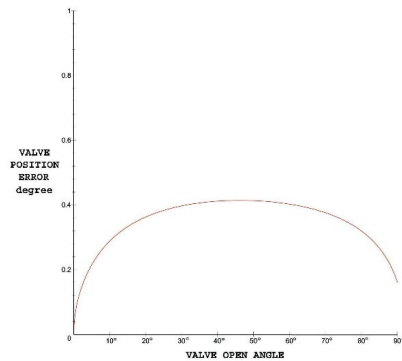
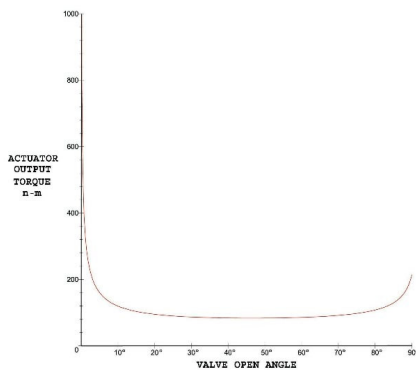
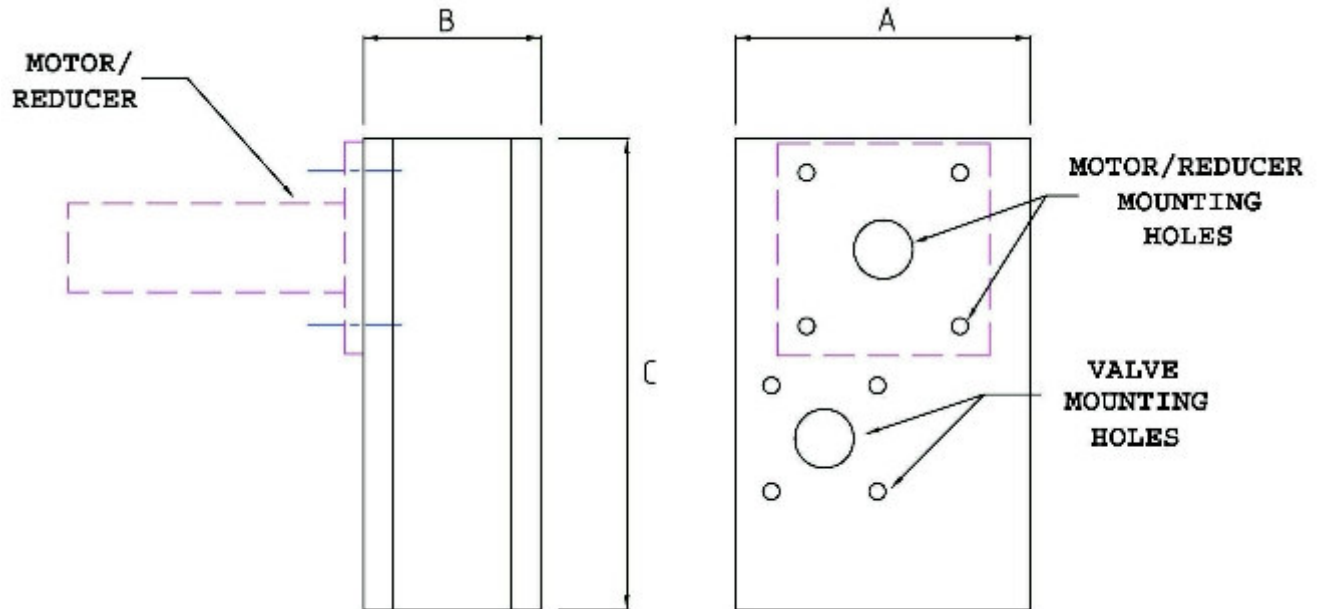
Model Type	A	E	L	Do f8	h max	Dc	Dm	No. of bolts N
LR120	250	150	65	55	3	70	M8	4
LR620	250	175	90	100	4	140	M16	4
LR1400	250	200	110	130	5	165	M20	4
LR4000	300	250	150	200	5	254	M16	8

