DESCRIPTION

M94F2 – M94FC

24V electromotive actuator to drive Pressure Independent Control Valve **EvoPICV 94F/95F series**.

Managed control signals: analogue (voltage and current), PWM, 3 points and ON/OFF.

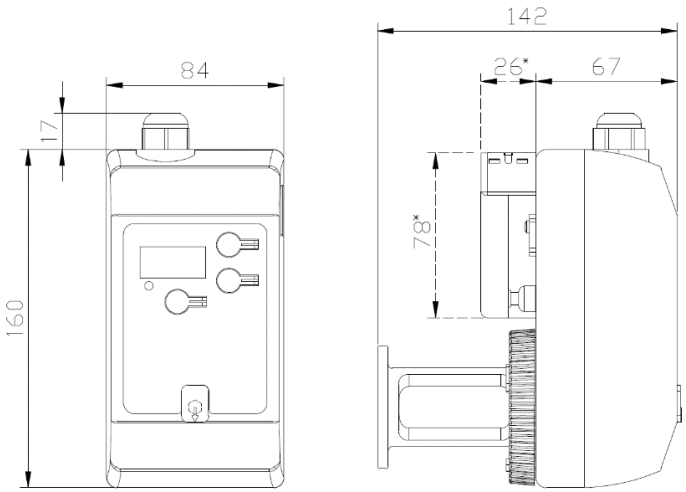
It can be completely configurable through the on board display and controlling buttons.

Manual override and LED indicating the status of the fail safe battery.

Actuator already fit onto the valve **94F/95F** as standard or available as spare part (in this case, please tell the valve reference that the actuator is going to be installed on to allow Fratelli Pettinaroli's technicians its configuration).

Electrical safe return achievable on demand (additional battery case **M94FC**).

DIMENSIONS



Dimensions in **mm**

***** Dimensions **M94FC**

APPROVALS

CE

Conform to **UL**

TECHNICAL FEATURES

Control signal	0(2)-10V 0(4)-20mA (with 500 Ω resistor*) ON/OFF 3 points floating PWM
Supply voltage	24V AC/DC ±15% – 50/60 Hz
Current absorption	80 mA, Load max 380 mA
Power consumption	5 W; 2.5 W stand-by
Feedback	0(4) - 20 mA and 0(2) – 10 V
Torque	10 Nm Max, self-limited at 7 Nm
Manual Override	Through release button and 6mm Allen key
Motor	Brushless DC motor

Running speed	Selectable: 1 RPM or 1.5 RPM
Ambient temperature range	-20° / + 60° C (@)
Storage temperature range	-20° / + 80°C (@)
Class/Degree of protection	II / IP54
Weight	0.975 kg
Connecting cable	18 AWG
Connection to valve	8mm square. Easy fitting gear
Operating life	50.000 cycles
Fail safe	Through additional battery

(@) no condensation
* not supplied

Electromotive actuators **M94F - 24V** are used to make any kind of control systems, ON/OFF, floating, proportional managed by thermostat or BMS handling analogue signals or PWM digital, of HVAC installations where **EvoPICV** balancing valves are exploited; in order to properly set the presetting, see the specific section devoted to actuator setting.
For further information about electrical connections, see the specific section.

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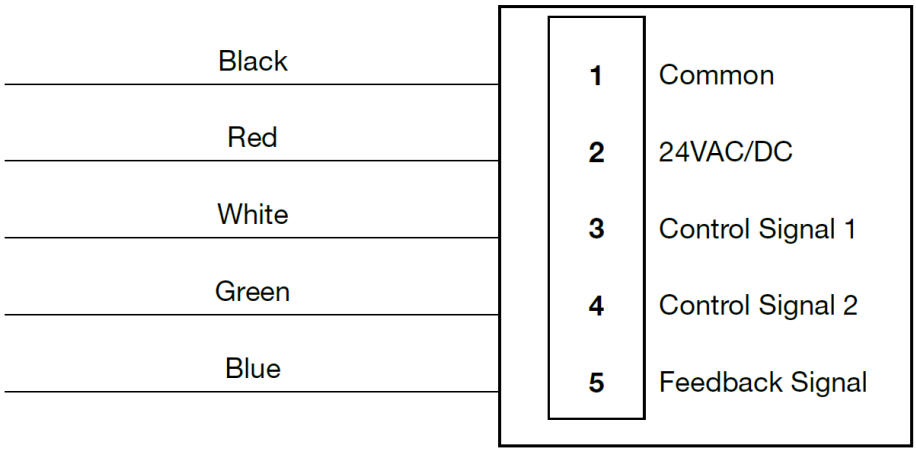
CONNECTION SCHEMES

