

UMC800 Controller Technical Overview

Specification

Overview

The Universal Multiloop Controller (UMC800) is a modular controller designed to address the analog and digital control requirements of small unit processes. With up to sixteen analog control loops, four setpoint programmers, a setpoint scheduler,

and an extensive assortment of analog and digital control algorithms, the UMC800 is an ideal control solution for furnaces, environmental chambers, ovens, reactors, cookers, freeze dryers, extruders, and other processes with similar control requirements.

Accommodating up to 64 universal analog inputs, 16 analog outputs, and 96 digital inputs or outputs, the UMC800 provides the appropriate balance of input and output hardware for these smaller unit processes.

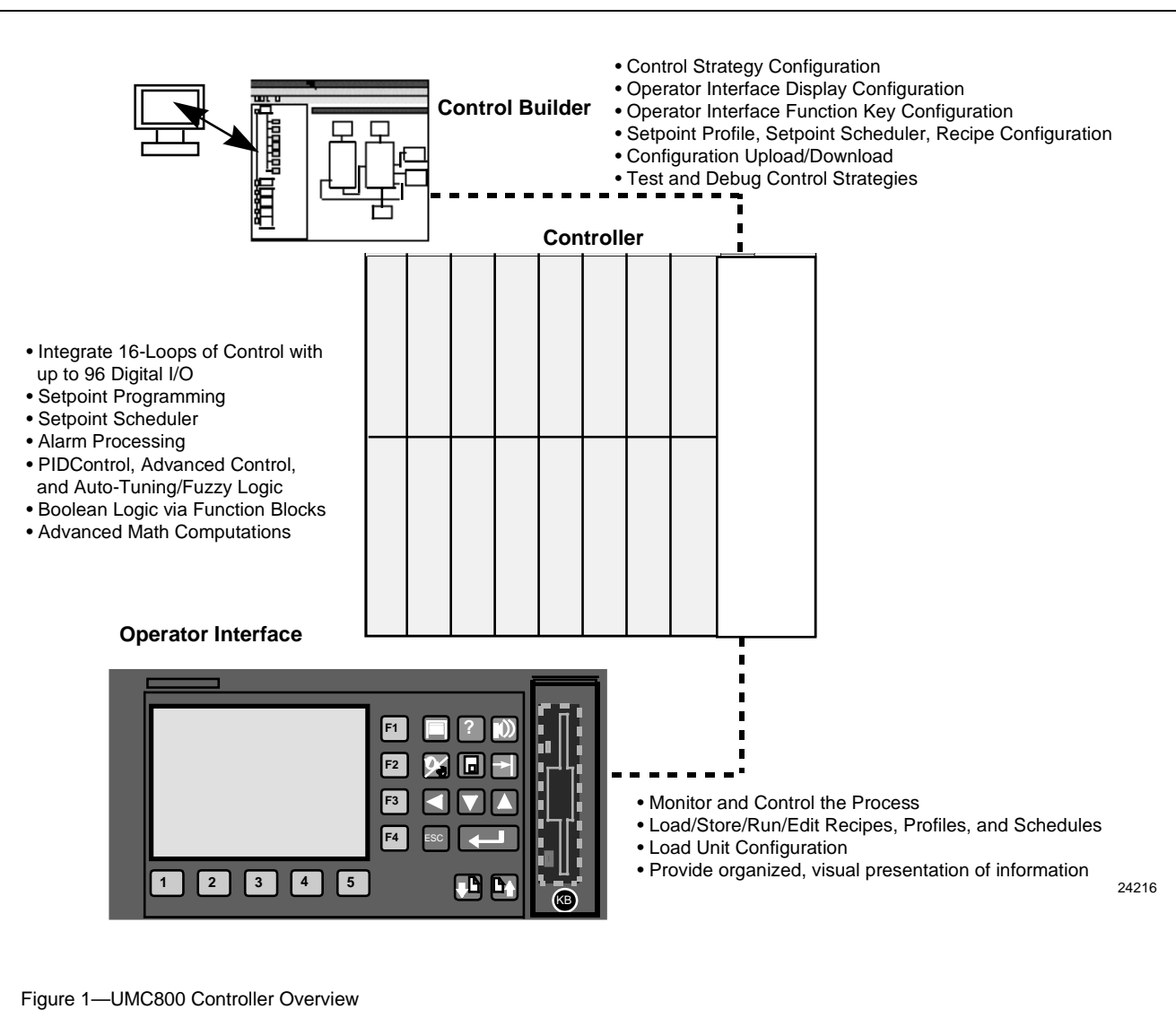


Figure 1—UMC800 Controller Overview

Overview (continued)

The UMC800 uses separate hardware for control functions and operator interface functions to provide greater installation flexibility. The controller incorporates a **card rack** capable of supporting up to 16 input and output modules that can be mixed to satisfy the hardware requirements of a specific application. Three available models of the **operator interface** use color graphic LCD display to provide a variety of screen presentations for viewing control loops, setpoint programs, and other analog and digital status. A separate **“Control Builder” configuration software** program is used for system configuration that operates on a Windows™ 95, 98, or NT-based PC. The software program uses graphic symbols and line drawing connections to create custom control strategies.

Menus are provided in the software to allow selection of screens for the operator interface and to customize screen access methods and operator keys. Completed configurations are loaded into the control system using a dedicated communications port in the controller or, optionally, via floppy disk or Zip drive.

Feature Summary

- Up to sixteen PID or ON/OFF Control Loops
- Auto-tuning for each control loop
- Up to 64 Universal Analog Inputs
- Up to 96 Digital Inputs or Outputs
- Up to 4 Setpoint Programmers, 3500 total segments
- Setpoint Profile and Recipe storage
- Setpoint Scheduler, 10 stored schedules
- Selection of English, French, German, Italian or Spanish language