#### Notes:

2. The standard dimensions meet ISO 5211:2001(E)
2. Configurations can be modified to meet customers' specifications.

## Expro Type RR Rotary to Rotary Actuators Actuator Parameters

Model	Output Torque n-m(lbs-in)	A Length mm(inch)	B Width mm(inch)	C Height mm(inch)	Motor Power KW(HP)	Reducer Ratio	Motor Speed RPM	Output Stroke
RR80	80 (700)	250 (10")	120 (4")	400 (16")	0.2 (0.24)	100 : 1	3000	90°
RR370	370 (3200)	250 (10")	150 (6")	400 (16")	0.9 (1.2)	100 : 1	3000	90°
RR870	870 (7700)	250 (10")	175 (7")	450 (18")	2.1 (2.8)	100 : 1	3000	90°
RR2500	2500 (22000)	250 (10")	200 (8")	450 (18")	6.0 (8.0)	100 : 1	3000	90°

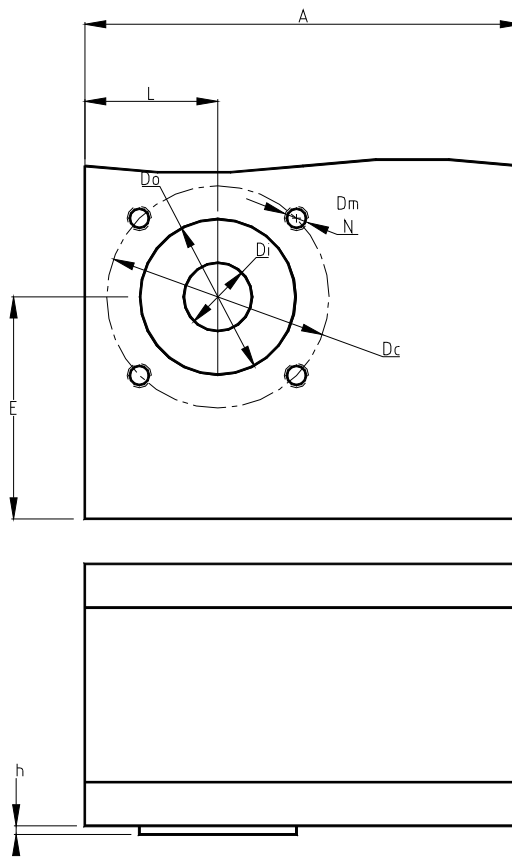


### Notes:

1. The actuator nominal speed is 90°/s. Output torque is minimum torque.
2. The valve position errors are calculated under assumed reducer 0.5 degree position error.
3. Different output strokes, speed and cylinder strokes are available.
4. Configurations can be modified to meet customers' specifications.
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## Mounting Dimensions for RR Actuators

### Dimension Data

Model Type	A	E	L	Do f8	h max	Dc	Dm	No. of bolts N
RR80	250	150	65	55	3	70	M8	4
RR370	250	165	80	85	3	125	M12	4
RR870	250	175	90	100	4	140	M16	4
RR2500	250	200	110	130	5	165	M20	4

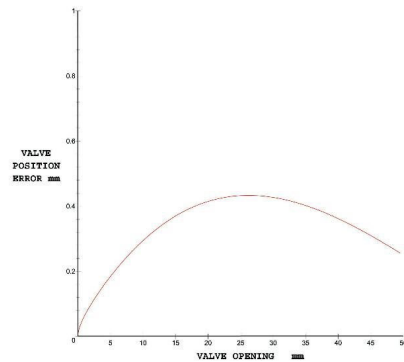
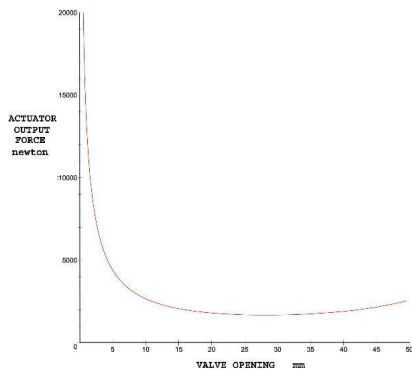
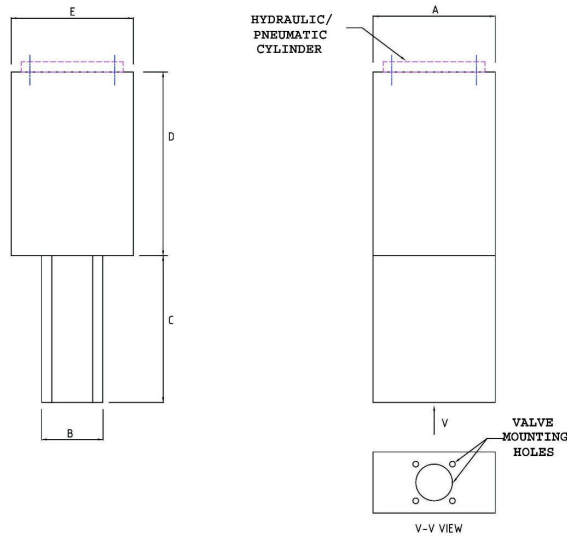
#### Notes:

3. The standard dimensions meet ISO 5211:2001(E)
2. Configurations can be modified to meet customers' specifications.

# Expro Type SL Spring Return Linear Actuators

## Actuator Parameters

Model	Output Force Newton(Lbs)	A Length mm(inch)	B Width mm(inch)	C Height mm(inch)	D S.H.H. mm(inch)	E S.H.W. mm(inch)	Cylinder Bore mm(inch)	Cylinder Stroke mm(inch)	Hydraulic Pressure Mpa(PSI)	Output Stroke mm(inch)
SL1500	1500 (350)	300 (12")	120 (4")	375 (15")	450 (18")	300 (12")	25 (1.0")	100 (4")	10 (1500)	50 (2")
SL7500	7500 (1700)	350 (14")	150 (6")	375 (15")	450 (18")	350 (14")	50 (2.0")	100 (4")	10 (1500)	50 (2")
SL17500	17500 (4000)	350 (14")	175 (7")	425 (18")	450 (18")	350 (14")	75 (3.0")	100 (4")	10 (1500)	50 (2")
SL50000	50000 (11000)	375 (15")	200 (8")	425 (18")	550 (22")	375 (15")	125 (5.0")	100 (4")	10 (1500)	50 (2")

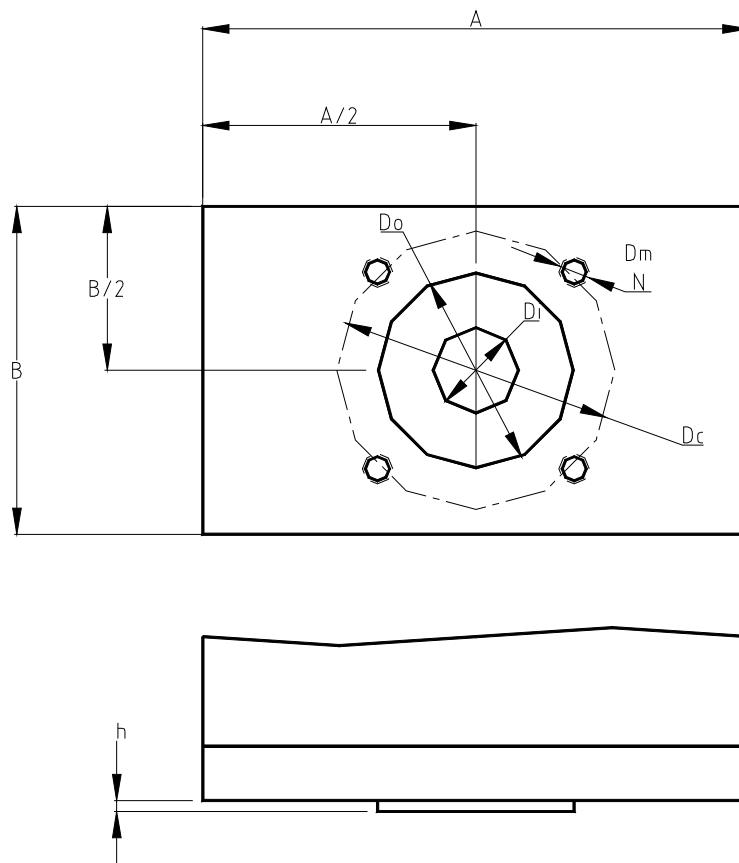


### Notes:

1. The actuator nominal speed is 50 mm/s. Output force is minimum force.
2. The valve position errors are calculated under assumed cylinder 0.5 mm position error.
3. Fail-safe operation time can be between 100 ms and 500 ms, depending on the configuration.
4. Configurations can be modified to meet customers' specifications.
5. Contact **Expro Engineering** to discuss your specifications. **Expro** will make it work for you.

