

Appendix E

Flow Max

Flow Max is a unique feature specifically designed to manage multiple Evolution DX2 controllers which share a common water source.

Figure E-1: “Hardwire Configuration” illustrates a typical installation.

***Note:** The Flow Max feature is not applicable for any controller which has exclusive use of its water source (One point of connection (POC) per controller). Please refer to Appendix A: "Flow Meters", whenever flow and flow control (Master Valve and Pump) is required for a single controller installation.*

Flow Max utilizes the intelligence of Evolution DX2 field satellite controllers to provide the following features:

- Operation of shared Master Valves, Pump or Flow Meters across controllers without the need for peripheral relays or complex wiring
- Shared devices may be wired in the conventional fashion to the nearest controller
- Dynamic adjustment/validation of station flow limits as stations turn on and off anywhere in the system
- Detection of system main line breaks
- Detection of system unscheduled flow
- Ability to read the flow GPM rates at any of the Flow Max participant controllers
- Automatic establishment of flow limits and current limits for all the controllers in the system

- Automatic system protection for the shared pump in partial power outages or communication failures
- Automatic generation of diagnostic system warning messages at each Flow Max unit
- Dynamic real time monitor shows system status at all times

Overview

Flow Max systems intelligently share resources and manage operations for satellites utilizing a single point of connection (POC). The shared resources may include a common pump, two Flow Meters, two Normally Closed Master Valves and one Normally Open Master Valve.

A Flow Max system is comprised of a number of identical DX2 Controllers (typically 3 to 5) with the first controller set up as the submaster and the remaining units set up as satellites.

Controllers that share any Pump, Master Valve or Flow Sensor are defined as Flow Max participants. As Flow Max participants, the Evolution DX2 controllers must be part of a serial hardware configuration. Controllers that are not Flow Max participants may reside on the hardware link and are defined as non-participants.

The serial hardware configuration requires a communications cable and the appropriate communications card at each controller, as depicted in Figure G-2.

Flow Max provides a means to detect station flow limits and main line breaks within design and programming limitations. All controllers participating within a Flow Max system must be programmed as Flow Max participants from each of their respective control panels.

Submaster

The Submaster Controller in the Flow Max group is the watchdog for the entire group. It monitors all participant device operations such as pumps and master valves. It also issues corrective action for flow violations, maintains the communication link status and accumulates all flow related status. The Submaster allows the user to review all pertinent shared device information from its control panel. The user can also monitor real time activity such as measured flow, upper and lower limit changes as stations transition, as well as flow delay status.

The Submaster allows flow limits and current limits for each station of all participant controllers to be established automatically from one location.

Devices

The devices in a Flow Max system are defined as follows:

- Master Valve 1 (MV1 - normally closed)
- Master Valve 2 (MV2 - normally closed)
- Normally Open Master Valve (N.O.)
- Pump
- Flow Meter 1 (FM1)
- Flow Meter 2 (FM2)

Flow Max allows any participant controller to utilize a shared device. When a Flow Max participant program/ISC reaches its "Start Time," the Submaster initiates a command to turn the device on. The device will remain on provided there is at least one program or ISC running that has been set up to share the use of the device.

The shared device may be connected to any Flow Max participant controller. Each device connection is made to one and only one controller. All other participant controllers that

share the use of the device must be programmed at the respective controller to select the appropriate option.

The Master Valve and Pump devices are physically connected to the respective controller Master Valve Power Board (Part # PCDX2-MV). The Flow Meters are connected to the respective controller Sensor Terminal Board (EV-SEN). Flow Meter installation instructions are included with the optional Flow Sensor kit.

Flow Sensors

Flow sensor operation must include the calibration factors of "K" and "Offset" values for accurate calculations. These values are required to compensate for the differences between pipe size and flow sensor used. Complete tables on K and Offset values are given in Appendix A: Flow Meters.

The satellite controllers that are physically connected to flow sensors must have the "K" and "OFFSET" values for the particular flow sensor programmed. The Submaster **MUST** also have the "K" and "OFFSET" value programmed identical to those programmed at the controllers where they are connected.

Caution:



K and Offset value difference between the submaster and satellites will cause severe errors in Flow Meter measurements. The results can virtually eliminate the over-limit protection features such as Main Flow, Unscheduled Flow, etc.

The Submaster must also be programmed to identify "Uses Flow 1," "Uses Flow 2," or "Uses Sum of Flow 1 and 2."

