Relay Assignments

The MFT B-Series has two solid state relays which are rated for +/-30 VDC or 24 VAC up to 0.5 A RMS load. Not all versions of the sensor control board support the relays. The relay functions are configurable, but each relay can only be assigned one function at a time.

The Table below shows the functions that can be assigned to each relay. Note that the sensor purge cleaning function can only use Relay #2 (or DO2).

Relay # (or DO#)	Alarms	Pulse Totalizer	Purge Valve
1	YES	YES	NO
2	YES	YES	YES

Relay assignments are performed in *Program Mode*. Enter *Program Mode*, press **P**, the **654321** access code, and **E**. Press **2** to invoke the *Quick Jump* option entry method and select **Option #8** for the Setup Relay Outputs menu. The first menu item that the meter will prompt for is a Relay #. Using the numeric keys, enter either **1** or **2** and press **E** to accept the entry.

```
SELECT RELAY #
> 1
```

The meter will next prompt for a function to assign to the selected relay. Use the **^** or **v** key to scroll through the valid selections, then press **E** to accept the selected function. As indicated in the Table above, Relay #1 can be assigned to the following functions: ALARM OUTPUT / TOT PULSE OUT. And Relay #2 can be assigned to the following functions: ALARM OUTPUT / TOT PULSE OUT / PURGE OUTPUT.

```
ASSIGN RELAY TO
>ALARM OUTPUT ^v
```

Once a function is configured for the selected Relay #, the meter will advance to the setup menu for that function.

If the flow meter is configured with more than 1 relay output, the meter will repeat the sequence of prompts to configure the other relay output. Press **H** to exit the Setup Relay Outputs Menu.

If the screen displays

```
RELAY IS USED!!
CHANGE IT>NO
```

then the relay is being used by another active function. The relay can be reassigned to the new function by changing the response to 'YES' by pressing the **^** or **v** key and pressing **E** to accept the selection. The meter will reassign the relay to the new function and deassign the previously assigned function and turn it OFF, if necessary. For example, if relay #2 was previously assigned to the PURGE OUT function and later relay #2 was reassigned to the TOTALIZER PULSE OUTPUT, and the PURGE TIMER was turned ON, the meter would ensure that the PURGE TIMER is turned OFF when the relay is reassigned to the PULSE OUTPUT function.

In the case of ALARM OUTPUT assignments to relays, if the relay is reassigned to another function, the alarm will not be turned OFF; only the actuation of the relay due to the triggered alarm will be disabled. The alarm will remain ON and continue to trigger as configured.

Alarm Output Setup

When a relay has been configured to actuate an alarm from the Setup Relay Outputs Menu **(Option #8)**, the meter will advance to the Setup Alarms menu.   The flow meter can have up to 2 alarms, so the user must select an alarm # to assign to the relay. The meter will prompt the user to select an alarm # to setup. Using the numeric keys, enter either **1** or **2** and press **E** to accept the entry.

```
SELECT ALARM #
>1
```

The meter will next prompt to set the selected alarm ON or OFF. Use the **^** or **v** key to change the selection to 'ON' then press **E** to accept the selection.

```
SET ALARM 1
>ON
```

The meter will confirm the relay selection and alarm # assignment similar to the following:

```
ALARM #1
ASSIGNED TO DO1
```

Press **P** or **C** to advance to the next screen.

If the screen displays a prompt similar to the following

```
ALARM 2 AT DO 1
REASSIGN>NO
```

The relay is currently assigned to the other alarm. The user can reassign the relay by using the **^** or **v** keys to change the selection to YES and press **E** to accept the selection. If the relay is reassigned, the other alarm will still be active, but it will not actuate any relay.

After the relay selection is confirmed, the meter will prompt for the normal (unalarmed) state of the relay

```
RELAY 1 STATE
>NORMALLY OPN    ^v
```

Use the **^** or **v** keys to select between NORMALLY OPN or NORMALLY CLS and press **E** to accept the selection. NORMALLY OPN is used if the contact will be closed when the alarm is triggered and NORMALLY CLS is used if the contact will be opened when the alarm is triggered.

The meter next prompts the user to select from a list of trigger events that will actuate the alarm. The available events are FLOW RATE / VELOCITY / TEMPERATURE / GLOBAL EVENT

```
ALARM 1 TRIGGER
>FLOW RATE       ^v
```

Use the **^** or **v** key to scroll through the list and press **E** to accept the desired trigger event for the alarm. GLOBAL EVENT is selected if the alarm will be triggered by any Flow Meter Events. If FLOW RATE, VELOCITY or TEMPERATURE is selected, the meter will prompt for a trip condition that will actuate the alarm. The trip condition can be LOW SETPOINT / HIGH SETPOINT / LO AND HI SP. Use the **^** or **v** key to scroll through the list and press **E** to accept the desired trip condition.

```
ALARM 1 TRIP
>LOW SETPOINT    ^v
```

The next menu screens prompt the user for the LOW and/or HIGH setpoints depending on the trip condition selected. The examples below show the screens prompting for the FLOW RATE low and high alarm set points.

```
LO ALARM SETPT
>0.0000000    SFPM
```

```
HI ALARM SETPT
>10000.0000   SFPM
```

Use the numeric and decimal keys to enter the set point value and press **E** to accept the entry or press P to skip the value entry. Pressing E or P will exit from the Alarm Output Setup menu and will return to the Setup Relay Outputs menu.

