

Bettis RTS FL Series

Smart Mechanical Fail-Safe Linear Actuator

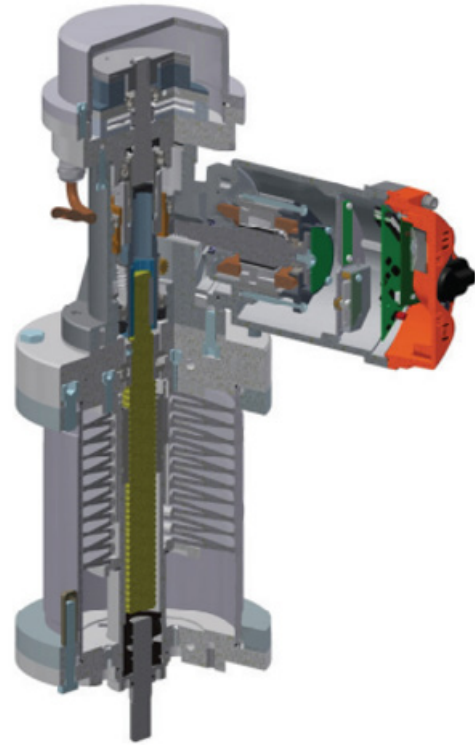


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Main Features

- Smart mechanical fail-safe linear actuator
- Direct acting linear output
- Unique spring-return fail action. No battery or super capacitors required
- Small footprint
- Non-intrusive local device configuration
- On/Off: S2-15 min. and 30 s/h, IEC 60034 (Class A and B, EN 15714)
- Modulating: S4-1200 s/h and S9-Continuous duty, IEC 60034 (Class C and D, EN 15714)
- Adjustable speed and torque
- Configurable fail-safe settings
- Fail-safe triggering selectable in case of drop-off 24 V DC fail-safe signal or main power supply
- Independently adjustable soft starts/stops
- Reliable and high positioning control 0.1% accuracy
- DC, single phase, three phase power supply options
- Weatherproof and explosion proof construction options
- SIL3 capable
- Optional De-clutchable handwheel
- Local User Interface with wireless Bluetooth® capability for configuration, monitoring, and diagnostics of key parameters
- DCMLink software interface available
- Process Control via optional on-board PID-controller
- Multilingual user interface
- Configurable action on loss of control signal

Figure 1. Bettis RTS FL Series Cut-away



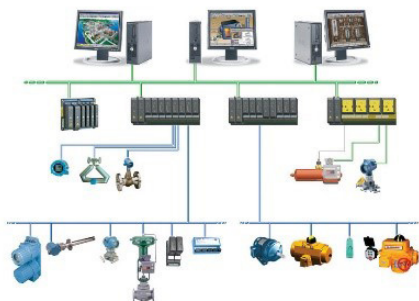
Features

Figure 2. Local Display, Status, and Configuration



Rotatable display panel and readout in 90° increments
2 Hall Effect contactless selector switches
(Black) right selector switch for local Open, Close directional commands
Padlockable (Red) left selector switch for Local, Off, Remote control options
Programmable status indicating LED's for visual operation, readiness, warnings, and error message enunciations
Day/night backlit text display in multiple configurable languages
Current position, over torque indication, machine health, operation data logging history

Figure 3. Control and Status Options



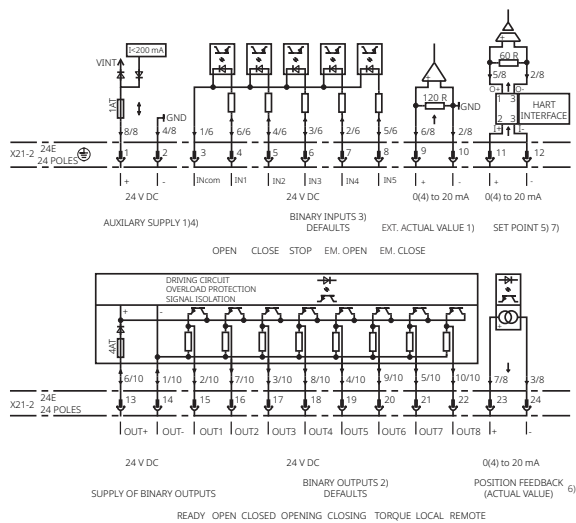
Discrete I/O 2, 3, or 4 wire control options
Multiple status feedback: Actuator ready, open, closed, ESD initialized, PST pass/fail, etc.
Analog 0 to 20 mA or 4 to 20 mA position set-point and position feedback
WirelessHART® capable with Thum: control and status update
Network Protocols: Modbus TCP and RTU, HART®, Profinet, and Profibus DP (optional)
Single loop PID process variable control (optional)

