

## Installation and Operation Instruction

The **MapleF Energy FIT System** is available in an insert-based solution under the name **FIT-MP**. The MapleF FIT-MP is used with:

- MapleF AB DN15-32 (1/2"-1 1/4")

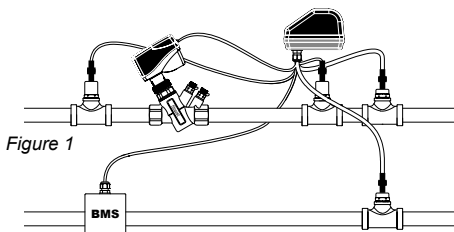


Figure 1

### Insert Setting and Installation

Prior to installing the MapleF Green insert (supplied from factory in setting 5.0 due to calibration), the system should be properly flushed. Blank valve covers are available to be installed during flushing.

It is recommended to grease the O-rings located around the insert and headnut with silicone grease before installing the insert in the valve housing.

The desired flow rate is set by adjusting the insert (turn counter-clockwise to setting 1.0 and then clockwise up) with a special adjustment key. **Range is between 1.0 and 5.0 ⚠ Do not overturn.** Scale setting is located on top of the insert, where the large white digits, numbered 1 to 5, indicate full turns and red digits, numbered 0 to 9, indicate 1/10 of full turn. Flow setting may be done either before or after the insert is installed in the valve housing. Once flow is set and insert is fitted in the valve housing, the actuator may be applied.



Figure 2

### Fitting and Re-fitting the Actuator

The suitable actuator types are MapleF MFN.0.2 and MFN.1.2 (failsafe). These are electrical modu



**Do not connect power to the actuator unless the actuator is already fitted on the valve and NEVER install the actuator in closed position – this may damage the valve. Actuator is supplied in open position to ensure easy commissioning of the system.**

Mount the actuator on the valve and finger tighten the connection union. Do not use additional tools. In case the actuator will have to be removed, it is recommended to electrically open the actuator by activating DIP switch #6 for easier removal. Hereafter disconnect power and finger loosen the connection union. Again, no need for additional tools. Please make sure that the actuator is electrically opened, before re-fitting it on the valve. **It is essential that the actuator runs linear control mode, 2-10V DC.**

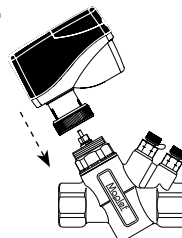


Figure 3

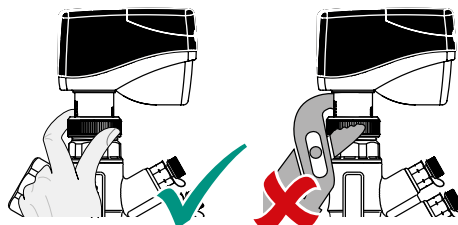


Figure 4



## Orientation

Upside-down installation is allowed along with the standard horizontal and vertical installation (figure 5).

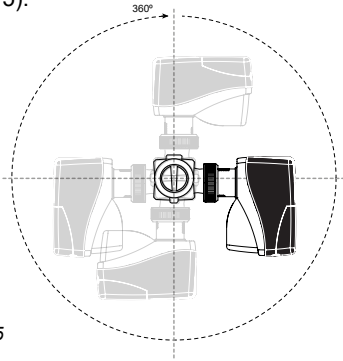


Figure 5

## Intelligent Interface Connection

The Maplef Energy FIT System includes the state-of-the-art Maplef Intelligent Interface which is the controller of the FIT System. The Intelligent Interface is compatible with 24V AC/DC and calculates the BTU and displays the data via Bluetooth® on any Android or iPhone mobile device and includes fully integrated BACnet communication to and from the BMS.

The Intelligent Interface also includes 1 month and 1 year of accumulated BTU data stored.

The FIT System will automatically detect if it is installed in a heating or in a cooling system as it will add T1 and T2 readings and cross-check the result. If  $T1+T2 < 135^{\circ}\text{F}$  the system is seen as a cooling system and if  $T1+T2 \geq 135^{\circ}\text{F}$  it will be considered a heating system.