Wires indication

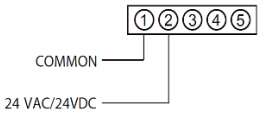


Wire guidelines

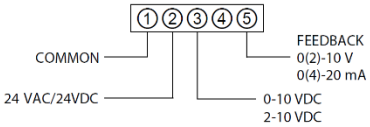
Input	Number	1	2	3	4	5	REMARKS
	Colour	Black	Red	White	Green	Blue	
Internal control		Common	24 AC/DC			Feedback 0(2)-10 V 0(4)-20 mA	Power: cable 1 - 2
Voltage signal		Common	24 AC/DC	0-10V DC 2-10V DC		Feedback 0(2)-10 V 0(4)-20 mA	Power: cable 1 - 2 Voltage signal: cable 1 - 3
Current signal		Common	24 AC/DC	0-20mA 4-20mA		Feedback 0(2)-10 V 0(4)-20 mA	Power: cable 1 - 2 Current signal: cable 1 - 3
ON/OFF signal		Common	24 AC/DC	24V DC (open) 0V (close)		Feedback 0(2)-10 V 0(4)-20 mA	Power: cable 1 - 2 ON/OFF signal: cable 1 - 3
3 points floating		Common	24 AC/DC	Opening 24V AC/DC	Closing 24V AC/DC	Feedback 0(2)-10 V 0(4)-20 mA	Power: cable 1 - 2 Floating 3 points: cable 3 - 4
PWM control		Common	24 AC/DC	PWM signal		Feedback 0(2)-10 V 0(4)-20 mA	Power: cable 1 - 2 PWM control: cable 1 - 3

Connections

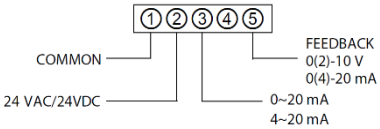
1. Internal control*



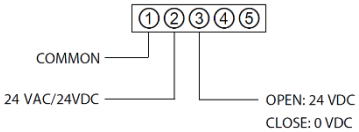
2. Voltage signal



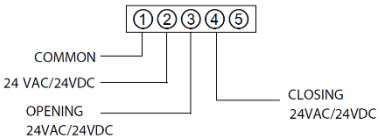
3. Current signal



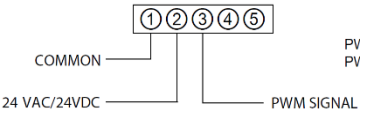
4. ON/OFF



5. 3 points signal



6. PWM signal



PWM Type 1: 0.1 – 5 s / Step 20ms

PWM Type 2: 0.1 – 25 s / Step 100ms

* Flow rate can be set by buttons on the actuator and read on the 4 digits display.

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INSTALLATION

If the actuator **M94F2** is purchased with the valve **EvoPICV 94F/95F**, it is already installed onto the valve. If it is bought as a spare part, follow the next procedure:

1. Completely open the valve with an 8 mm spanner (max torque 7 Nm)
2. Install the actuator in the same position of that has been previously removed
3. Insert the three pins in the specific buttonholes on the fixing plate
4. Turn the fixing ring
5. Close the valve by means of the actuator which has to be electrically connected; the actuator performs a new Zero Detection cycle

Be sure the actuator is not mounted upside down to avoid any damage due to leaking from the valve stem. Please note that care must be taken to actuator installation: little angular deviations can compromise the correct actuator operation

If the actuator replaces a **M94F** (old type actuator), the metal support must be replaced with the new one. Be sure that the actuator is aligned to the valve when mounted.