Figure 4. Diagnostics, Monitoring, Control, and Configure



Configuration software: DCMLink
Wireless communications via IRLT and Bluetooth
Communication device: MS laptop
DCMLink provides diagnostics, control, configuration uploads, and monitoring of alarms
DCMLink comes as a single laptop app or a licensed AMS Device Manager Snap-On

Figure 5. Digital Inputs and Outputs



5 Binary Inputs 8 Configurable Binary Outputs
Digital Inputs and Outputs can be powered by actuator or customer supplied 24 V DC
Optional board available for 115 to 230 DC/AC voltage for discrete inputs and outputs
Common ground of the binary inputs is optically isolated from other internal electronics
All binary outputs are optically isolated when customer supplies control voltage
Different wiring conduits available for weatherproof and explosion proof ratings

Figure 6. Binary Input/Output Current Characteristics



Customer supplied control power: 20 to 30 V DC maximum current: 500 mA or 120 mA in power-safe
Maximum allowed current for all binary outputs with power supplied by control system: 250 mA
Actuator sourced output voltage: typical 23 V maximum output current: 200 mA
Maximum allowed current for all binary outputs with power supplied by actuator: 150 mA
Max. allowed current per binary output: 500 mA
Analog in and out uses the actuator's control unit common ground

Bettis RTS Fail-Safe Linear Units

Table 1. Bettis RTS FL Series Technical Data

Attribute	FL-05		
Base Actuator	CM32		
Power Supply, V ⁽¹⁾	24 V DC ±10%	1Ph 110 to 230 V ±10%	3Ph 380 to 480 V ±10%
Nominal Motor Current, A (Conditions) ⁽²⁾	4.6 (16 Nm/20 RPM/ 24 V DC)	1.47 (16 Nm/72 RPM/ 230 V)	0.46 (16 Nm/72 RPM/ 400 V)
Idle Power Consumption, W	16		
Power Consumption at Idle to Hold Spring, W	40		
Electric Maximum Thrust Against Spring, S2 (Class A/B), lbf / kN	1843 / 8.2		
Electric Maximum Modulating Thrust, S4 (Class C), lbf / kN	1124 / 5		
Allowed Modulating Speed, S4 (Class C), RPM	1.0 to 36		
Electric Maximum Modulating Thrust, S9 (Class D), lbf / kN	674 / 3		
Allowed Modulating Speed, S9 (Class D), RPM	1.0 to 20		
Spring Break Thrust, lbf / kN	2248 / 10		
Spring End Thrust, lbf / kN	1124 / 5		
Adjustable Stroke Speed, in. / seconds	0.0031 to 0.0638	0.0031 to 0.2295	
Adjustable Fail-Safe Stroke Speed, seconds ⁽³⁾	1 to 5		
Maximum Travel, in. / mm	1.18 / 30		
Mounting Base/Spindle End	F10/M16x1.5		
Ambient Temperature Range, °F / °C	-40 to +140 / -40 to +60		
Explosion Proof Certifications	NEC-500	NEC-500	-
	NEC-505	NEC-505	-
	IECex	IECex	IECex
	ATEX	ATEX	ATEX
Water Ingress Protection ⁽⁴⁾	IP66 (NEMA 4X), IP67 (NEMA 6), IP68		
Approximate Weight, lb / kg	176.4 / 80		
Duty Cycle	S2 (Class A/B) Standard, S4/S9 (Class C/D) Optional		
Coating and Color	High quality two component polyurethane paint system - C2 ISO12944-5/RAL7012 Other options available on request.		

FL-15		
CM32		
24 V DC ±10%	1Ph 110 to 230 V ±10%	3Ph 380 to 480 V ±10%
4.6 (16 Nm/20 RPM/ 24 V DC)	1.47 (16 Nm/72 RPM/ 230 V)	0.46 (16 Nm/72 RPM/ 400 V)
16		
40		
4361 / 19.4		
2248 / 10		
1.0 to 36		
1574 / 7		
1.0 to 20		
3822 / 17		
1798 / 8		
0.0031 to 0.0638	0.0031 to 0.2295	
1 to 5		
1.97 / 50		
F10/M16x1.5		
-40 to +140 / -40 to +60		
NEC-500	NEC-500	-
NEC-505	NEC-505	-
IECex	IECex	IECex
ATEX	ATEX	ATEX
IP66 (NEMA 4X), IP67 (NEMA 6), IP68		
218.3 / 99		
S2 (Class A/B) Standard, S4/S9 (Class C/D) Optional		
High quality two component polyurethane paint system - C2 ISO12944-5/RAL7012 Other options available on request.		