- Function Block Graphic Configuration with up to 250 blocks
- Large assortment of algorithms for combination analog and logic functions
- Carbon Potential, Dewpoint, and Relative Humidity Control
- Extensive alarm and event monitoring
- Various Operator interfaces with a selection of graphic displays
- Optional 3-1/2" floppy disk drive or Zip drive for data archiving, program and recipe storage
- Optional RS485 Communications, Modbus RTU protocol
- FM CL 1, Div 2, Groups A, B, C, D approved (except with Relay D.O.)
- Ethernet/Modbus RTU Bridge
- Universal Power (100 Vac to 240 Vac), or 24 Vac/dc
- Industrial Operating Range (0 °C to 55 °C, 10 % to 90 % RH)
- UL, CE, CSA approved – Y2K compliant

UMC800 CONTROLLER OVERVIEW

The UMC800 controller is comprised of a CPU with two serial communication ports, power supply, and a backplane assembly capable of supporting up to 16 input or output modules in a wall-mounted sheet-metal enclosure. Modules are available in ten different configurations to support both analog and digital inputs and outputs of various types and signal levels. Each module has a removable terminal block accepting #16 AWG wire. The I/O capacity for each module type is indicated in Table 1. An optional RS485 serial communication card that supports both slave data exchanges with a host PC for centralized operation and data management and/or communications via a Modbus RTU master to other Honeywell or third party compatible products.

The UMC800 uses a function block configuration architecture to develop control strategies for both analog and digital operations. A function block may represent a physical input or output, several physical inputs or outputs, an internal calculation, or an internal function such as a PID algorithm. A summary of the assortment of greater than 70 standard UMC800 function block algorithm types follows. Typically, a function block algorithm type may be used any number of times up to the limit of 250 blocks. Some of those with specific limits are:

- PID and ON/OFF control loops and associated support blocks—eight or sixteen maximum
- Setpoint programmer blocks and associated support blocks—four maximum
- Time proportioning output blocks—sixteen maximum
- Setpoint scheduler block—one

For limits on other function block algorithm types, refer to those particular algorithm descriptions starting on the next page.

