



FM/1 digi 20

One Channel Electronic Time Switch

The FM/1 digi 20 is a compact electronic 24 hour/7 day time switch module with heavy duty relay contacts for switching low or line voltage loads. Applicable for time of day control of pumps, fans, heaters, HVAC control circuits, lighting, machinery and many other types of commercial, industrial, and agricultural equipment.

The FM/1 digi 20 features large keys with unique "circular pattern" for easy programming, an easy-to-read LCD display and capacitor backup to retain program memory during power outages.



TECHNICAL DATA:

Channels: 1 (SPDT)	Input voltage models available:
Programs: 20	24VAC/DC; 120VAC;
Holiday Program: No	208/240VAC
Daylight time changeover: Manual	Switching output: SPDT relay
Manual 3 way override:	Switch ratings:
On-Auto-Off	16A res. @ 277VAC
Shortest switching time:	1000W Tungsten @ 250VAC;
1 minute	500W @ 125VAC
Reserve carryover: 5 days	

SPECIFICATIONS:

Input draw: 4VA
 Input frequency: 50 or 60Hz
 Wiring connections: 1/4" quick connects
 Ambient temperature: -20°F to 140°F (-28°C to 60°C)
 UL and Canadian UL recognized: File E83486

INSTALLATION & WIRING:

Note: Although the FM/1 models contain some degree of spike and electrical noise protection, as with all electronic devices, these units can be affected by electrical noise. Therefore, it is recommended that they be powered from a voltage source that has no switching devices or inductive loads connected.

1. Check the input and output ratings marked on the unit to make sure this product is suitable for your supply voltage, load, and application.

2. Disconnect supply power prior to installation to prevent electrical shock.

3. Install in accordance with all applicable National and Local electrical code requirements.

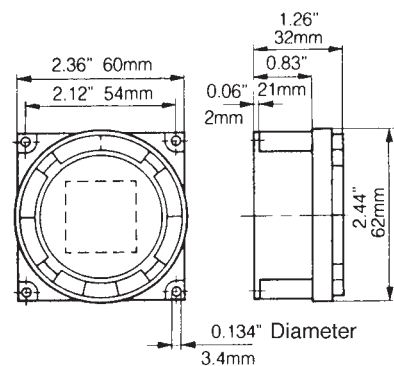
MOUNTING OPTIONS:

The standard FM/1 models may be surface mounted inside a panel or flush mounted with MK-FM mounting kit, available from Grasslin. Indoor NEMA 1, and outdoor NEMA 3R enclosures are available for stand-alone mounting. Consult Grasslin catalog or price sheet for various options.

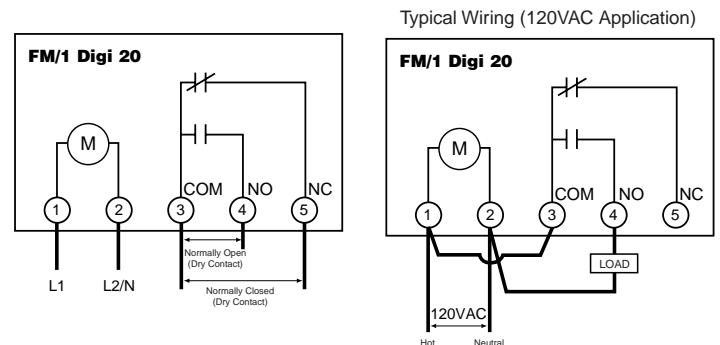
A mounting base (MB-FMPC) is available for printed circuit board mounting. A clear plastic dust cover (DC-FM) is also available.

Models are also available with screw terminals and DIN rail mounting, or for flush mounting with housing and clear cover. (Digi 20A & Digi 20E)

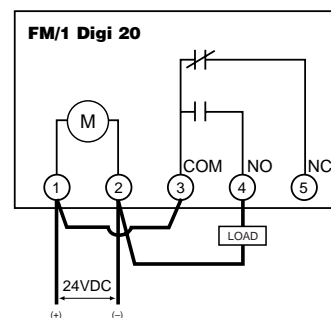
Dimensions



Terminal Connections



Typical Wiring (24VDC Application)



■ KEYPAD DESCRIPTION

Setting the Time/Automatic Run Mode

Prog. Program Mode

Res.* Reset: Clears all programs and time

Select ON or OFF in Prog. Mode, Manual Override in Run Mode

±1h* Manual Daylight Change Key

h Setting the Hour (12:- – AM)

m Setting the Minute (12:01 AM)

Day Set Day(s) for time and programs

*Recessed keys; use a pen point to press

■ LCD DISPLAY ELEMENTS

The LCD incorporates a number of different elements to display various data and information.

Days of the Week → 1 2 3 4 5 6 7

Daylight Time Symbol → +1h

AM and PM Symbol → AM

Time of Day or Switching Time → 88:88

Run Mode Symbol →

ON/OFF Symbol →

Manual Override ON →

Under normal operation the clock symbol should always appear.