Notes:

- 24 V DC power supply characteristics are applicable for BLDC version 10.1 and higher.
- Nominal motor current measured at specified conditions: base unit torque set up/speed/power supply. For detailed current draw and other performance data, please contact a local Emerson sales channel representative.
- At ambient temperatures below -4 °F / -20 °C, the fail-safe spring operating time will increase.
- CM32 and CM64 base units IP68 immersion: 5 m / 16 ft, 21 hours. All bolt-on gear boxes (linear drives, QT planetary gears, fail-safe units) are not IP68 rated and need to be rebuilt in case of a flood event.

Table 2. Bettis RTS FL Series Technical Data

Attribute	FL-25 ⁽⁵⁾		
Base Actuator	CM32		
Power Supply, V ⁽¹⁾	24 V DC ±10%	1Ph 110 to 230 V ±10%	3Ph 380 to 480 V ±10%
Nominal Motor Current, A Conditions ⁽²⁾	4.6 (16 Nm/20 RPM/ 24 V DC)	1.47 (16 Nm/72 RPM/ 230 V)	0.46 (16 Nm/72 RPM/ 400 V)
Idle Power Consumption, W	16		
Power Consumption at Idle to Hold Spring, W	40		
Electric Maximum Thrust Against Spring, S2 (Class A/B), lbf / kN	3687 / 16.4		
Electric Maximum Modulating Thrust, S4 (Class C), lbf / kN	2698 / 12		
Allowed Modulating Speed, S4 (Class C), RPM	1.0 to 36		
Electric Maximum Modulating Thrust, S9 (Class D), lbf / kN	1798 / 8		
Allowed Modulating Speed, S9 (Class D), RPM	1.0 to 20		
Spring Break Thrust, lbf / kN	4496 / 20		
Spring End Thrust, lbf / kN	2698 / 12		
Adjustable Stroke Speed, in. / seconds	0.0031 to 0.0638	0.0031 to 0.2295	
Adjustable Fail-Safe Stroke Speed, seconds ⁽³⁾	2 to 10		
Maximum Travel, in. / mm	3.94 / 100		
Mounting Base/Spindle End	F10/F14/M16x1.5		
Ambient Temperature Range, °F / °C	-40 to +140 / -40 to +60		
Explosion Proof Certifications	NEC-500	NEC-500	-
	NEC-505	NEC-505	-
	IECex	IECex	IECex
	ATEX	ATEX	ATEX
Water Ingress Protection ⁽⁴⁾	IP66 (NEMA 4X), IP67 (NEMA 6), IP68		
Approximate Weight, lb / kg	229.3 / 104		
Duty Cycle	S2 (Class A/B) Standard, S4/S9 (Class C/D) Optional		
Coating and Color	High quality two component polyurethane paint system - C2 ISO12944-5/RAL7012 Other options available on request.		

FL-40		
CM64		
24 V DC ±10%	1Ph 110 to 230 V ±10%	3Ph 380 to 480 V ±10%
Not Available	2.17 (20 Nm/60 RPM/ 230 V)	0.9 (32 Nm/60 RPM/ 400 V)
	21	
	40	
	5036 / 22.4	
	3372 / 15	
	2.5 to 30	
	2248 / 10	
	2.5 to 20	
	10116 / 45	
	6744 / 30	
	0.0051 to 0.1547	
	4 to 15	
	3.94 / 100	
	F10/F14/M20x1.5	
	-40 to +140 / -40 to +60	
	-	-
	NEC-505	-
	IECex	IECex
	ATEX	ATEX
IP66 (NEMA 4X), IP67 (NEMA 6), IP68		
350.5 / 159		
S2 (Class A/B) Standard, S4/S9 (Class C/D) Optional		
High quality two component polyurethane paint system - C2 ISO12944-5/RAL7012 Other options available on request.		