REMOVAL

If the actuator has to be removed, follow the next procedure:

1. Turn the connection ring between valve and actuator
2. Remove the actuator

SETTINGS

Actuator **M94F2** is delivered already set at max flow rate of the valve where it is mounted (SET 4); if it is bought as spare part, the customer must inform Fratelli Pettinaroli about valve type the actuator will be mounted on, allowing Fratelli Pettinaroli's technicians to properly set it.

When the actuator is powered, the valve **94F/95F** corresponding code is displayed on the 4 digits screen. Verify using the table at the end of the next page that the shown code corresponds the installed valve. If an issue occurs, contact Fratelli Pettinaroli's technicians.

To set the actuator, use the 3 buttons and the display on the upper side. When it is switched on, the Zero Detection function automatically starts: the display shows "Go 0". Do not carry out any operation while the actuator is running and the end stroke is found: finally it displays "0". To enter the settings browser, push the button MODE. Use UP and DOWN buttons to select the parameter, then push MODE to show different options (option browsing is carried out through UP and DOWN buttons); push MODE to confirm the selection.

Here a list of configurable parameters:

SET 1 – Input indication selection with internal control signal

SET 2 – Control signal selection

SET 3 – Min flow rate setting

SET 4 – Max flow rate setting

SET 5 – Setting display mode during operation

SET 6 – Rotation angle compensation

SET 7 – Flow rate offset compensation

SET 8 – Power failure mode

SET 9 – Flow rate unit selection

SET 10 – Control curve selection

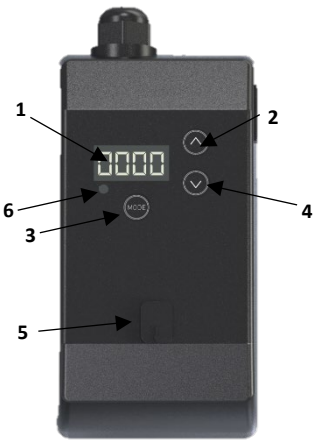
SET 11 – Max voltage control signal

SET 12 – Min voltage control signal

SET 13 – Actuator rotation speed

SET 14 – Feedback signal selection

1	**Display**
2	**Button UP**
3	**Button MODE**
4	**Button DOWN**
5	**Manual override**
6	**Battery status LED**



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	Display indication	Meaning	Operating
SET 1	PErc	Input internal control in %	Selection with UP/DOWN buttons and confirmation with MODE button
	FLo (default)	Input internal control in flow rate	
SET 2	0- 10 (default)	Voltage control signal	Control with voltage signal
	2- 10	Voltage control signal	Control with voltage signal
	0-20	Current control signal	Control with current signal
	4-20	Current control signal	Control with current signal
	on-F	ON/OFF	24 V: open; 0 V: close;
	3-FL	3 points floating	24 V open if white wire connected (3) 24 V close if green wire connected (4)
	rT	Remote control	**Not available**
	P-05	PWM 5 s	PWM (0.1 – 5 s)
	P-25	PWM 25 s	PWM (0.1 – 25 s)
	Int	Internal input	Flow rate set by on board display and buttons. Push MODE, wait until "Set" is replaced by flow rate indication (or flow rate %, depending on SET 1), set the flow rate with UP/DOWN buttons and confirm with MODE.
SET 3	Flow rate on display	Min flow rate selection (default: 0)	Selection with UP/DOWN buttons and confirmation with MODE button
SET 4	Flow rate on display	Max flow rate selection (default: depending on model)	Selection with UP/DOWN buttons and confirmation with MODE button
SET 5	St-P	Set flow rate in "%"	Selection with UP/DOWN buttons and confirmation with MODE button Display option during operation: St allows to see the flow rate value required by the controller; Fd allows to see the current flow rate value given by the valve (the progressive change of flow rate values is displayed during valve stem motion)
	St-F	Set flow rate in "flow rate"	
	Fd-P	Current flow rate in "%"	
	Fd-F (default)	Current flow rate in "flow rate"	
SET 6*	Value on display	Rotation angle compensation	Selection with UP/DOWN buttons and confirmation with MODE button.
SET 7	Value on display	% flow rate offset (default: 0)	Selection with UP/DOWN buttons and confirmation with MODE button
SET 8	oPEn	Valve open at power failure	Selection Fail-CLOSE or Fail-OPEN option. Additional battery needed. **Available with M94FC.**
	CLoS (default)	Valve close at power failure	
SET 9	LIt (default)	Unit SI (m^3/h)	Selection with UP/DOWN buttons and confirmation with MODE button
	GAL	Unit GPM (gal/min)	
SET 10	LIn (default)	Linear control curve	Selection with UP/DOWN buttons and confirmation with MODE button
	EPEr	Equal percentage control curve	
SET 11*	Value on display	Min voltage control signal	Selection min voltage control value with UP/DOWN buttons and confirmation with MODE button
SET 12*	Value on display	Max voltage control signal	Selection max voltage control value with UP/DOWN buttons and confirmation with MODE button
SET 13	PE 15 (default)	Actuator rotation speed 1.5 RPM	Selection of actuator rotation speed with UP/DOWN buttons and confirmation with MODE button
	PE0 1	Actuator rotation speed 1 RPM	
	Auto	Actuator rotation speed automatic	
SET 14	0- 10 (default)	Voltage feedback signal	Selection of feedback signal type with UP/DOWN buttons and confirmation with MODE button
	2- 10	Voltage feedback signal	
	0-20	Current feedback signal	
	4-20	Current feedback signal	

