

**BERNARD[®]
CONTROLS**

//////////////////// Invest in Confidence //////////////////////



**Failsafe
Electric Actuators**
FQ RANGE





LABEL

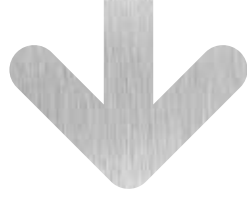


- Reliability
- Security
- User Friendly

*BERNARD CONTROLS introduces the BC Premium label.
The BC Premium label is the guarantee of high performance, reliable and innovative actuator solutions designed to sustain severe environmental and operational conditions.
Decades of return of experience from very demanding applications such as nuclear qualified valves actuation have shaped our technical orientations and our commitment to quality and safety.
Moreover, BC Premium labeled products offer user-friendliness and extremely low level of maintenance requirements.*

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Failsafe electric actuators

For all quarter-turn applications, spring return FQ range actuators ensure automatic opening or closing even without any power supply.

> Operating principle

When energized, the actuator operates the valve normally and at the same time compresses the spring which is held in the loaded position by a solenoid brake.

In case of power failure to the solenoid, the spring will drive the actuator and valve to the safety position either open or closed. The associated dashpot speed controls the spring action and allows a safe and shockfree operation of the valve.

When the power supply is restored (no resetting of the spring is required), the actuator is immediately available for normal operation.

In standard, the spring operates clockwise when viewed from the top. The electric part is equipped with an asynchronous three-phase motor. Other versions are available in single phase and direct current supply.

> Application fields

All applications where the loss of power supply requires automatically to put the driven device in a safety position.

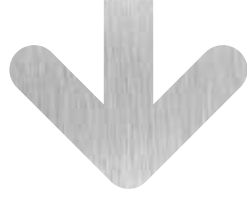
All applications where the risks are such, that driving the device to its safety position must be possible at any time even in the absence of power supply.



For example :

Storage and distribution of gas and dangerous fluids
Refineries
Trucks loading arms
Fire protection systems
Chemical installation safety
Climate control and ventilation on hazardous areas
Tunnel ventilation





Main features

For all quarter turn applications, spring return FQ range actuators ensure automatic opening or closing even without any power supply.

➤ Easy to use, maintenance free

- No periodic maintenance required.
- Trouble free operation for years (the FQ system is not battery technology based).
- Spring efficiency guaranteed over the full 90° travel.
- Fast and shock-free operation of the valve during emergency closing / opening.
- Travel limit switches easy to set with a simple screw driver and unaffected by mechanical vibrations effects.
- Easy access to electrical connections via a terminal strip.

FQ actuator is supplied complete with:

- Mechanical position indicator
- Adjustable quarter-turn mechanical stops
- 2 travel limit switches setting easy, with a simple screw driver
- Electrical connection to a terminal strip
- Emergency handwheel on all models (excepted the FQ04 and the FQ08)

FQ actuators are available as:

- On-Off operation (complying with EN15714-2 Class A) and Inching/Positioning (complying with EN15714-2 Class B): 30% motor duty rating. Up to 360 starts per hour at peak of operation.
- BC Modulating Class III (complying with EN15714-2 Class C) : 50% motor duty rating. Up to 1 200 starts per hour at peak of operation.



What is Failsafe?

The activation of an emergency signal triggers the immediate opening or closing of the backup device, without the need of any external power source and using a full mechanical spring return.

This signal can be activated following:

- An abnormal event (fire, overflow ...)
- An automatic control
- An operator's action
- A lack of power supply

> Enclosures

FQ actuators are weather-proof to IP67 and are also available as explosion-proof according to international standards.

> Possible options

- Motor:
 - 3PH 50 or 60 Hz
 - 1PH 50 or 60 Hz
 - DC versions
- EN15714-2 DUTY CLASSIFICATION
 - On-Off : Class A
 - Inching/Positioning : Class B
 - Modulating : Class C
- Advanced controls with local buttons
 - INTEGRAL+ (On-Off)
 - POSIGAM+ (Inching/Positioning & Modulating)
- Extra limit switches
- Anticondensation heater resistor
- Position transmitters : 4-20mA or potentiometer
- Specific voltage for solenoid brake supply
 - 115V AC
 - 230V AC
 - 24V DC (other DC voltages on request)
- Fast spring return
- Clockwise or counterclockwise spring action