Digital I/O and digital function blocks are scanned and executed every 100 milliseconds. Analog I/O and analog function blocks are processed at a rate based on the quantity of I/O and the number of function blocks contained in the controller. See performance specifications.

TABLE 1 – Input/Output Capacity per Module

| Signal Type | Maximum I/O | I/O per Card | Maximum Number of Cards |
|------------------------------------|-------------|--------------|-------------------------|
| Universal Analog Inputs | 64 | 4 | 16 |
| Analog Outputs—Spans to 0 to 20 mA | 16 | 4 | 4 |
| Digital Inputs (3 types) | 96 | 6 | 16 |
| Digital Input (Contact Closure) | 48 | 16 | 3 |
| Digital Outputs (4 types) | 96 | 6 | 16 (10 relay) |

UMC800 Function Block Types

Control Loop Function Blocks

| | |
|--|---|
| Analog Inputs | Universal Analog Input (see Table 3 for input types) Filter—1 st order lag, 0 seconds to 120 seconds Bias—Input value adjust Burnout—Off, Upscale, Downscale, Default Value |
| Analog Outputs | Regulated analog output current. Input scaling in engineering units Output scaling within 0 mA and 20 mA |
| Time Proportioning Output | Proportions the amount ON time and OFF time of a digital output. Input scaling in engineering units Cycle time—1 second to 120 seconds Output minimum ON and OFF time—0 seconds to 15 seconds |
| 3 Position Step Output | Motor position control without position sensing |
| PID (8 standard, 16 optional) | <p><i>PID algorithm includes:</i></p> <ul style="list-style-type: none"> • Accutune II auto-tuning and fuzzy logic overshoot suppression • PID A or PID B operation • Two sets of PID constants with choice of Gain or Proportional Band entry and Integral time or Repeats/minute entry • Setpoints—Two setpoint values or one value and one remote setpoint • Alarms—Two outputs with up to two high, low, or band conditions each <p><i>Inputs:</i> PV, remote setpoint, feedforward, output track and track command, ratio, bias, switch block connection, mode switch block connection, and back calculations</p> <p><i>Outputs:</i> Control output, working setpoint, alarm status (2), Autotune indication, mode status</p> |
| ON/OFF (8 standard, 16 optional) (displaces PID) | ON/OFF control algorithm |
| Loop Switch Inputs | Digital interface to control loops to initiate autotuning, change control action, force bumpless transfer, select tuning set #1 and select tuning set #2. Connects to PID and ON/OFF block switch input. |
| Loop Mode Selection | Digital interface to control loops to select automatic or manual modes and/or local or remote setpoint. Connects to PID and ON/OFF mode block input. |
| Mode Decoder (Mode Flags) | Decodes PID mode status into a set of discrete (or Boolean or digital) mode flags. |
| Carbon Potential and PID (8 standard, 16 optional) (displaces PID) | A combined carbon potential calculation and PID algorithm for controlling the carbon potential of furnace atmospheres using a zirconia probe input and temperature input. Local/remote %CO adjustment, probe manufacturer selection, anti-sooting protection, dewpoint calculation output, and furnace factor adjustment supported, probe burnoff configurable. |

UMC800 Function Block Types (continued)

Control Loop Function Blocks (continued)

| | |
|------------------------|---|
| Write Tuning Constants | Automatically changes the GAIN, RATE-MIN, and RESET-MIN parameters of an internal PID loop without operator interaction. A digital input controls changes. |
| Auto-Manual Bias | Allows a manually adjusted output to be maintained on transfer to automatic by applying bias to the input signal. Bias value is maintained as output value tracks input value changes. Consumes 1 loop. |