Flow Check Delay

The Flow Check Delay provides a specified amount of time before any limit comparisons or corrective action is taken by the system. This allows water lines and pressures to stabilize after station turn on and turn off transitions.

Assume the system has the default check delay of two minutes. When a station turns on, the flow measurement takes place immediately, however, the limits will not be checked or reacted upon until the first reading after the flow check delay has completed. Keep in mind, that the more station transitions that occur within the group of Flow Max participants, the more limits will go un-checked.

Main Line Limits

For any number of controllers within a Flow Max group, there will only be one Main Flow Limit. Remember that the main flow limit must be higher than an expected flow under normal operation yet low enough to react when a main break line occurs.

Flow Max Limitations

Although the number of controllers in a Flow Max system is not limited, the higher the number of participants, the less control there is to detect problems.

Assume a total of five controllers in a Flow Max group with all five controller programs running simultaneously. Each of the five programs operating has stations that under normal conditions use 100 Gallons Per Minute to irrigate. Each station allows for a 10% Upper Limit Tolerance. With a 10% tolerance, a station normally using 100 GPM would be allowed a maximum flow of 110 GPM before causing an alarm. With five stations operating under the same conditions, Flow Max, which sums all limits, will allow a maximum flow of 550 GPM before causing an alarm for a station upper limit violation. This means that a

broken head would require a 50 GPM measurable difference before causing an alarm, not a 10 GPM difference, which would be the case if only one station had been operating. Under the conditions above, normal operating flow would be 500 GPM with station limits allowing up to 550 GPM. The main flow limit must be higher than 550 GPM. The question is, does a main line break yield more than 550 GPM? That's where programming and scheduling can accommodate the ability to keep the main limit within an amount detectable by a real break.

Physical Configuration

The Hardwire Link provides the communication among all controllers of a standard irrigation system and/or a Flow Max system. All units are connected in a series configuration using direct burial EV-CAB-COM twin axial cable. The Hardwire Link provides reliable communication among the controllers at distances up to several thousand feet.

Figure E-1: See Hardwire Configuration illustrates a typical wiring configuration for a 3 controller system.

Caution:



Hardwire Link Cable installation must maintain polarity for proper operation.

The Controller Hardwire link requires the installation of the standard Evolution DX2 Communications Circuit Board, RMIS part # DX-HW.

In a stand-alone configuration, both submaster and satellite units may be equipped with the standard circuit board.

System configurations that include the Central Control Computer will require the submaster controller to operate with either a radio communication board or a phone communication board.

For radio operation, install the RF (radio frequency) Evolution DX2 Communication Circuit Board, RMIS part # DX-RF. The submaster will then communicate by radio to the Central Control

Computer and through the hardwire link to the controller satellites. The DX-RF board communicates to the Central Control Computer via the 25-pin RS=232 connected to J1.

For phone communication, install the phone DX2 Communication Circuit Board, RMIS part # DX-PH. The submaster will then communicate by phone (modem) to the Central Control Computer and through the hardwire link to the controller satellites. The DX-PH board communicates to the Central Control Computer via the RJ-11 phone connected to J5.

The following pictorial diagrams of Figures 1, 2 and 3 illustrate the wiring detail and connections of a typical system configuration:

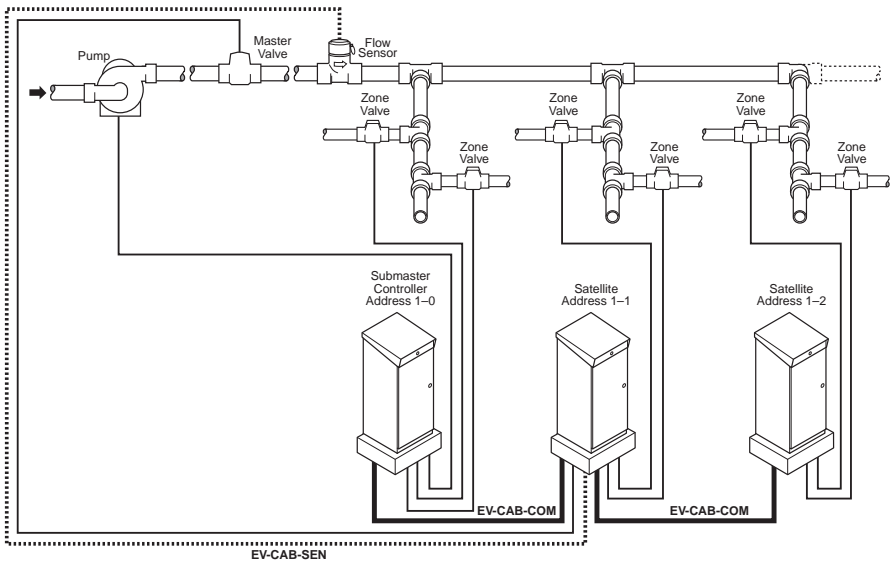


Figure 204: Flow Max Hardwire Configuration

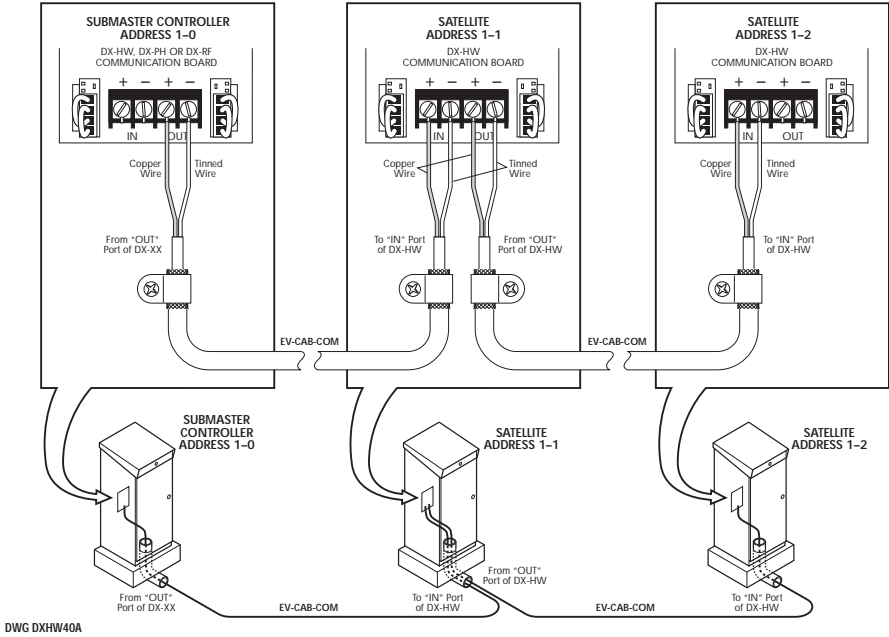
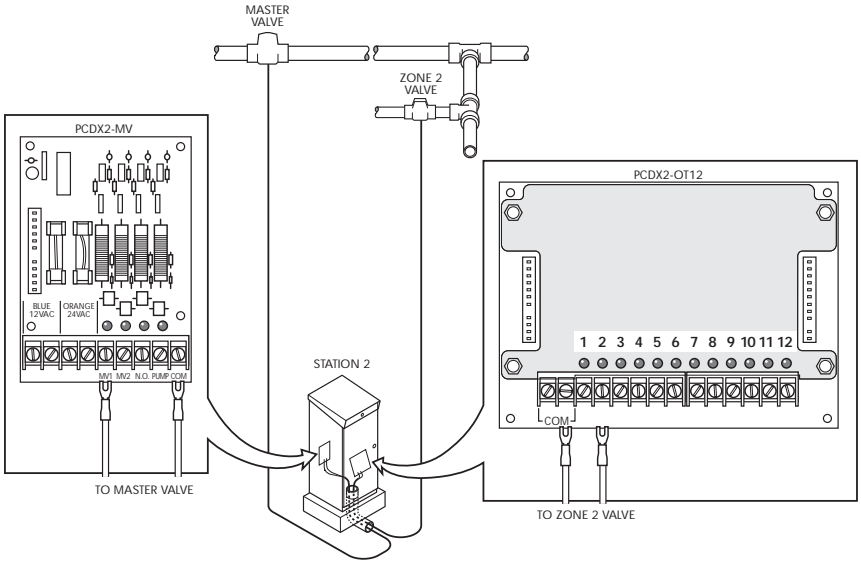


Figure 205: Detailed Hardwire Connections



DWG DXMV10A

Figure 206: Detailed Master Valve and Station Connections

Master Valve/Pump Configuration

The Master Valve or Pump may be physically connected to any controller of the system, which is then shared by the remaining controller units. Any given valve/pump may be physically connected to only one controller.

The Master Valve Power Board (RMIS Part # PCDX2-MV) supplies the power and control for the Master Valves and Pump. Every controller is equipped with this board assembly, providing the ability to connect any given valve/pump to any controller. Connections are made to the screw terminals as depicted in Figure E-3. One wire of the valve/pump connects to its associated terminal and the other (common) wire connects to the COM terminal.