Technical data

> Product specifications

General spec.	Torque range	Quarter-turn, direct mounting from 354 to 4425 lbs.in
	Actuator Duty Class	On-Off (Class A), Inching/Positioning (Class B), Modulating (Class C)
Enclosure	Enclosure	Cast aluminium
	Waterproofness	IP67
	Programming	FQ range is generally proposed with switch control (camblock + end-of-travel switches). INTEGRAL+ & POSIGAM+ (See INTEGRAL+ catalogue) advanced controls are also possible with separated control box. Maximum distance between control box and actuator: 164ft
	Explosion proof ATEX (option)	ATEX Directive 94/9/EC - CENELEC EN 50014, EN 50018 As standard: EEx d IIC T4 (option T5 or T6) - Ex II 2 G Certificate : LCIE 02 ATEX 6209
	Ambient temperature operating range	Weatherproof models: -4°F to 158°F (-40°F as an option) EEx d IIC T4 : -4°F to 140°F (-40°F as an option) EEx d IIC T5 : -4°F to 140°F (-40°F as an option) EEx d IIC T6 : -4°F to 122°F (-40°F as an option)
	Explosion proof C.S.A. (Canada & USA) (option)	NEMA 7 - NEMA 9 certified C22-2, FM3600, FM3611 and FM3615 standards Class I Group C, D div 1&2 (option Group B) Class II Group E, F, G div 1&2 Certificate : 1061444
	External corrosion protection	Standard paint system: Zinc rich primer, epoxy undercoat and RAL5002 blue protection polyurethane top coat. Optional special anti-corrosion protection for marine, aggressive or abrasive atmospheres. All cover fasteners captive and stainless.
Motor	Motor technology	TENV type (Totally Enclosed Non Ventilated). Class F insulation. Integrated thermal overload protection.
	Motor duty rating	S4 motor service (Intermittent periodic duty with startings) acc. to IEC 34-1 • S4 - 30% for On-Off Class A - up to 360 starts per hour. • S4 - 30% for Inching/Positioning Class B - up to 360 starts per hour. • S4 - 50% for Modulating Class III - up to 1,200 starts per hour.
Mechanical specifications	Gearing	Self-locking
	Manual override	Function available on FQ12, FQ18, FQ30 and FQ50. Handwheel does not rotate during motor operation. Padlockable clutch lever.
	Spring return	CW as standard, CCW on request (non reversible device) Fast spring return in option
	Output flange	Flange comply with ISO 5211 (with optional socket/flange for FQ04 to FQ18)
	Output drive	Direct output drive on FQ04 to FQ18 (Removable socket ias an option). Removable socket on FQ30 and FQ50.
	Vibration Resistance	1g (32.2 ft/s²) at 10-500 Hz For higher vibration resistance, please contact us.
	Lubrication	Actuators are lubricated for product lifetime and do not require any specific periodic maintenance

Electrical specifications	Power supply	Actuators are available for a wide range of power supplies: • Single-phase, three-phase or DC voltages • 50 or 60 Hz • Specific voltages on request
	Cable entries	Weatherproof design : - 2xM20 - 3xM20 (as an option) Explosionproof design : - 2x 3/4" NPT - 3x 3/4" NPT (as an option)
	Solenoid brake	The solenoid rated power is 21 W. This solenoid is normally under permanent power supply. Need separated power supply. Nominal voltage: • 230V AC for 230V or 400V AC actuators • 115V AC for 115V or 460V AC actuators • 24V DC for 24V DC actuators Other possible voltages on request
	Position sensors	• Movement read directly on the main shaft (direct mechanical link) • Adjustable camblock with 2 SPDT end-of-travel switches • 2 extra position switches as an option • Independent position transmitter (TAM or potentiometer) as an option