*Contact the manufacturer to modify.

Setting procedure

SET 9 → **SET 4** → **SET 2** → **SET 10**

Other parameters can be set, if necessary, without a preferential path.

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Setting parameter SET 4: PRESETTING

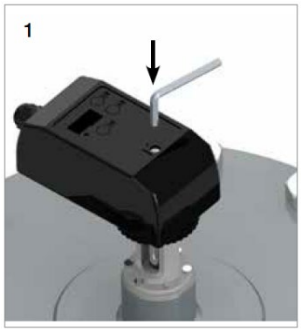
Valve	94FH 2”	94FL 2 ½”	94FH 2 ½”	94FL 3”	94FL 4”	94FL 5”	94FH 5”	94FL 6”	94FH 6”	94FL 8”	94FH 8”	94FL 10”	94FH 10”
Max presetting flow rate [m³/h]	20	20	30	30	55	90	120	90	150	200	300	300	500
Min presetting flow rate [m³/h]	6	6	6	6	16.5	27	36	27	37.5	50	75	90	150
Model code	F-50	F-64	F-65	F-80	F-100	F-125	F-126	F-150	F-151	F-200	F-201	F-250	F-251

The presetting flow rate of valve **94F/95F** can be set through the parameter SET 4 of the **M94F2** actuator: the parameter should set between the max and min presetting flow rate of the valve. SET 3 should be left at 0.

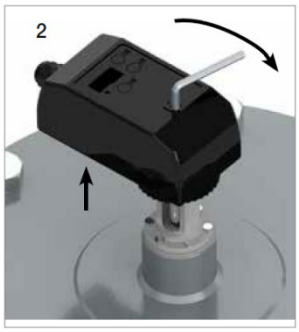
MANUAL OVERRIDE

If a manual opening of the valve is needed, proceed as follows:

1. Open the rubber cover on the actuator upper face and insert the 6mm Allen key



2. Turn the key keeping the released button pushed under the actuator



To re-assembly the actuator, follow the same procedure on *INSTALLATION* section.

ACCESSORIES

M94FC (optional)

Lithium-ion battery case for Safe Return function. Suitable for 2 rechargeable batteries NCR 18650 – 2600 mAh. Batteries are not included.
The LED indicating the status of the batteries on the actuator is RED if the battery is not fully charged. It becomes fixed green when the battery is full power. It is fast flashing green if the battery pack is not plugged and the safety connection has been removed.
For installation, follows the instruction on the back of the actuator.

Dimensions: 78 x 49 x 26 mm. Weight: 140 g.

Technical features:

Type of battery	2 x 18650 Lithium-ion battery
Voltage	3.6 V
Charge time	5 hours after full-discharge
Suggested replacement	18 Months / Warranty 6 months
Suggested capacity	2 x 2600 mAh

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