**Do not remove cover from Intelligent Interface. Opening cover will void warranty.**

## Sensor Kit Connection

The Maplef Energy FIT System includes two temperature sensors that should be installed as close to the coil as possible, within 0.3-3 meter (1-10 ft). T1 should be installed on the inlet of the coil and T2 on the outlet of the coil. Sensors are to be installed in 1/4" ISO ports. The temperature sensors connect via quick-connectors to the grey cables from the Intelligent Interface. Cable length is different for T1 and T2. T1 connects to the longer cable (3 meter / 9 ft) and T2 to the shorter (1 meter / 3 ft).

Optionally, the FIT System may include two pressure sensors that must be installed on or close to the PICV valve. P1 should be installed on the inlet of the PICV and P2 on the outlet. The pressure sensors connect via quick-connectors to the black cables from the Intelligent Interface. P1 and P2 have identical cable length (1 meter / 3 ft), but P1 cable will be marked with a white sticker.

Be aware to connect according to wiring diagrams page 4 and 5 to avoid losing warranty.



Flow Rate Table - Maplef Green										
Insert size: 20 mm · 3/4"						Insert size: 40 mm · 1 1/2"				
16-600 kPaD · 2.3-87 psid <sup>1</sup>			30-800 kPaD · 4.4-116 psid <sup>2</sup>			16-800 kPaD · 2.3-116 psid (at setting 2.6)			Setting	
Green.0 (grey O-ring)			Green.1 (black O-ring)			Green.2 (black O-ring)				
l/sec	l/hr	GPM	l/sec	l/hr	GPM	l/sec	l/hr	GPM		
-	-	-	0.0178	64	0.282	0.240	865	3.81	1.0	
0.0103	37	0.163	0.0393	142	0.624	0.282	1010	4.46	1.1	
0.0233	84	0.370	0.0580	209	0.920	0.322	1160	5.10	1.2	
0.0322	116	0.510	0.0743	268	1.180	0.361	1300	5.72	1.3	
0.0419	151	0.664	0.0887	319	1.41	0.399	1430	6.32	1.4	
0.0500	180	0.792	0.102	366	1.61	0.435	1570	6.90	1.5	
0.0569	205	0.902	0.113	408	1.80	0.471	1700	7.47	1.6	
0.0650	234	1.03	0.124	446	1.96	0.506	1820	8.02	1.7	
0.0719	259	1.14	0.134	482	2.12	0.540	1940	8.56	1.8	
0.0781	281	1.24	0.143	516	2.27	0.573	2060	9.08	1.9	
0.0839	302	1.33	0.152	549	2.42	0.605	2180	9.59	2.0	
0.0889	320	1.41	0.161	580	2.56	0.636	2290	10.1	2.1	
0.0942	339	1.49	0.170	611	2.69	0.667	2400	10.6	2.2	
0.0981	353	1.55	0.178	641	2.82	0.696	2510	11.0	2.3	
0.103	371	1.63	0.186	671	2.95	0.725	2610	11.5	2.4	
0.106	381	1.68	0.194	700	3.08	0.753	2710	11.9	2.5	
0.109	394	1.73	0.202	728	3.21	0.780	2810	12.4	2.6	
0.113	406	1.79	0.210	756	3.33	0.807	2900	12.8	2.7	
0.115	414	1.82	0.218	783	3.45	0.832	3000	13.2	2.8	
0.119	428	1.88	0.225	810	3.56	0.858	3090	13.6	2.9	
0.122	439	1.93	0.232	835	3.68	0.882	3180	14.0	3.0	
0.125	449	1.98	0.239	860	3.79	0.906	3260	14.4	3.1	
0.127	458	2.02	0.245	883	3.89	0.930	3350	14.7	3.2	
0.130	468	2.06	0.252	906	3.99	0.953	3430	15.1	3.3	
0.133	477	2.10	0.257	927	4.08	0.975	3510	15.5	3.4	
0.135	486	2.14	0.263	946	4.17	0.997	3590	15.8	3.5	
0.137	494	2.17	0.268	965	4.25	1.02	3670	16.1	3.6	
0.140	503	2.21	0.273	982	4.32	1.04	3740	16.5	3.7	
0.142	511	2.25	0.277	998	4.39	1.06	3820	16.8	3.8	
0.144	518	2.28	0.281	1010	4.46	1.08	3890	17.1	3.9	
0.146	526	2.31	0.285	1020	4.51	1.10	3960	17.4	4.0	
0.148	532	2.34	0.288	1040	4.57	1.12	4030	17.7	4.1	
0.149	538	2.37	0.291	1050	4.61	1.14	4100	18.1	4.2	
0.151	544	2.39	0.294	1060	4.66	1.16	4170	18.4	4.3	
0.153	549	2.42	0.296	1070	4.70	1.18	4240	18.7	4.4	
0.154	553	2.43	0.299	1080	4.73	1.20	4300	19.0	4.5	
0.155	559	2.46	0.301	1080	4.77	1.21	4370	19.2	4.6	
0.156	563	2.48	0.303	1090	4.80	1.23	4440	19.5	4.7	
0.158	567	2.50	0.305	1100	4.83	1.25	4500	19.8	4.8	
0.159	571	2.51	0.307	1100	4.86	1.27	4570	20.1	4.9	
0.160	575	2.53	0.308	1110	4.89	1.29	4630	20.4	5.0	