Advanced controls (option)	Models	Two versions according to operating modes: INTEGRAL+ for On-Off which includes : • Terminal compartment • Power contactors • Logic control • Configuration panel • Signalling relays • Local control selectors POSIGAM+ for Class III positioning : • All INTEGRAL+ features • Positioner board • Position feedback
	Enclosure protection	Separated FPI box (weatherproof design) • Standard: IP67 / NEMA 4 Separated FPx box (explosionproof design) • Standard: IP67 / EEx d IIC T6 - NEMA 7 / 9
	On-off control	• Isolated by opto-couplers • Voltage: 10 to 250 V DC/AC • Current: 10 mA at 24V • Dry contacts (uses INTEGRAL+ auxiliary DC supply) • Minimum pulse duration: 100ms • Time of rotational direction change: 50ms or 200ms
	Positioning control	• Standard : Input signal 4-20 mA - Output signal 4-20 mA • On request : Input signal 0-20 mA - Output signal 0-20 mA • On request : Input signal 0-10 V - Output signal 0-20 mA
	Signaling relays	• 4 relays: 4 datas can be freely selected among a total of 16 available datas (250VAC-5A max.) • 1 fault relay
	Cable entries	Weatherproof design (with separated FPI control box option) - 3xM20 - 2xM20 + 2xM25 (en option) - 3xM20 + 4xM16 (With single or redundant fieldbus option) Explosionproof design (with separated FPx control box option) - 2x 3/4" NPT + 1x1" NPT
	EU conformity	INTEGRAL+ / POSIGAM+ controls complying with: • The 2004/108/EC electromagnetic compatibility • The 2006/95/EC low voltage • The following harmonized standards: Generic emission standard-Industrial environment EN 61000-6-4 Generic immunity standard - Industrial environment EN 61000-6-2. Degrees of protection provided by enclosures (IP code) EN 60529
	Vibration resistance	1g (32.2 ft/s²) at 10-500 Hz
ADDITIONAL OPTIONS	Fieldbus interface (option)	Profibus DP (single or redundant) • PROFIBUS-DP slave - RS 485 • Baudrate: autodetection • Total number of master and slave modules on the same line: 31 max. up to 99 with repeaters • PROFIBUS operability approved by PNO (Profibus Nutzer Organisation) • External power supply backup
	Additional options	• LED indication board (closed, open, power on) • Additional 3 relays board • Additional position transmitter isolated from the other output signals





Performances

3 PH 400V 50 Hz

Type	Torque		Available for			Operating time 90°/sec			Flange	Motor : S4 service - D.R. : 30%					
	Max lbs.in	Perm lbs.in	On-Off	Inching/ Positioning	Mod. Class III	Motor Sec	Spring*			Power kW	Speed rpm	Current rated A	Current start A	Cos Φ	Efficiency %
							Fast	Std							
FQ04	354	177	yes	---	---	14	3	7	F07	0,06	3000	0,4	0,9	0,8	30
FQ04	354	177	yes	---	---	33	3	7	F07	0,06	3000	0,4	0,9	0,8	30
FQ04	354	177	yes	yes	yes	26	3	7	F07	0,02	1500	0,2	0,3	0,9	14
FQ04	354	177	yes	yes	yes	61	3	7	F07	0,02	1500	0,2	0,3	0,9	14
FQ08	708	354	yes	---	---	33	2	6	F07	0,06	3000	0,4	0,9	0,8	30
FQ08	708	354	yes	yes	yes	61	2	6	F07	0,02	1500	0,2	0,3	0,9	14
FQ12	1062	531	yes	---	---	39	2	10	F10	0,06	3000	0,4	0,9	0,8	30
FQ12	1062	531	yes	yes	---	93	2	10	F10	0,06	3000	0,4	0,9	0,8	30
FQ12	1062	531	yes	yes	yes	78	2	10	F10	0,02	1500	0,2	0,3	0,9	14
FQ12	1062	531	yes	yes	yes	184	2	10	F10	0,02	1500	0,2	0,3	0,9	14
FQ18	1593	797	yes	yes	---	93	3	15	F10	0,06	3000	0,4	0,9	0,8	30
FQ18	1593	797	yes	yes	yes	184	3	15	F10	0,02	1500	0,2	0,3	0,9	14
FQ30	2655	1328	yes	yes	---	117	7	18	F14	0,06	3000	0,4	0,9	0,8	30
FQ30	2655	1328	yes	yes	yes	233	7	18	F14	0,02	1500	0,2	0,3	0,9	14
FQ50	4425	2213	yes	yes	---	117	9	27	F14	0,06	3000	0,4	0,9	0,8	30
FQ50	4425	2213	yes	yes	yes	233	9	27	F14	0,02	1500	0,2	0,3	0,9	14

***Please note:** The operating times of the spring actions are average values. Those may vary according to the resistive torque and temperature
NB: S4 - 30% for On-Off Class A and for Inching/Positioning Class B, S4 - 50% for Modulating Class III