Flow Max Setup Procedure

Overview

The following section details the programming required in order to setup a Flow Max configuration. Programming must be performed at all controllers which are utilizing this feature. A typical Flow Max setup includes the following:

Submaster:

- Submaster Address Entry
- Share Mode Selection
- Share Devices Configuration
- Flow Meter K and Offset Values
- Station Number and Valve/Pump Assignments
- Unscheduled Flow Limits

Satellite:

Non-Participant

- Controller Configuration (Normal Mode)

Participant

- Share mode selection
- Share devices configuration
- Flow Meter K and Offset Values (if connected to this satellite)

This procedure utilizes the configuration depicted in Figure E-1: Hardwire Configuration with a submaster address of 1-0. The figure illustrates a system consisting of three controllers, a Pump, one Master Valve and one 2 inch Flow Sensor. The Pump is physically connected to the submaster and the Master Valve and Flow Sensor are physically connected to satellite

address 1-1. Table 1:Flow Max Sample Worksheet lists the parameters for each controller.

Submaster Setup Procedure

Step 1 Set up the first controller of the hardwire link as the Submaster by advancing through the following sequences:



F1=Main Menu
F5=Setup
F4=Controller
F4=Configuration
F2=Acts As Submaster
F1=Radio/Wire



Figure 207: Submaster Address Entry

Enter 1 then press ENTER to return to Main Menu.

Note: For further information on creating the Submaster, refer to Chapter 4: Setup.

Step 2 Select the devices which are to be shared in the Flow Max operation from the following menu sequence:



F1=Main Menu
F5=Setup
F4=Controller
F4=Configuration
F3=Flow Max



Figure 208: Master Valve/Pump Selection

Step 3 Select F1=SHARE FLOW, PUMP & MV.

Note: This selection specifies that the Flow Sensor, Pump and Master Valve will be shared by all participating controllers. All participant Satellite Controllers of a Flow Max system should be set up with:

- *F1=SHARE FLOW, PUMP & MV*
- *F3=NORMAL MODE*

Selection applies to non-participating units that reside within a hardwire link configuration.

Non Flow Max participants may utilize their local pump, master valves and flow meters in a conventional fashion. This operation will be independent of any Flow Max activity.

Step 4 Configure the Submaster in the Flow Max Mode, select F3=FLOW MAX and select the connected devices as follows:



F1=Main Menu
F5=Setup
F4=Controller
F4=Configuration
F3=Flow Max
F1=Share Flow, Pump & MV



Figure 209: Flow Meter 1 Connection

Step 5 Select F2=NO.

Note: The NO response asserts that Flow Meter 1 is not physically connected to this controller and will not be under the control of this controller.

Step 6 Using the Down Arrow key, advance to the Flow Meter 2 Input display and select F2=NO.

Note: There is no second flow meter in our example procedure.

Step 7 Press the Down Arrow key to advance to the following display:



Figure 210: Pump Connection

Step 8 Press F1=YES.

Step 9 Press the Down Arrow key to advance to the following display:



Figure 211: Master Valve 1 Connection

Step 10 Press F2=NO.

Step 11 Press the Down Arrow key to advance to the following display:



IS SHARED MV2 CONNECTED TO THIS CLOCK?

| F1 | =NO | F2 | =YES | NOW=YES | ↑ |

Figure 212: Master Valve 2 Connection

- Step 12** Press F2=YES, this example procedure does not utilize MV2.
- Step 13** Press the Down Arrow key to advance to the following display:



IS SHARED N.O. CONNECTED TO THIS CLOCK?

| F1 | =NO | F2 | =YES | NOW=NO | ↑ |

Figure 213: Normally Open Valve Connection

- Step 14** Press F2=YES, this example procedure does not utilize a Normally Open Master Valve.
- Step 15** Using the Down Arrow key, advance to the following display and enter the least significant portion of the last address of the satellite configuration.

Note: If all satellite controllers are communicating properly, the last address will automatically appear in the display.



Figure 214: Last Address Entry

Step 16 In a three controller system, the address of the last unit is xxx-02. Enter 02 then press ENTER.

Note: If the correct address appears in the display, just press ENTER.

Press the QUIT key to return to the base menu.

Step 17 Flow Meter K and Offset Values

All Flow Meter K and Offset values of both Flow Meter 1 and Flow Meter 2 (if used) must be entered at the Submaster Controller, regardless of physical connection location. The values must also be entered at the Satellite Controllers that are physically connected to Flow Meter 1 or 2.