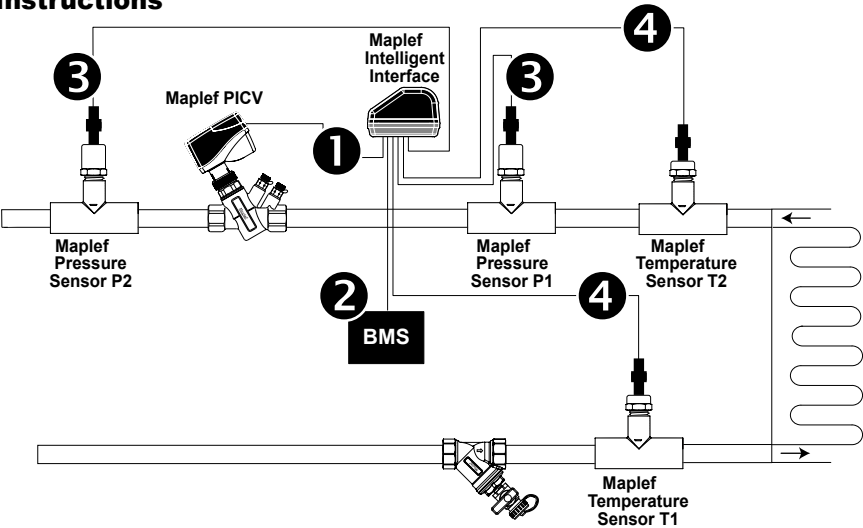
Accuracy: Greatest of either ±10% of controlled flow rate or ±5% of maximum flow rate.

Note 1: If used in pressure range 200-600 kPaD (29-87 psid), accuracy of -20% / +0% applies.

Note 2: If used in pressure range 400-800 kPaD (58-116 psid), accuracy of -20% / +0% applies.