3 PH 460V 60 Hz

Type	Torque		Available for			Operating time 90°/sec			Flange	Motor : S4 service - D.R. : 30%					
	Max lbs.in	Perm lbs.in	On-Off	Inching/ Positioning	Mod. Class III	Motor Sec	Spring*			Power kW	Speed rpm	Current rated A	Current start A	Cos Φ	Efficiency %
							Fast	Std							
FQ04	354	177	yes	---	---	12	3	7	F07	0,07	3600	0,4	0,9	0,8	30
FQ04	354	177	yes	---	---	28	3	7	F07	0,07	3600	0,4	0,9	0,8	30
FQ04	354	177	yes	yes	yes	22	3	7	F07	0,03	1800	0,2	0,3	0,9	14
FQ04	354	177	yes	yes	yes	51	3	7	F07	0,03	1800	0,2	0,3	0,9	14
FQ08	708	354	yes	---	---	28	2	6	F07	0,07	3600	0,4	0,9	0,8	30
FQ08	708	354	yes	yes	yes	51	2	6	F07	0,03	1800	0,2	0,3	0,9	14
FQ12	1062	531	yes	---	---	33	2	10	F10	0,07	3600	0,4	0,9	0,8	30
FQ12	1062	531	yes	yes	---	78	2	10	F10	0,07	3600	0,4	0,9	0,8	30
FQ12	1062	531	yes	yes	yes	65	2	10	F10	0,03	1800	0,2	0,3	0,9	14
FQ12	1062	531	yes	yes	yes	154	2	10	F10	0,03	1800	0,2	0,3	0,9	14
FQ18	1593	797	yes	yes	---	78	3	15	F10	0,07	3600	0,4	0,9	0,8	30
FQ18	1593	797	yes	yes	yes	154	3	15	F10	0,03	1800	0,2	0,3	0,9	14
FQ30	2655	1328	yes	yes	---	98	7	18	F14	0,07	3600	0,4	0,9	0,8	30
FQ30	2655	1328	yes	yes	yes	194	7	18	F14	0,03	1800	0,2	0,3	0,9	14
FQ50	4425	2213	yes	yes	---	98	9	27	F14	0,07	3600	0,4	0,9	0,8	30
FQ50	4425	2213	yes	yes	yes	194	9	27	F14	0,03	1800	0,2	0,3	0,9	14

1 PH 230V 50 Hz

Type	Torque		Available for			Operating time 90°/sec			Flange	Motor : S4 service - D.R. : 30%					
	Max	Perm	On-Off	Inching/ Positioning	Mod. Class III	Motor Sec	Spring*			Power kW	Speed rpm	Current rated A	Current start A	Cos Φ	Efficiency %
	lbs.in	lbs.in					Fast	Std							
FQ04	354	177	yes	---	---	33	3	7	F07	0,06	3000	0,4	0,9	0,8	30
FQ04	354	177	yes	yes	yes	66	3	7	F07	0,02	1500	0,2	0,3	0,9	14
FQ08	708	354	yes	---	---	33	2	6	F07	0,06	3000	0,4	0,9	0,8	30
FQ08	708	354	yes	yes	yes	66	2	6	F07	0,02	1500	0,2	0,3	0,9	14
FQ12	1062	531	yes	yes	---	93	2	10	F10	0,06	3000	0,4	0,9	0,8	30
FQ12	1062	531	yes	yes	yes	184	2	10	F10	0,02	1500	0,2	0,3	0,9	14
FQ18	1593	797	yes	yes	---	93	3	15	F10	0,06	3000	0,4	0,9	0,8	30
FQ18	1593	797	yes	yes	yes	184	3	15	F10	0,02	1500	0,2	0,3	0,9	14
FQ30	2265	1328	yes	yes	---	117	7	18	F14	0,06	3000	0,4	0,9	0,8	30
FQ30	2265	1328	yes	yes	yes	233	7	18	F14	0,02	1500	0,2	0,3	0,9	14

***Please note:** The operating times of the spring actions are average values. Those may vary according to the resistive torque and temperature

NB: S4 - 30% for On-Off Class A and for Inching/Positioning Class B, S4 - 50% for Modulating Class III