Setpoint Programmer and Recipe Function Blocks

| | |
|------------------------------------|--|
| Setpoint Program (4 maximum) | <p>Produces a setpoint output on a time-based profile that is loaded into the block. (See Setpoint Programming description for profile details.)</p> <p><i>Inputs:</i></p> <p>Process variables, up to three, to establish setpoint guarantee operation based on a deviation band from setpoint, profile number and starting segment.</p> <p><i>Digital Inputs:</i></p> <p>Set (to load a program), start, hold, restart, reset, advance, jog, and synchronize hold.</p> <p><i>Outputs:</i></p> <p>Setpoint value, segment number, program number, time remaining in segment, time elapsed in segment, program elapsed time.</p> <p><i>Digital Outputs:</i></p> <p>Status (ready, running, hold, stopped), synchronize hold state, events.</p> |
| Setpoint Program Events (up to 16) | Provides up to 16 digital status outputs that may be ON or OFF on a per segment basis. Inputs include program number, segment number, and program state (READY, RUN, HOLD, GHOLD, or STOP) from setpoint program block. |
| Setpoint Program Synchronizer | Used to synchronize the operation of two setpoint programs given the run. Hold and reset signals from each program. |
| Recipe Block | Used to initiate loading of recipe values into a chosen set of controller variables. Inputs include recipe number and load command, allowing remote recipe selection. |

Setpoint Scheduler Function Blocks

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|--------------------|--|
| Setpoint Scheduler | <p>Produces up to 8 ramp or soak setpoint outputs on a single time base. (See Scheduler description for details.)</p> <p><i>Inputs:</i></p> <p>Process variables, up to 8, to establish setpoint guarantee operation based on deviation from setpoint. Schedule number for automatic loading and starting segment number.</p> <p><i>Digital inputs:</i></p> <p>Dedicated input for connection to State Switch block output.</p> <p><i>Outputs:</i></p> <p>Up to 8 setpoint values, segment number, schedule number, time remaining in segment, time elapsed in segment, schedule elapsed time.</p> <p><i>Digital Outputs:</i></p> <p>Dedicated output for connection to State Flags block input.</p> |
|--------------------|--|

UMC800 Function Block Types (continued)

Setpoint Scheduler Function Blocks (continued)

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|------------------------------------|---|
| State Switch Block | Provides digital switch status inputs to the Scheduler block for Run, Hold, Reset, Ghold, Advance and Jog. |
| State Flags Block | Accepts status output from the Scheduler block and provides digital output signals for Run, Hold, Ghold, Ready and Stop. |
| Setpoint Scheduler Auxiliary Block | Provides up to 8 analog setpoint values for each segment of the schedule. <i>Inputs:</i> Up to 8 process variables used for display. |
| Event Decoder | Provides up to 16 digital outputs that may be ON or OFF on a per segment basis. |

Auxiliary Control Function Blocks

| | |
|-----------------------------|--|
| Lead Lag Signal Conditioner | Modifies an analog input value to include lead and lag time constants when a digital input is true. Lead time constant = 0 minutes to 99 minutes Lag time constant = 0 minutes to 99 minutes |
| Function Generator | Generates an output characteristic curve based on up to 11 configurable "breakpoints" for input and output values. |
| High/Low Limiter | Limits an analog variable between high and low limit values. Provides separate digital status outputs when high or low limit values are exceeded. |
| Rate (Velocity) Limiter | Limits the rate at which an analog variable can change when a logic input is ON. Provides independent increasing and decreasing rate of change limit values. Separate digital status outputs indicate when high or low rate limits are active. |
| Rate of Change | Provides an output value representing the rate of change value of the input in units per minute. Output value is positive for increasing input values and negative for decreasing input values. Two setpoint values and digital outputs are provided to indicate excess increasing or decreasing rates of change or insufficient increasing or decreasing rates of change. |
| Read Constant | Provides a read access to internal static parameters of selected blocks. |
| Write Constant | Provides write access to internal static parameters of selected blocks. |
| Write Variable | Provides a write of a value to a selected analog or digital variable block based on the ON state of a digital input. |
| Track and Hold | Allows updating or holding the value of an analog input based on the state of a digital input. |
| BCD Translator | Accepts up to 8 digital inputs in sequence and interprets the ON/OFF status of the first 4 inputs as a BCD value between 0 and 9, and the second 4 digits as a value between 10 and 90. |
| Digital Encoder | A 16 input block whose output is the decimal value of the number of ON inputs. |
| Hand/Off/Auto (16 maximum) | Provides Hand-Off-Automatic outputs based on digital inputs emulating a standard H-O-A panel switch. |
| Device Control (16 maximum) | Provides device control (pumps, etc) including Start, Stop, Feedback Delay times along with feedback confirmation and failure check. |