		Auto ON Symbol indicates output is ON based on program. Terminals 3&4 make while 3&5 break.
		Auto OFF Symbol indicates output is OFF based on program. Terminals 3&4 break while 3&5 make.
		Continuous ON Symbol indicates output is permanently ON. Terminals 3&4 make while 3&5 break.
		Continuous OFF Symbol indicates output is permanently OFF. Terminals 3&4 break while 3&5 make.
		Temporary ON Symbol indicates output is temporarily ON. Terminals 3&4 make while 3&5 break. It will resume Auto operation at the next program event.
		Temporary OFF Symbol indicates output is temporarily OFF. Terminals 3&4 break while 3&5 make. It will resume Auto operation at the next program event.

■ PROGRAMS

The Digi 20 will accept up to 20 programs

A program consists of:

1. An ON or OFF command
2. Time of day (Hour **and** Minute)
3. Single day or multiple days

A program is required for each ON event, and a program is required for each OFF event.

NOTE: MULTIPLE ON OR OFF EVENTS MAY BE PROGRAMMED. For example, Program 1 may turn the office air conditioner ON at 8AM Mon.-Fri. Program 2 may turn the air conditioner OFF at 5PM Mon.-Fri.

If someone is working late, they may press the override key to turn ON the air conditioner. If they forget to press the override key again when they leave, the air conditioner will stay ON all night (or all weekend).

To prevent this from occurring, **additional OFF times may be programmed.**

- Program 3 can turn the air conditioning OFF at 6PM.
- Program 4 can turn the air conditioning OFF at 7PM.
- Program 5 can turn the air conditioning OFF at 8PM., etc.

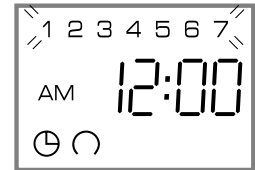
IMPORTANT: BEFORE PROCEEDING WITH SETTING THE TIME AND PROGRAMMING THE UNIT, PRESS THE RESET KEY TO CLEAR ALL DATA FROM MEMORY.

■ SELECTING AM/PM OR MILITARY TIME

After pressing reset, the display may show AM (right). The numbered day symbols will be flashing on and off.

If the display does not show AM, it is in military time mode (24:00 hr.) To change to AM/PM mode, press and hold the **h** key and press the **±1h** key once. AM will appear in display.

If display is in AM mode and military mode is desired, press and hold the **h** key, press the **±1h** key once.



■ SETTING THE TIME

NOTE: If the **h** and **m** keys are held down longer than 2 seconds, the numbers will advance rapidly.

Press and hold the key during the following:
(If Daylight Savings Time is in effect, press **±1h** first)

1. Press **h** to advance to the current hour (while holding down the key)
2. Press **m** to advance to the current minute (while holding down the key)
3. Press **Day** repeatedly to advance to current day (while holding down the key)

NOTE: If the days are flashing, it indicates the day of the week was not set when setting the time. The timer cannot be programmed unless the day of the week is entered.

■ MANUAL DAYLIGHT TIME CHANGEOVER

Each year, in the Spring, press **±1h** to advance the time an hour. In the Fall, press **±1h** to set back an hour.

■ PROGRAMMING 24 HOUR OR 7 DAY SCHEDULES

It is helpful to write out the program schedules *before* beginning. See last page.

IMPORTANT: THE CURRENT TIME OF DAY AND DAY OF WEEK MUST BE SET PRIOR TO PROGRAMMING. SEE "SETTING THE TIME"

Example

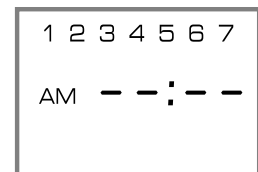
Program 1: ON at 7:00AM Monday thru Saturday

Program 2: OFF at 5:00PM Monday thru Friday

Program 3: OFF at 7:00PM Saturday

Three programs need to be entered.

Press **Prog.** key only once. Display shows:



Program 1 (ON at 7:00AM Monday thru Saturday)

- | | |
|---------------------------------|--------------------------|
| Press key once | ON symbol appears |
| Press h key | to 07AM |
| Press m key once | to 00 |
| Press Day key once | 1 2 3 4 5 6 is displayed |
| Press Prog. key to enter | |

Program 2 (OFF at 5:00PM Monday thru Friday)

- | | |
|---------------------------------|------------------------|
| Press key twice | OFF symbol appears |
| Press h key | to 05PM |
| Press m key once | to 00 |
| Press Day key two times | 1 2 3 4 5 is displayed |
| Press Prog. key to enter | |

Program 3 (OFF at 7:00PM Saturday)

- Press key twice OFF symbol appears
- Press **h** key to 07PM
- Press **m** key once to 00
- Press **Day** key 9 times until only 6 is displayed
- Press **Prog.** key to enter
- Press key to enter Run Mode

IMPORTANT: IF AN "ON" TIME WAS PROGRAMMED THAT IS EARLIER IN THE DAY THAN THE CURRENT TIME, PRESS ONCE TO TURN THE TIMER "ON". (IT DOES NOT "LOOK BACK" TO DETERMINE IF IT SHOULD BE ON OR OFF AFTER PROGRAMMING)

NOTE: If 24 hour time control (same schedule every day of the week) is desired, ignore **Day** key.