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## Mounting Dimensions for SL Actuators

### Dimension Data

Model Type	A	B	Do f8	h max	Dc	Dm	No. of bolts N
SL1500	300	120	30	3	42	M5	4
SL7500	350	150	55	3	70	M8	4
SL17500	350	175	85	3	125	M12	4
SL50000	375	200	130	5	165	M20	4

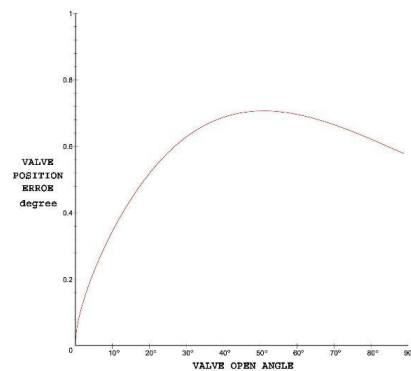
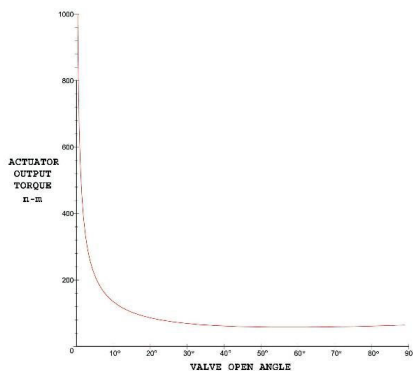
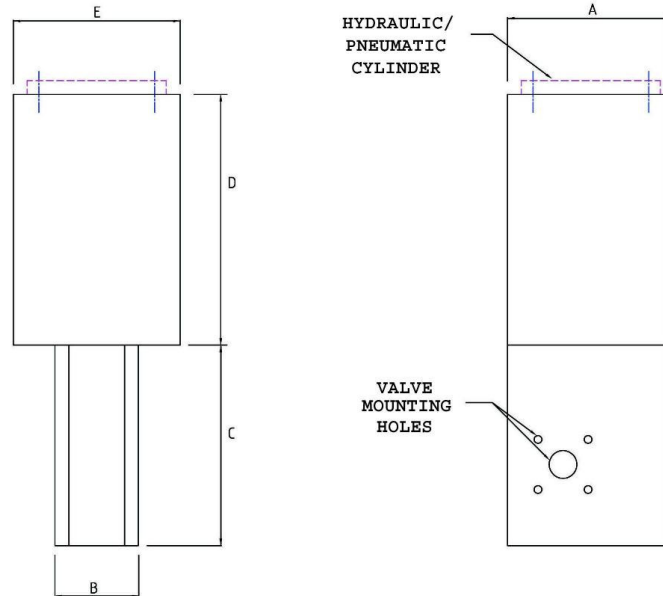
#### Notes:

2. The standard dimensions meet ISO 5211:2001(E)
3. Configurations can be modified to meet customers' specifications.

# Expro Type SR Spring Return Rotary Actuators

## Actuator Parameters

Model	Output Torque n-m(lbs-in)	A Length mm(inch)	B Width mm(inch)	C Height mm(inch)	D S.H.H. mm(inch)	E S.H.W. mm(inch)	Cylinder Bore mm(inch)	Cylinder Stroke mm(inch)	Hydraulic Pressure Mpa(PSI)	Output Stroke
SR60	60 (520)	300 (12")	120 (4")	375 (15")	450 (18")	300 (12")	25 (1.0")	100 (4")	10 (1500)	90°
SR310	310 (2700)	350 (14")	150 (6")	375 (15")	450 (18")	350 (14")	50 (2.0")	100 (4")	10 (1500)	90°
SR700	700 (6200)	350 (14")	175 (7")	425 (18")	450 (18")	350 (14")	75 (3.0")	100 (4")	10 (1500)	90°
SR2000	2000 (17700)	375 (15")	200 (8")	425 (18")	550 (22")	375 (15")	125 (5.0")	100 (4")	10 (1500)	90°