Set the K VALUE and OFFSET VALUE in the Submaster by advancing through the following menus:



- F1=Main Menu
- F5=Setup
- F5=Sensors
- F2=Flow

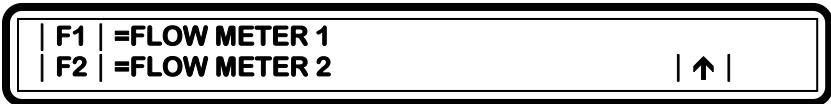


Figure 215: Flow Meter Selection

Select F1=FLOW METER 1.

Note: Refer to Appendix A to select the proper K value and Offset value for your installation.

Step 18 From the Set Value display, press F1=SET K VALUE to advance to the K VALUE entry screen:

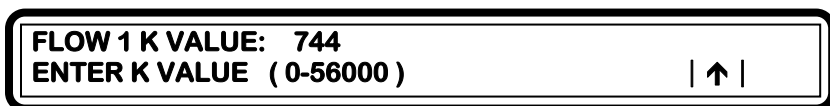


Figure 216: K Value Entry

Enter the appropriate K VALUE then press ENTER.

Step 19 Select F2=SET OFFSET VALUE to advance to the following OFFSET parameter display.

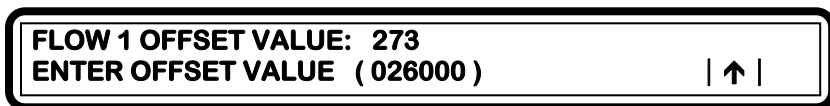


Figure 217: Offset Value Entry

Enter the appropriate OFFSET VALUE.

Note: For further information on K VALUE and OFFSET, refer to Chapter 4: Setup and Appendix A: Flow Meter.

Step 20 This completes the Submaster Setup procedure.

Press the QUIT key to return to the base menu.

Flow Max Main Line Flow Limits Procedure

This procedure establishes the maximum flow limit for the complete Flow Max irrigation system.

In a Flow Max system, the total GPM of all participating controllers is calculated into the overall Main Line Flow Limit value. The Main Line Flow Limit is entered at the submaster controller only. For any number of controllers within a Flow Max group, there will only be one Main Line Flow Limit. Remember that the Main Line Flow Limit must be higher than an expected flow under normal operation yet low enough to react when a main break occurs.

Main Flow Procedure

Step 1 Advance to the Station Number/Master Valve Entry screen through the following sequence:



F1=Main Menu
F5=Setup
F3=Stations
F2=Limits/Type

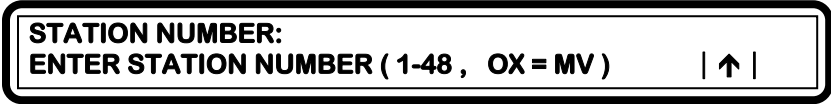


Figure 218: Main Flow Limit Entry

Step 2 Enter 01 (zero 1) then press ENTER. The following screen options are displayed:



| F1 | =CURRENT LIMIT | F2 | =FLOW LIMIT | ↑ |

Figure 219: Main Limit Options

- Step 3** Select F2=FLOW LIMIT. The maximum main flow limit is displayed (the default value is 2000 GPM).



MAIN FLOW MAX FLOW LIMIT: 2000
ENTER MAX LIMIT (0-2000) | ↑ |

Figure 220: Main Flow Maximum Limit

- Step 4** Enter the determined value for your system and press ENTER. Press QUIT to return to the base screen.

This completes the Main Flow Limit procedure.

Press the QUIT key to return to the base menu.

- Step 5** **Unscheduled Flow Limit**
From the base menu, advance to the UNSCHED FLOW LIMIT display through the following sequence:



F1=Main Menu
F5=Setup
F4=Controller
F1=Flow Options
F4= Unshed Limit



Figure 221: Unshed Flow Limit

Enter the appropriate value then press ENTER.
This value sets the maximum allowable flow when
NO stations are on (units in GPM).

This completes the Flow Max setup procedure at the
submaster.

Press the QUIT key to return to the base menu.

Satellite Controllers

Procedure

The remaining two Satellite Controllers may be configured to
either of the two following options:

- Non-participant Satellite - Satellite IS NOT part of the Flow Max system.
- Participant Satellite - Satellite IS part of the FlowMax system utilizing one or more shared devices.