UMC800 Function Block Types (continued)

Signal Selector Function Blocks

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|----------------------------|---|
| High Selector/Low Selector | Provides the highest (high select) or lowest (low select) of two analog input variables. |
| Switch | Output switches between two analog input values based on the status of a digital input. |
| Bumpless Analog Transfer | Output switches between two analog input values based on the status of a digital input. When switched, output ramps to the new value at a specified rate. A rate value is available for each direction. |
| Rotary Switch | Single output is selected from up to 8 analog values based on the value of a select input (1 to 8). |

Calculation Function Blocks

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|-----------------------------------|---|
| Compare | Compares one analog variable to a second analog variable and generates separate digital outputs to indicate greater than, equal, or less than status. |
| Absolute Value | Provides an absolute value output for a single analog variable input. |
| Square Root | Output is the square root of a single analog variable input. |
| Mass Flow | <p>Calculates the mass flow of gases when measuring flow using an orifice plate.</p> $\text{Output} = K_g * \sqrt{(K_x * X + B_x) (K_y * Y + B_y) / (K_z * Z + B_z)}$ <p style="margin-left: 40px;">with inputs X = differential pressure Y = pressure, and Z = temperature.</p> <p>A low flow cut-off feature provides a user-specified drop-off value below which the output goes to zero.</p> |
| Minimum – Maximum – Average – Sum | Accepts inputs from up to 6 analog variables and outputs analog variables representing the highest value, lowest value, average value, sum, and standard deviation. Removes bad inputs and provides an alarm output for deviations of any variable outside user-specified standard deviations. |
| Negate | Accepts a single analog variable input and negates the output. |
| Totalize | Integrates an analog variable using a specified rate. Rate may be in units per minute, hour, or day. A preset is provided to indicate when a specific quantity has been accumulated. Separate enable and reset inputs are provided. |
| Deviation Compare | Compares up to 6 analog variables to deviation limits set around a 7th variable. If any variable is outside the limits, a digital signal is provided. |
| Relative Humidity | Calculates the relative humidity using wet bulb, dry bulb, and atmospheric pressure inputs. Output may be in degrees Fahrenheit or Celsius. |
| Dewpoint (12 maximum) | A dewpoint PV is supplied to a PID function block for dewpoint control. Used in conjunction with other blocks including a PID to generate more elaborate control strategies than that provided by the carbon potential function block. |
| Continuous Average | Provides the average value of a single analog parameter for a user-specified time period, plus the running average within the time period. Average value is updated at the end of each sample period. Time periods to 1440.0 minutes are supported. A hold input allows excluding samples from the average when active. |

Math Function Blocks

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| Scale and Bias | Output = $(K * X) + b$ with single analog variable input X. |
| Two and Four Input Math | Executes +, – or * on two or four analog variable inputs, / on two inputs. |
| Free Form Math | Calculates the result of a user-specified equation. The block accepts up to 8 analog input signals. Operators include: +, -, *, /, ^, and parentheses. Functions include: absolute value, exp, ln, Log, neg, sqrt. |

UMC800 Function Block Types (continued)