1 PH 115V 60 Hz

Type	Torque		Available for			Operating time 90°/sec			Flange	Motor : S4 service - D.R. : 30%					
	Max lbs.in	Perm lbs.in	On-Off	Inching/ Positioning	Mod. Class III	Motor Sec	Spring*			Power kW	Speed rpm	Current rated A	Current start A	Cos Φ	Efficiency %
							Fast	Std							
FQ04	354	177	yes	---	---	28	3	7	F07	0,07	3600	0,4	0,9	0,8	30
FQ04	354	177	yes	yes	yes	55	3	7	F07	0,03	1800	0,2	0,3	0,9	14
FQ08	708	354	yes	---	---	28	2	6	F07	0,07	3600	0,4	0,9	0,8	30
FQ08	708	354	yes	yes	yes	55	2	6	F07	0,03	1800	0,2	0,3	0,9	14
FQ12	1062	531	yes	yes	---	78	2	10	F10	0,07	3600	0,4	0,9	0,8	30
FQ12	1062	531	yes	yes	yes	154	2	10	F10	0,03	1800	0,2	0,3	0,9	14
FQ18	1593	797	yes	yes	---	78	3	15	F10	0,07	3600	0,4	0,9	0,8	30
FQ18	1593	797	yes	yes	yes	154	3	15	F10	0,03	1800	0,2	0,3	0,9	14
FQ30	2655	1328	yes	yes	---	98	7	18	F14	0,07	3600	0,4	0,9	0,8	30
FQ30	2655	1328	yes	yes	yes	194	7	18	F14	0,03	1800	0,2	0,3	0,9	14

24V DC

Type	Max	Available for			Operating time 90°/sec			Flange	Motor : S4 service - D.R. : 30%					
	Torque lbs.in	On-Off	Inching/ Positioning	Mod. Class III	Motor Sec	Spring*			Power kw	Speed rpm	Current rated A	Current start A	Cos Φ	Efficiency %
						Fast	Std							
FQ04	354	yes	---	---	30	3	7	F07	0,027	3000	2,4	7	---	48
FQ08	708	yes	---	---	40	2	6	F07	0,027	3000	2,4	7	---	48
FQ12	1062	yes	---	---	100	2	10	F10	0,027	3000	2,4	7	---	48
FQ18	1593	yes	---	---	110	3	15	F10	0,027	3000	2,4	7	---	48
FQ30	2655	yes	---	---	150	7	18	F14	0,027	3000	2,4	7	---	48

***Please note:** The operating times of the spring actions are average values. Those may vary according to the resistive torque and temperature

NB: S4 - 30% for On-Off Class A and for Inching/Positioning Class B, S4 - 50% for Modulating Class III