Step 1 Non-participant Satellite

Note: This step does not apply to our sample procedure.

Advance through the following displays to clear all
Flow Max connections:



F1=Main Menu
F5=Setup
F4=Controller
F4=Configuration
F3=Flow Max



Figure 222: Normal Mode

Select F3=NORMAL MODE.

The controller returns to the base menu.

Step 2 Participant Satellite (No Physical Device Connection)

Establish the Flow Max mode at the satellite by advancing to the configuration display as follows:



F1=Main Menu
F5=Setup
F4=Controller
F4=Configuration
F3=Flow Max



Figure 223: Controller Options

Select F1=SHARE FLOW, PUMP & MV and verify that the Main Menu returns.

Note: *This mode selection must coincide with what was programmed at the submaster.*

Press the QUIT key to return to the base menu.

Step 3 Set up device parameters by advancing to the Flow Max display through the following sequence:



<p>F1=Main Menu F5=Setup F4=Controller F4=Configuration F3=Flow Max F1=Share Flow, Pump & MV</p>

IS FLOW METER 1 CONNECTED TO THIS CLOCK?

| F1 | =YES | F2 | =NO | NOW=NO | ↑ |

Figure 224: Flow Meter Connection

Step 4 Enter F2=NO and press the Down Arrow. Repeat for the five remaining displays and respond to each of the following displays with F2=NO:

- Is Flow Meter 2 Connected To This Clock?
Then press the Down Arrow key.
- Is The Pump Connected To This Clock?
Then press the Down Arrow key.
- Is Shared MV1 Connected To This Clock?
Then press the Down Arrow key.
- Is Shared MV2 Connected To This Clock?
Then press the Down Arrow key.
- Is Shared N.O. Connected To This Clock?

Then press the Down Arrow key.

In larger installations, repeat step on all remaining controllers with no physical device connected.

Press the QUIT key to return to the base menu.

Step 5 Participant Satellite (Physical Device Connected)

This procedure assumes our example configuration with devices MV1 and FM1 physically connected to Satellite address 1-1.

Advance to the Flow Meter display through the following sequence:



F1=Main Menu
 F5=Setup
 F4=Controller
 F4=Configuration
 F3=Flow Max
 F1=Share Flow, Pump & MV



Figure 225: Flow Meter Connection

Step 6 Using the Down Arrow key, respond to the six sub-menus of the SHARE FLOW, PUMP & MV Menu accordingly, per the system configuration.

Select F1=YES, then press Down Arrow key.

This selection must be identical to the submaster setup. Select F1=YES for Flow Meter 1.

The K and Offset Values will require configuration using the exact same values as entered for the submaster. Refer to the Flow Meter K and Offset Values section of the Submaster procedure.

Step 7 Press the Down Arrow key.
Is Flow Meter 2 connected to the clock?

Step 8 Press F1=NO, then press the Down Arrow key.
Is the Pump connected to this clock?

Step 9 Press F1=NO, then press the Down Arrow key.



Figure 226: Master Valve Connection

Step 10 Select F1=YES for MV1 to complete the configuration for this sample procedure. Once all the participants have been programmed with the Flow Max configuration data:

- Program each satellite with the desired irrigation program(s).

Note: *Insure the program(s) have been set up properly for usage of a Master Valve and/or Pump.*

- Flow limits must be established for all stations in the system. Flow limits can be established using the Auto Limits feature.

This completes the Setup procedure for the satellite controllers.

Press the QUIT key to return to the base menu.



F1=Main Menu
F5=Setup
F3=Stations
F3=Auto Limits



Figure 227: Auto Limits

Selecting F2=SET LIMIT (%) allows a global % to be used for upper limit calculations. Be sure to set the % before selecting the F3 or F1 option.

Selecting F3=AUTO LIMITS FOR ALL SATELLITES will start the Auto Limits function. All Flow Max participants will be tested. Each station is turned on one at a time and the flow limits will be automatically learned.

Note: This selection applies to the submaster only.

Flow Max Worksheet

The Flow Max Worksheet lists all parameters for the example Flow Max configuration. This table may serve as a guide to setting up a future Flow Max system.