Notes:

- 24 V DC power supply characteristics are applicable for BLDC version 10.1 and higher.
- Nominal motor current measured at specified conditions: base unit torque set up/speed/power supply. For detailed current draw and other performance data, please contact a local Emerson sales channel representative.
- At ambient temperatures below -4 °F / -20 °C, the fail-safe spring operating time will increase.
- CM32 and CM64 base units IP68 immersion: 5 m / 16 ft, 21 hours. All bolt-on gear boxes (linear drives, QT planetary gears, fail-safe units) are not IP68 rated and need to be rebuilt in case of a flood event.
- Model FL25 24 V DC is pending for BLDC version 10.1 certification approval and will be available in the near future. For more details, please contact a local Emerson sales channel representative.

Table 3. Force Table for Selection of Actuator Construction Size – Fail-safe Close

Type	Stroke	Electric against Spring Maximum Thrust (lbf / kN)			Electric with Spring Maximum Thrust (lbf / kN)			Spring Maximum Thrust (lbf / kN)		
		BTO	RTO ⁽¹⁾	ETO	BTC	RTC ⁽¹⁾	ETC	BTC	RTC ⁽¹⁾	ETC
FL-05	30	2967 / 13.2	2405 / 10.7	1843 / 8.2	4294 / 19.1	3732 / 16.6	3170 / 14.1	2248 / 10	1686 / 7.5	1124 / 5
FL-15	50	6384 / 28.4	5373 / 23.9	4361 / 19.4	5867 / 26.1	4856 / 21.6	3844 / 17.1	3822 / 17	2810 / 12.5	1798 / 8
FL-25	100	5485 / 24.4	4586 / 20.4	3687 / 16.4	4923 / 29.1	5643 / 25.1	4743 / 21.1	4496 / 20	3597 / 16	2698 / 12
FL-40	100	8408 / 37.4	6722 / 29.9	5036 / 22.4	13893 / 61.8	12207 / 54.3	10521 / 46.8	10116 / 45	8430 / 37.5	6744 / 30

Table 4. Force Table for Selection of Actuator Construction Size – Fail-safe Open

Type	Travel	Electric against Spring Maximum Thrust (lbf / kN)			Electric with Spring Maximum Thrust (lbf / kN)			Spring Maximum Thrust (lbf / kN)		
		BTC	RTC ⁽¹⁾	ETC	BTO	RTO ⁽¹⁾	ETO	BTO	RTO ⁽¹⁾	ETO
FL-05	30	2967 / 13.2	2405 / 10.7	1843 / 8.2	4294 / 19.1	3732 / 16.6	3170 / 14.1	2248 / 10	1686 / 7.5	1124 / 5
FL-15	50	6384 / 28.4	5373 / 23.9	4361 / 19.4	5867 / 26.1	4856 / 21.6	3844 / 17.1	3822 / 17	2810 / 12.5	1798 / 8
FL-25	100	5485 / 24.4	4586 / 20.4	3687 / 16.4	4923 / 29.1	5643 / 25.1	4743 / 21.1	4496 / 20	3597 / 16	2698 / 12
FL-40	100	8408 / 37.4	6722 / 29.9	5036 / 22.4	13893 / 61.8	12207 / 54.3	10521 / 46.8	10116 / 45	8430 / 37.5	6744 / 30

Notes:

1. For S4 or S9 operation, please consider for RTO and RTC the maximum modulating forces and speeds from Table 1.

- BTO = Break to Open force
- RTO = Run to Open force at 50% stroke
- ETO = End to Open force
- BTC = Break to Close force
- RTC = Run to Close force at 50% stroke
- ETC = End to Close force
- Fail to close = spindle of actuator extends to close valve
- Fail to open = spindle of actuator retracts to open valve

Different Versions of Cable Entries

Table 5. Conduit Entries

	Non Fail-Safe	Fail-Safe	Step-down Converter (400 V Module)	Bus System Enabled	Bus System TCP
Standard/WP	1xM40, 1xM32, 1xM25	1xM40, 1xM32, 1xM25	1xM40, 1xM32, 1xM25	2xM32, 1xM25 + additional 4xM20 (different connector housing)	1xM40, 1xM32, 1xM25 + 2xM12 connector directly on housing (different actuator housing)
XP	1xM40, 2xM20, 1xM16	1xM40, 2xM20	SDC Module with 1xM40, 2xM20 (1xM40, 2xM20 from actuator housing not usable)	1xM40, 2xM20 + additional ring with 4xM20	1xM40, 2xM20 + additional ring with 4xM20
Additional Ring Added VA001-654-22	4xM20	4xM20	4xM20	N/A	N/A

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