Logic Function Blocks

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|---|---|
| Digital Input (1) | Provides the digital status of a digital input point. The output status may be inverted. |
| Digital Input (Up to 8) | Provides the digital status of up to 8 digital input points. The output status may be inverted. |
| Digital Output (1) | Directs a digital status to a physical logic output. Output status may be inverted. |
| Digital Output (Up to 8) | Directs up to 8 digital statuses to physical logic outputs. Output status may be inverted. |
| Pulse Input | Provides the accumulated value in Engineering Units of a Pulse input. Preset input and digital output are available |
| Frequency Input | Provides the current value in Engineering Units of a Frequency Input. |
| Pushbutton | Provides a one-shot output based on an OFF to ON change of an operator interface key action. Supports four pushbuttons per block. |
| AND, OR, XOR (2 inputs) | Provides a digital status output based on the digital status of two digital inputs for logic AND, OR, or XOR (exclusive OR) operations. Input status of each input may be inverted. |
| AND, OR (4 and 8 inputs) | Provides a digital status output based on the digital status of four or eight digital inputs for logic AND or OR operations. Input status of each input may be inverted. |
| NOT (Complement) | Inverts a logic input status. |
| Latch | Provides a digital output that turns ON when a digital input turns ON and remains ON (latched) after the input goes OFF until an unlatch input turns ON. |
| Edge Detection Element (One-shot) [Trigger] | Provides an ON state of its output for one controller scan when a digital input goes from OFF to ON. |
| Toggle (Flip-Flop) | Provides an ON state output when a digital input goes from OFF to ON and the previous state of the output was OFF, and an OFF state output when the digital input goes from OFF to ON and the previous state of the output was ON. A reset input holds the output OFF when the digital input is ON or active high. |
| Free Form Logic | Reads eight digital inputs and calculates the output based on specified Boolean logic functions (e.g., AND, OR, NOT, etc.) and multiple levels of parentheses. |
| Four Selector Switch | Provides up to 16 digital outputs in groups of four outputs each. Only one output from each group may be ON at a time and when selected automatically turns other outputs OFF. |

Counters/Timers Function Blocks

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| Resettable Timer | Provides a timing function based on an enable input. Elapsed time value is provided as an output. A Preset value allows settings from 1 second to 999999 seconds. A digital output is ON when time value is equal to the preset. An up/down digital input is provided to allow reverse timing from the preset value. A pre-load value allows initiating the timer to a non-zero starting time. |
| Periodic Timer | Provides an ON state output for one controller scan cycle based on a specified time period using the real-time clock. Periods may be monthly, weekly, daily, or time period in a day. |
| Up/Down Counter | Counts the number of raising edge logic transitions on the input to the block up to a preset value. When the preset value is reached a logic output is enabled. A reset input resets the block. Value may be set to increase to the preset value or decrease from the preset value (1–99999). |
| ON-Delay Timer | An OFF to ON change of the digital input is delayed on the block output by a user-specified time (0.1 seconds to 999.9 seconds). |
| OFF-Delay Timer | An ON to OFF change of the digital input is delayed on the block output by a user-specified time (0.1 seconds to 999.9 seconds). |

UMC800 Function Block Types (continued)

Alarm and Signal Monitoring Blocks

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| High Monitor | Accepts two analog values and provides a digital status output if the first input is higher than the second input. A hysteresis adjustment is provided to prevent output cycling. |
| Low Monitor | Accepts two analog values and provides a digital status output if the first input is lower than the second input. A hysteresis adjustment is provided to prevent output cycling. |
| Analog Alarm | The analog alarm block accepts an analog signal as a process variable and compares it to a user-entered limit value (setpoint) to determine an alarm condition. The setpoint may be entered by the user or be another analog signal in the controller. Alarm actions may be high, low or high deviation, low deviation or band deviation. For deviation alarming, a second analog signal provides the reference and setpoints represent deviation from the reference. The alarm output may be inverted to create normally active digital output. A user selection for latching until acknowledged or automatically reset is provided. A user-specified hysteresis value in the engineering units of the process variable is provided. An on-delay time value up to 240 seconds is available to prevent momentary alarm actions. A digital reset input is available to disable alarm actions. |
| System Monitor Block | Provides system and start-up status outputs including: <ul style="list-style-type: none"> • Program scan cycle time • Restart pulse (to activate a custom control action on power-up after power loss) • Time off (the time that power has been off previous to restart) • Two common alarm outputs (Active Unacknowledged, Active alarms) for assignment to digital outputs • Low Battery • Hardware OK • Hi Temp • Comm. Fail • Bad Block • Test Mode |