Table 6: Flow Max Sample Worksheet

Menu Function	Submaster	Controller 1	Controller 2
Address	1-0	1-1	1-2
Share Flow Pump & MV	yes	yes	yes
Flow Meter 1	No	yes	no
Flow Meter 2	n/a	n/a	n/a
Pump	yes	no	no
Shared MV 1	No	yes	yes
Shared MV2	n/a	n/a	n/a
Shared N.O.	n/a	n/a	n/a
Last Address	2	(auto config)	(auto config)
K/Offset Value	yes	yes	no
Flow Limits	yes	yes	yes
Main Limits	yes	no	no
Unsched Limit	yes	no	no
Non-participant	No	no	no

Device Connection

Flow Max Worksheet

Menu Function	Submaster	Controller 1	Controller 2	Controller 3
Address				
Share Flow Pump & MV				
Flow Meter 1				
Flow Meter 2				
Pump				
Shared MV 1				
Shared MV2				
Shared N.O.				
Last Address		(auto config)	(auto config)	(auto config)
K/Offset Value				
Flow Limits				
Main Limits				
Unsched Limit				
Non-participant				

Device Connection

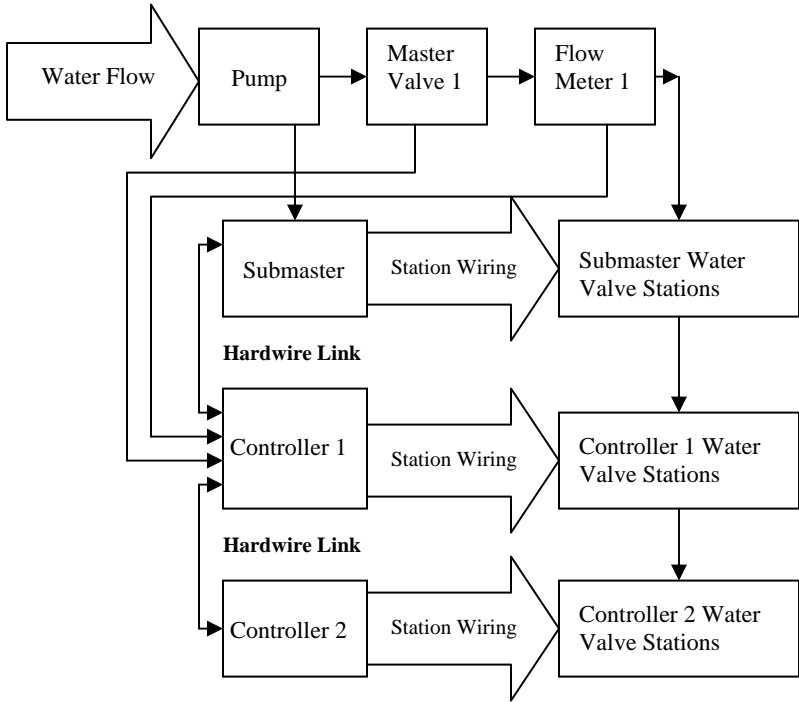


Figure 228: Configuration Block Diagram

Flow Max Diagnostic Tools

Real Time Flow Monitor

A Real Time Flow Monitor is available at the submaster controller of a Flow Max system. This tool provides a wealth of information about the operational status of the system. The real time monitor can be started and run in the back ground as the system is running.

Procedure

Step 1 Advance to the real time flow screen display as follows:



F1=Main Menu
F3=Status
F2=Measurements
F1=Flow



Figure 229: Submaster Real Time Review

The Real Time Flow Monitor updates continuously and displays:

- Flow from Flow Sensors one and two (F1, F2)
- The sum to Flow Sensor a and Flow Sensor 2 (TF)
- The dynamic flow upper limit (UL), changes whenever stations at any controller transition On or Off
- The dynamic flow lower limit (L), changes whenever stations at any controller transition On or Off

- The status of Master Valves and Pump (On or Off)

MV1 = master valve 1

MV2 = master valve 2

NO = Normally open master valve

P = PUMP

- The status of whether the submaster is in Flow Delay (FD) mode. If "FD" appears on the second line of the display this indicates that flow delay is in effect, hence limits are not being checked. The absence of "FD" from the display means that the measured flow is being checked against the displayed limits.

The Real Time Flow Monitor is a useful tool for verifying that the proper flow delay has been programmed for the system. Flow readings should stabilize a minimum of 20 to 30 seconds prior to the "FD" removal from the display. This should provide adequate margin when programming this parameter.

Step 2

In addition to the submaster capabilities, each participant controller of the Flow Max system can display the measured flow. Flow is monitored at the Flow Max participant using the same key sequence as at the submaster.

Press the QUIT key to return to the base menu.