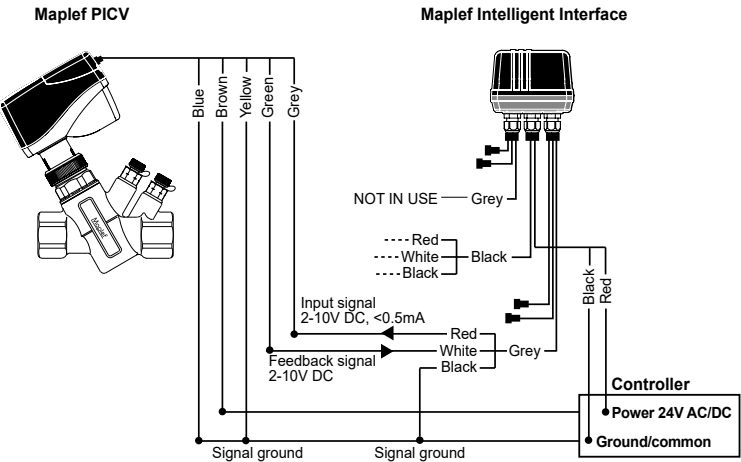


Wiring Instructions



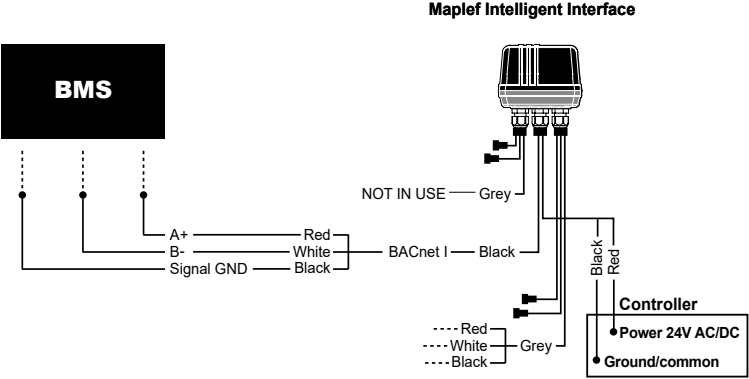
Please find the Quick Start-Up guide for proper set-up of Baud rate and MAC-address and FIT configuration BEFORE connecting Maplef FIT to BMS BACnet

1

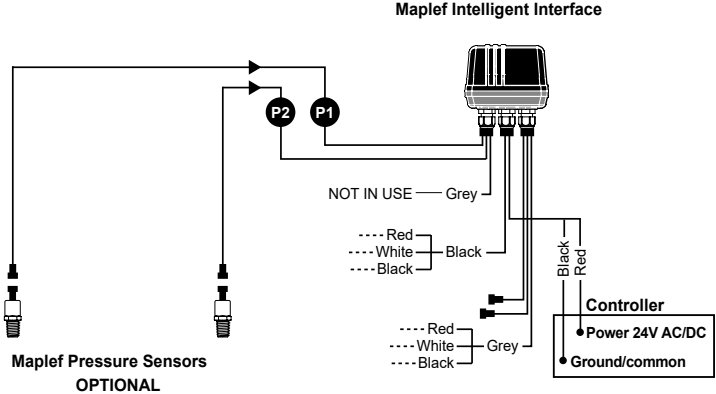




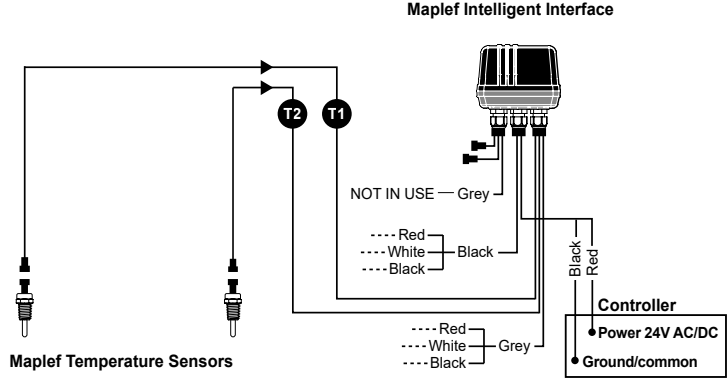
2



3



4





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### Start-up Sequence

When power to the actuator is turned on, the actuator will automatically calibrate to determine closing point. Hereafter it will proceed to normal operation mode (according to control signal).

For the failsafe version (MFN.1.2), capacitor charging will be prioritized (max. 120 sec. depending on capacitor energy level) during start-up and re-powering. After completion of charging mode followed by calibration mode, the actuator will proceed to normal operation mode.

### Auto Cycle Sequence

Auto Cycle can be activated during commissioning. It prevents the valve from jamming when the valve is not moved for a longer period of inactivity. By moving DIP switch #1 from OFF to ON, Auto Cycle is activated. Actuator will then perform 50% stroke cycle every 3 weeks if no stroke movement has occurred.

### Electrical Override

By moving DIP switch #6 from OFF to ON, electrical override is activated and the actuator will open valve fully. During electrical override the LED indicator will blink red and green. When DIP switch #6 is moved back to OFF, the actuator will re-calibrate and thereafter go into normal operation mode. Electrical override is performed with power supply on.

### Failsafe Mode (MapleF MFN.1.2)

When power is lost, the actuator will go into failsafe mode after a few seconds, mandatory that capacitor charging and start-up sequence are completed. The actuator will perform failsafe action (open or close) and stay in failsafe final position until return of power. Upon power, the actuator remains in the final failsafe position until charging mode is reached (max. 60 sec). Hereafter the actuator will return to normal operation mode.



DIP Switch Settings

The valve functions are set on DIP switches found under the connection cover. PCB mounted electrical components will not be directly exposed when DIP switches are to be set. Factory setting for all switches is OFF.