Pulse Output Setup

When a relay has been configured to the Pulsed Output of Totalized Flow from the Setup Relay Outputs Menu (Option #8), the meter will advance to the Setup Pulsed Output menu.

If the screen displays

```
PULSE OUTPUT IS
NOT INSTALLED!!
```

the meter was not purchased with this option. Section I defines each version of the hardware to check if this feature is available for your meter.

The meter will prompt to set the Totalizer Pulse Output feature ON or OFF. Use the **^** or **v** key to change the selection to 'ON' then press **E** to accept the selection.

```
PULSE OUTPUT
>ON              ^v
```

After the Pulse Output function is turned ON, the meter will confirm the relay assignment as follows:

```
PULSE OUTPUT #1
ASSIGNED TO DO1
```

Press **E** or **P** to continue. The meter will next prompt for the Totalized Flow per pulse.

```
SCF  PER PULSE
>100000.000
```

Here the accumulated flow per pulse is defined. The units of volume or mass per pulse depend on the system units. The example above is English and standard cubic feet. Using the numeric keys, type in the volume or mass per pulse and press **E** to accept the new value.

The next screen will prompt for the Pulse Width which is the length of time to close the assigned relay when the accumulated volume or mass is reached.

```
PULSE WIDTH
>50            MSEC
```

Using the numeric keys, type in the number of milliseconds to pulse the relay closed. Press **E** to accept the value or press **P** to skip over the value. Pressing **E** or **P** will exit from the Setup Pulsed Output menu and will return to the Setup Relay Outputs menu.

Purge Output Setup
When a relay has been configured to the Purge Output from the Setup Relay Outputs Menu (Option #8), the meter will advance to the Setup Sensor Purge menu.
The first item that the meter will prompt for in this menu is the ON/OFF state of the PURGE TIMER. Use the **^** or **v** key to change the selection to 'ON' then press **E** to accept the selection.

```
PURGE  TIMER
>ON               ^v
```

After the PURGE TIMER is turned ON, the meter will confirm the relay assignment as follows:

```
PURGE  OUTPUT
ASSIGNED to DO2
```

Press **E** or **P** to continue. Next the meter prompts for the PURGE TIME. The PURGE TIME is the length of time the purge solenoid is held open.

```
PURGE  TIME  MSEC
>500
```

Using the numeric keys, type in the number of milliseconds to hold the purge solenoid open during the purge. A short blast generally works best. Press **E** to accept the value.

To allow the sensor to recover from the purge, a HOLD TIME can be configured. The HOLD TIME applies to the update of the flow rate, velocity and temperature values with respect to the 4-20mA output, Modbus output and the LCD display.   The HOLD TIME is

used to mask off the large flow spike following the purge. The HOLD TIME may be a function of the purge gas temperature compared to the temperature of the process gas being measured. The larger the temperature difference between these two variables, a longer HOLD TIME may be needed. Also, lower flow rates tend to need more recovery time following a purge than higher flow rates. Note, the readings will change following a purge since the sensor is cleaner, regardless of what hold time is used. Additionally, the rate at which the shift occurs is filtered by the meter time constant setting.

The HOLD TIME entered is the total time for the entire purge cycle (eg, a HOLD TIME of 2000 milliseconds with a PURGE TIME of 500 milliseconds means that the Purge Relay will be pulsed for 500 milliseconds, followed by an additional 1500 milliseconds of idle time to allow for sensor recovery). Therefore, the entered HOLD TIME must be greater than or equal to the entered PURGE TIME. Using the numeric keys, type in the number of milliseconds for the desired HOLD TIME. Press **E** to accept the value.

```
HOLD TIME MSEC
>2000
```

The meter will next prompt for the PURGE INTERVAL in minutes. The PURGE INTERVAL is used to set the frequency of the purge cycle. For example, a PURGE INTERVAL of 60 minutes will trigger one purge per hour.

```
PURGE  INTV MIN
> 60
```

Using the numeric keys, type in the number of minutes for the desired PURGE INTERVAL. The meter will accept a PURGE INTERVAL between 1 and 1440 minutes. Press **E** to accept the value or **P** to skip over the value. Pressing **E** or **P** will exit from the Setup Sensor Purge menu and will return to the Setup Relay Outputs menu.