From the Flow Max participant controller, advance to the satellite measured flow screen as follows:



F1=Main Menu
F3=Status
F2=Measurements
F1=Flow



Figure 230: Satellite Real Time Review

Press the QUIT key to return to the base menu.

Review Flow Max Physical Configuration

The Flow Max physical configuration can be reviewed after it has been entered into all Flow Max participants. The review capability is available at the submaster only.

Review All Procedure

Step 1 Advance to the program display screen as follows:



F1=Main Menu
F3=Status
F4=Review All

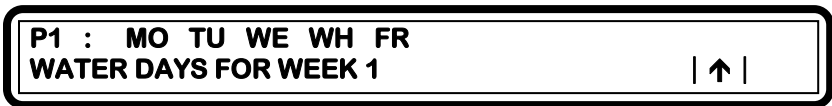


Figure 231: Program Parameters

The first display indicates the program number and the watering days as programmed.

Step 2 Press the Down Arrow key repeatedly to step through all parameters of the program.

Continue pressing the Down Arrow key until the following submaster configuration screen is displayed:



Figure 232: Submaster Configuration

This configuration screen displays the submaster address, the selected mode, and the devices that are physically connected to the submaster.

- Step 3** Press the Down Arrow key to display the screen for the next satellite address unit.



Figure 233: Satellite 001 Configuration

Satellite address 001 is configured to the same mode, with no physical devices connected.

- Step 4** Press the Down Arrow to display the screen for the next satellite address unit.



Figure 234: Satellite 002 Configuration

Satellite address 002 is configured to the same mode, but with Flow Meter 1 physically connected.

Step 5 Continue pressing the Down Arrow key to review all remaining satellite units.

Note: *A device can only be physically connected to one controller. Duplicate device assignments must be checked, verified and eliminated.*

This completes the Flow Max REVIEW ALL procedure.

Press the QUIT key to return to the base menu.

Flow Max Warnings and Exception Conditions

All warnings referenced in this section are described fully in Chapter 10, Flow Max warnings. Please refer to that section for details. Most exception conditions result in warnings being generated at the submaster as well as each Flow Max participant. Different information however will appear at different controller locations depending upon the circumstances.

Flow Max Lower Limit Violation

The submaster has determined that the measured flow from the flow meters(s) is less than the expected flow. Irrigation is terminated for all stations which were on at the time of the violation. Programs automatically advance to their next scheduled station.

SUBMASTER WARNING	SATELLITE WARNING
<i>FM FLOW LO LIM</i>	<i>FM STATION ADVANCE</i>
This warning includes a list of satellites which had stations on at the time of the alarm.	Lists the station(s) which were on Note: FM STATION ADVANCE only appears at the satellite if at least one station was turned on.

Flow Max Upper Limit Violation

The submaster has determined that the measured flow from the flow meters(s) is greater than the expected flow. Irrigation is terminated for all stations which were on at the time of the violation. Programs automatically advance to their next scheduled station.

SUBMASTER WARNING	SATELLITE WARNING
<i>FM FLOW UP LIM</i>	<i>FM STATION ADVANCE</i>
This warning includes a list of satellites which had stations on at the time of the alarm.	Lists the station(s) which were on. Note: FM STATION ADVANCE only appears at the satellite if at least one station was turned on.

Flow Max Communications Failure

The hardwire data communications between the submaster and one or more satellites has been lost or interrupted. This may be indicative of a failure of the communications cable which runs to/from each satellite in a Flow Max configuration. All irrigation is terminated.

SUBMASTER WARNING	SATELLITE WARNING
<i>HW COMM FAIL</i>	<i>OFFLINE</i>
	<i>FM STOP WATER</i>
	Lists the station(s) which were on.
	Note: The "OFFLINE" warning only appears at the satellite (s) which lost hard wire communications.

Flow Max Main Flow

The main line limit for the Flow Max system has been exceeded. All irrigation is terminated and all future scheduled irrigation will be inhibited.

SUBMASTER WARNING	SATELLITE WARNING
<i>FM MAIN FLOW</i>	<i>FM STOP WATER</i>
This warning includes a list of satellites which had stations on at the time of the alarm.	Lists the station(s) which were on.

Flow Max Unscheduled Flow

Flow was detected but no controllers within the system had any stations which were turned on.

The normally open master valve will be energized and all future scheduled irrigation will be inhibited.

SUBMASTER WARNING	SATELLITE WARNING
<i>UNSCHED LIMIT</i>	<i>FM STOP WATER</i>
This warning includes a list of satellites which had stations on at the time of the alarm.	Lists the station(s) which were on.

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