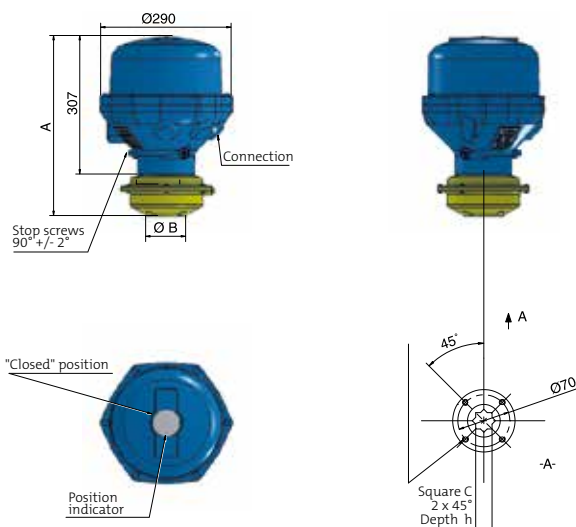






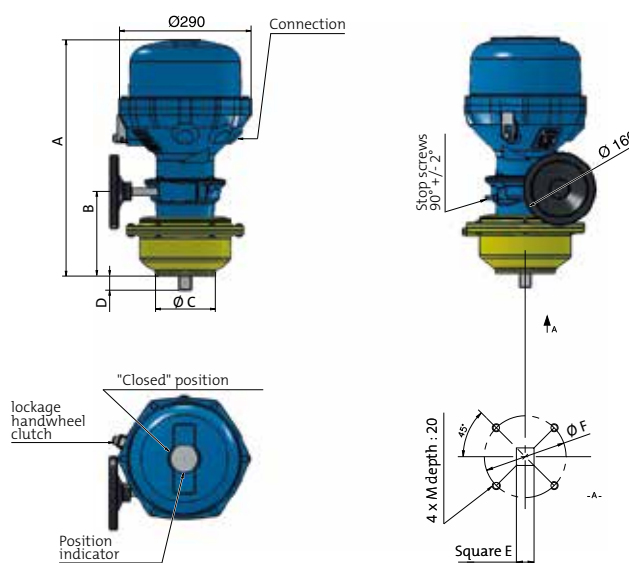
Dimensional drawings

> FQ04 & FQ08



Type	A	Ø B	Square C	h	Weight
FQ04	386	Ø 84	17	19	55.12 lbs
FQ08	396	Ø 117	22	24	66.14 lbs

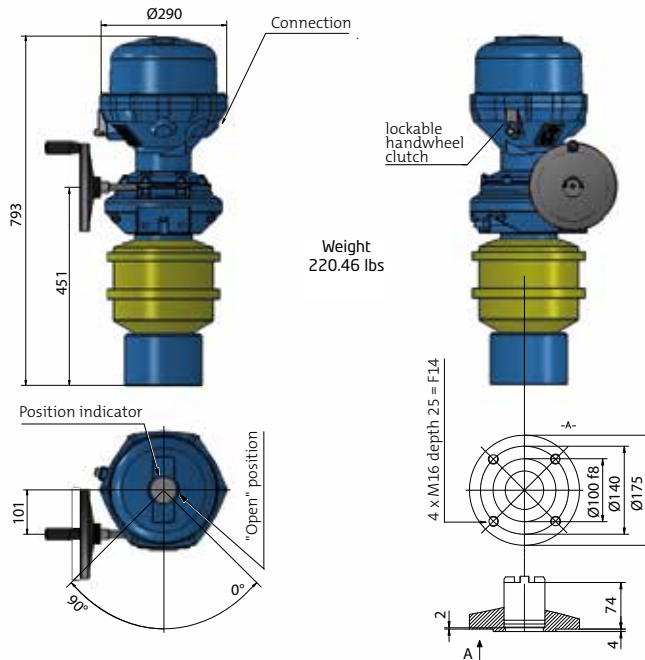
> FQ12 & FQ18



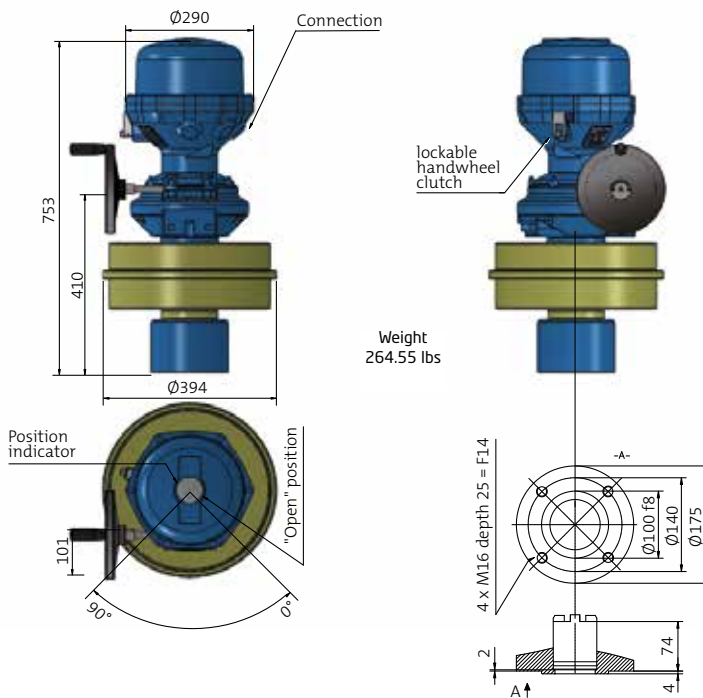
Type	A	B	Ø C	D	Square E	Ø F	M	Weight
FQ12	500	167	Ø 117	25	22	Ø 102	M10	88.18 lbs
FQ18	518	185	Ø 130	31	25	Ø 78	M12	99.21 lbs

Please note: FQ04 to FQ18, ISO5211 mounting with optionnal socket. FQ04 to FQ50, plain socket in standard and machined socket on request