Maplef MFN.0.2 Actuator

DIP switch	Function ON		Function OFF
#6	Electrical override ON		Electrical override OFF
#5	No function		No function
#4	Equal percentage		Linear
#3	Normally Open		Normally Closed
#2	Control signal 2-10V		Control signal 0-10V
#1	Auto cycle ON		Auto cycle OFF

Maplef MFN.1.2 Actuator

DIP switch	Function ON		Function OFF
#6	Electrical override ON		Electrical override OFF
#5	Failsafe open		Failsafe close
#4	Equal percentage		Linear
#3	Normally Open		Normally Closed
#2	Control signal 2-10V		Control signal 0-10V
#1	Auto cycle ON		Auto cycle OFF

LED Status

The LED indicator is visible through the dark colored transparent connection cover. The LED indication will give the following statuses.

	MFN.0.2	MFN.1.2
Normal operation mode	Full on green	Full on green
Charging mode (60 sec)	n/a	Blinking red
Calibration mode (closing point adjustment)	Blinking green	Blinking green
Electrical override mode	Blinking red/green	Blinking red/green
Failsafe mode	n/a	OFF
Perpetual failure mode	Full on red	Full on red



## BACnet programming of Maple Intelligent Interface

In this instruction:

**AV** = Analog Value

**BV** = Binary Value

**MSV** = Multi-State Value.

Default values are underlined.

Please also see Maple FIT BACnet PICS.

After completing **Quick Start-up Sequence** setting Baud Rate (MSV.1), MAC Address (MSV.2) and FIT Configuration (MSV.5) and re-connecting power at specific location start by selecting your **PICV valve** in MSV.7:

1 = Green.0    2 = Green.1

3 = Green.2    4 = Green.3

Hereafter **trim the pressure sensors** (if a solution with pressure sensors is selected). To trim the pressure sensors, please check via BACnet AV.13 (Pressure1) and AV.14 (Pressure2) which show simple read-out from the two pressure sensors. AV = Analog Valve in BACnet communication. Before installation in the system or withdrawn from the system, the pressure sensors should both read zero (= related to atmospheric pressure). Any deviation from zero shall be deducted in AV.16 (Press1Correct) and AV.17 (Press2Correct) respectively. If AV.13 reads 10 and should be zero, then value in AV.16 is entered to -10. It is also possible to calibrate based on another known pressure entity than ATM.

**Select flow unit** in MSV.39:

1 = l/sec    2 = GPM    3 = l/hr

**Select pressure unit** in MSV.6:

1 = kPa    2 = psi

**Select temperature unit** in MSV.3:

1 = °C    2 = °F

Finally **select FIT control mode** in MSV.4:

1 =  $\Delta T$  Control

2 = Comfort Control

3 = Smart Control

When set to direct  $\Delta T$  Control, Maple FIT will work as an energy valve and regulate based on  $\Delta T$  target alone. When set to direct Comfort Control, Maple FIT will work as a PICV for room comfort control. When set to Smart Control, Maple FIT will prioritize room temperature setting and within designated range, optimize the  $\Delta T$ .

Provide **analog control signal** in AV.141 (0% to 100%).

## Condition of the FIT System through BACnet

Besides checking object values already described, the following information is available through BACnet. Please also see Maple FIT BACnet PICS:

**Check the current flow rate** (not measured) in AV.68. To know whether the valve is fully closed, please check the motor position in AV.98 (0%=fully closed). Set max.flow can be changed or confirmed in AV.62.

**Check P1, P2 and  $\Delta P$**  in AV.13, AV.14 and AV.15.  **$\Delta P$  alarm** can be seen in BV.1.

Valid output only on a solution with pressure sensors.

**Check Water Temperatures T1, T2 and  $\Delta T$**  in AV.1, AV.2 and AV.3.  **$\Delta T$  Target** is changed or confirmed in AV.4.  **$\Delta T$  Target Deadband** is changed in AV.5

**Check Room Temperature** in AV.6 and **Room Temperature Target** in AV.7. **Room Temperature Deadband** is changed in AV.8. Control interval for all water- and room temperatures is set in AV.9

**Check current BTU, accumulated BTU for the last month and accumulated BTU for the last year** in AV.10, AV.11 and AV.12.