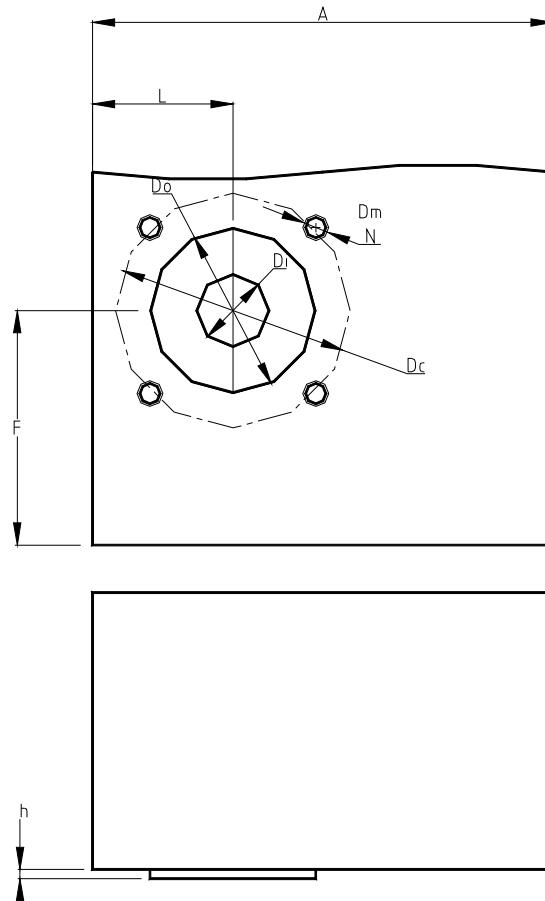
### Notes:

1. The actuator nominal speed is 90°/s. Output torque is minimum torque.
2. The valve position errors are calculated under assumed cylinder 0.5 mm position error.
3. Fail-safe operation time can be between 100 ms and 500 ms, depending on the configuration.
4. Configurations can be modified to meet customers' specifications.
5. Contact **Expro Engineering** to discuss your specifications. **Expro** will make it work for you.

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## Mounting Dimensions for SR Actuators

### Dimension Data

Model Type	A	F	L	Do f8	h max	Dc	Dm	No. of bolts N
SR0	250	150	65	55	3	70	M8	4
SR310	250	175	90	100	4	140	M16	4
SR700	250	200	110	130	5	165	M20	4
SR2000	300	250	150	200	5	254	M16	8

#### Notes:

4. The standard dimensions meet ISO 5211:2001(E)
2. Configurations can be modified to meet customers' specifications.

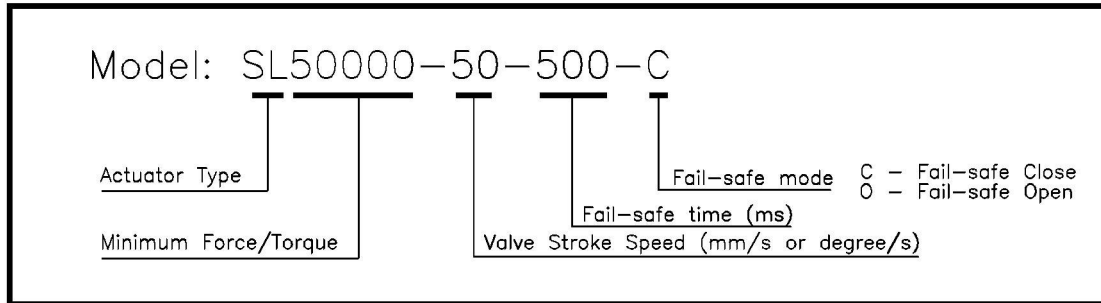
# Expro Actuator Quoting and Ordering Information

## Request a Quote:

In order to assist you in an expedited manner, please provide the following actuator specifications with your quote request:

- Configuration type (LL, RL, etc.)
- Minimum actuator force or torque
- Valve metering orifice relative position error requirement, if any.
- Valve stroke speed
- Flange mounting dimensions

Expro Engineering will work with you to develop a configuration that meets all your requirements.



## Actuator Type:

Expro has six types of actuator configurations:

- Linear to Linear (LL)
- Linear to Rotary (LR)
- Rotary to Linear (RL)
- Rotary to Rotary (RR)
- Spring Return Linear Actuator (SL)
- Spring Return Rotary Actuator (SR)

The linear actuator input can be provided by hydraulic or pneumatic cylinders. The rotary input can be provided by motors or reducers or rotary hydraulic devices.

## Minimum Force/Torque:

Expro actuator configurations are set based on the minimum force or torque at specified valve positions. When a quote is received, Expro needs to know at which valve position the minimum force or torque applies.

## Important:

- **Expro Engineering can provide custom designs to meet your specifications. Please consult Expro Engineering for more information. Expro Engineering will be more than happy to assist you.**

## Notes:

- All data are subject to change without notice.

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