> FQ30



> FQ50





ISO 5211 Mounting

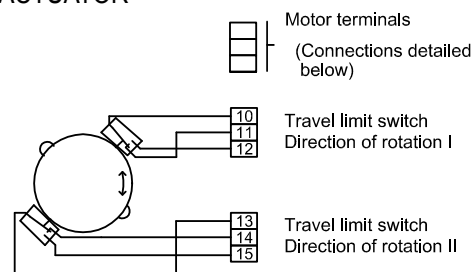
		PARALLEL SQUARE	KEY	FLAT
FQ04		S 11 / 14 / 17	Ød7 14 / 18 / 22 / 28	S 11 / 14 / 17
FQ08		S 11 / 14 / 17	Ød7 14 / 18 / 22 / 28	S 11 / 14 / 17
FQ12		S 14 / 17 / 19 / 22	Ød7 18 / 22 / 28 / 36	S 14 / 17 / 19 / 22
FQ18		S 14 / 17 / 19 / 22	Ød7 18 / 22 / 28 / 36	S 14 / 17 / 19 / 22
FQ30 & FQ50		S 19 / 22 / 36	Ød7 22 / 28 / 30 / 40	S 19 / 22 / 36

Please note: FQ04 to FQ18, ISO5211 mounting with optionnal socket. FQ04 to FQ50, plain socket in standard and machined socket on request



Standard wiring diagram

ACTUATOR

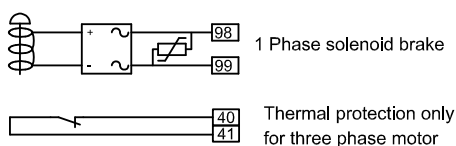


FUNCTION OF SWITCHES

Direction of rotation

- I) Counterclockwise
(normally opening)
- II) Clockwise
(Normally closing)

Direction of rotation seen on opposite side of fixing flange of actuator



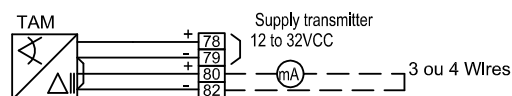
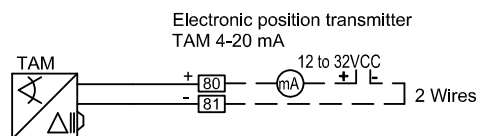
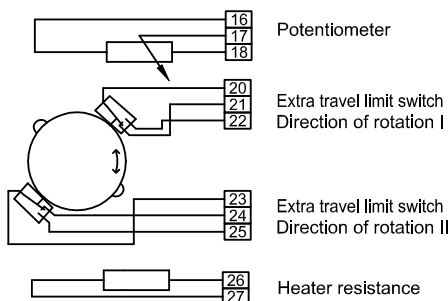
SOLENOID OPERATED BRAKE CONNECTION INSTRUCTIONS

- Do not connect the solenoid operated brake (terminals 98 & 99).
- Connect terminals 1,2,3 to give supply to the motor and check the rotation direction.
- Connect the travel limit switches and check its function.
- Now connect the solenoid operated brake if all other operations have been given satisfactory.

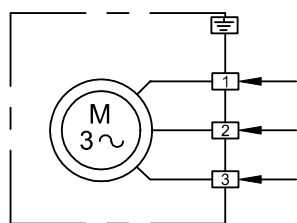
Voltages table

MOTOR	Solenoid Operated Brake
3Ph 460V-60Hz	115V
3Ph 400V-50Hz	230V
1Ph 230V-50Hz	230V
1Ph 115V-60Hz	115V
24V DC	24V DC

OPTIONAL ACCESSORIES

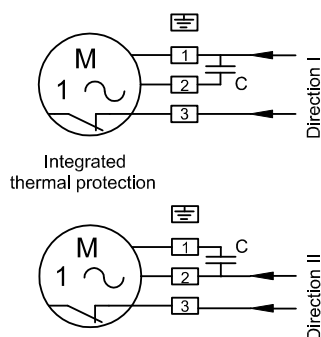


MOTOR THREE PHASE

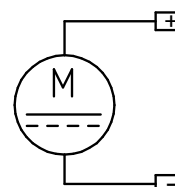


NOTA: 3Ph phase direct = Direction II

SINGLE PHASE



DC



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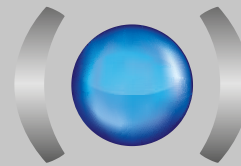
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