If a ON or OFF symbol is not entered, the ON symbol will flash, and program will not be accepted.

DAY KEY SELECTIONS

Press Day Key	Display Shows	Days
0 times	1 2 3 4 5 6 7	Every Day
1 time	1 2 3 4 5 6	Mon.-Sat.
2 times	1 2 3 4 5	Mon.-Fri.
3 times	6 7	Sat. & Sun.
4 times	1	Monday
5 times	2	Tuesday
6 times	3	Wednesday
7 times	4	Thursday
8 times	5	Friday
9 times	6	Saturday
10 times	7	Sunday

REVIEWING PROGRAMS

To review the programs at any time, press **Prog.** key. Programs will appear in the order they were entered with repeated presses of the **Prog.** key. After all programs have been reviewed, the blank display will appear to allow entering another program. Another press of the **Prog.** key will display the number of free programs available, such as **Fr 16** if 4 programs have been entered.

MANUAL OVERRIDE

TEMPORARY: While in the Run Mode, pressing the key once will reverse the output; ON to OFF or OFF to ON. The symbol appears in the display to indicate a temporary override. At the next scheduled switching time, automatic control resumes, eliminating the override.

CONTINUOUS: While in the Run Mode...

- Pressing the key twice will turn the output to ON permanently. symbol appears in display.
- Pressing the key three times will turn the output OFF permanently. symbol appears in display.
- To terminate a continuous override, press the key until appears in the display.

CHANGING A PROGRAM

Select the program to be changed with the **Prog.** key. A new set of days may be selected with the **Day** key just as in initial programming. Hour and minute can be changed with the **h** and **m** keys.

Press **Prog.** key to store the new program.

DELETING A PROGRAM

To delete only one or a few programs: Press **Prog.** key until the desired program is displayed.

Press **m** key to :59 and press once more to blank out.

Press **h** key to 11PM and press once more to blank out.

Press key, display will flash for several seconds and then enter the Run Mode.

Using the reset key will delete ALL programs, the time of day, and day of the week.

TROUBLESHOOTING

PROBLEM: Days are flashing, pressing any key does nothing except key turns output ON and OFF.

SOLUTION: **Time of Day** and **Day of Week** have not been set. See "SETTING THE TIME"

NOTE: This is the condition after a reset. If the timer is found in this condition after it has been installed, programmed and operating for a while, it may indicate that electrical noise or voltage transients have disrupted the microprocessor causing a loss of program information. Call 1-800-272-1115 and request that a no-charge "Snubber Filter" be sent to you to place across the input to the timer, which may solve the problem.

A second, but very unlikely cause of loss of program is a power failure with the backup capacitor low or dead. Check by disconnecting power and monitoring how long the capacitor keeps the time of day in the display. Typically, the capacitor will maintain the time and programs for 5 days.

PROBLEM: Time of day was set while holding the key down, but days are still flashing.

SOLUTION: Current day of week was not set **while holding down the key**. See "SETTING THE TIME"

PROBLEM: It is 10AM and a ON program for 8AM was entered, but the output is not ON. Display shows the and symbols.

SOLUTION: After programming, the timer does not "look back" to determine if it should be ON. Press the key (temporary override) to turn the output ON; appears in display. The timer will resume automatic operation at the next programmed event.

PROBLEM: A program for 8AM Monday thru Friday was entered, but it will not accept it and is flashing.

SOLUTION: The ON or OFF was not entered as part of the program. ON or OFF **must be selected**.

TESTING UNIT

After the unit has been programmed you may want to check if it will perform ON/OFF switching at the correct times. To accomplish this test simply change the current time to 1 minute before the actual programmed switching event time. For example if the ON time programmed is at 8:00AM (MON-SUN) and the OFF time programmed is at 5:00PM (MON-SUN) then first check the ON event by changing the current time to 7:59AM. The unit will display as follows (see setting the time section):

AM 7:59
←

1 Minute Later >>>>

Make sure the Auto OFF Symbol appears.

AM 8:00
←

Auto ON Symbol will appear to indicate the switching event occurred at 8:00AM.

To check the OFF event change the current time to 4:59PM. The unit will display as follows (see setting the time section):

PM 4:59
←

1 Minute Later >>>>

Make sure the Auto ON Symbol appears.

PM 5:00
←

Auto OFF Symbol will appear to indicate the switching event occurred at 5:00PM.

This process verifies that the unit will switch at the proper programmed times. Now simply change the time to the actual current time.