Communications

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|--------------|--|
| Modbus Slave | A communication function block that is internally assigned to optional Communication Port B that allows the controller to communicate with slave devices using the Modbus protocol. Requires one block per slave device, up to 16 devices maximum. Supports 4 read and 4 write parameters plus provides digital indication of communication integrity. Write operations may be controlled by digital inputs. Multiple blocks may be assigned to the same slave device. |
| Modbus Read | A communication function block that expands the read capability of the Modbus Slave function block to 16 additional data points. Multiple read blocks may be connected to the same Modbus Slave block. |
| Modbus Write | A communication function block that expands the write capability of the Modbus Slave function block to 8 additional data points. Each write parameter may be individually controlled via digital inputs. Multiple write blocks may be connected to the same Modbus Slave block. |

Other Diagram Items

| | |
|------------------|--|
| Analog Variable | Connects to a function block's inputs and can be changed from the operator interface. |
| Digital Variable | Connects to a function block's inputs and can be changed from the operator interface. |
| T (Text) | Allows descriptive data to annotate a specific area of a function block diagram to be entered. |
| Soft Wire | Connects function blocks and objects together. |
| Connector | Connects tagged signals to function block inputs. |
| Signal Tag | Allows a name to be assigned to a wire and accessed by the operator interface. |
| Numeric Constant | A user-specified constant value that can be connected to function block inputs. |

Loop Control

The UMC800 supports up to sixteen control loops with PID or ON/OFF control action. Control loops may be configured to operate independently or in cascade. Operator entered setpoints may be limited by independent high and low limit values and setpoint rate of change limits are available to protect critical products during process changes. When feedforward operation is applied, a separate feedforward gain adjustment is available to tune the loop for the appropriate feedforward response. When Ratio control is applied, a ratio and bias adjustment is provided. When used with the supplementary loop control blocks, digital inputs may be used to set control mode, select the setpoint source, change control action, and other discrete actions. A status block provides digital outputs to facilitate integrating loop operation with other functions in the controller.

When configured for dual output (heat/cool), each output may be directed to different output types; e.g., current, time-proportioning, etc. Two sets of tuning constants for heating and cooling are also provided.

Honeywell's Accutune II™ automatic tuning algorithm and Fuzzy Logic Overshoot Suppression are available for each loop of the controller. Accutune tuning is initiated on command from the operator interface or through a digital input to the loop. This easy to operate feature optimizes control performance with a minimum of process disturbance.

Setpoint Programming

Up to four independent setpoint programming blocks may be configured in the controller. A single program may be up to 50 segments in length. Up to 70 ramp/soak profiles may be stored in controller memory. Any profile may be loaded into any of the four programs. Each segment of the program may be a ramp or a soak except the last step which must be a

soak. In addition to the main ramp and soak output value, a second analog value is available for each step of the program. This output is a fixed soak value, which may be used to provide a setpoint value for a secondary control loop in the process. An example would be a ramp and soak temperature program combined with pressure (or % carbon) setpoints for each step of the program.

A setpoint guarantee function is provided that holds the program if a process variable exceeds a predefined deviation from setpoint. Selections allow setpoint guarantee to be active for the entire program, for soak segments only, or for user-specified segments. Up to three process variables may be configured as inputs to the block for setpoint guarantee.

Setpoint programs may be started, placed in hold, advanced to a predefined segment or reset from the operator interface or by digital inputs to the block. A jog feature is also available using a digital input. Programs may also be started from a pre-selected segment number. A recovery ramp rate value is provided in the event of a power loss while a program is running. The ramp rate value is used to return the process to the last operating setpoint prior to power loss. A power off digital signal from a separate timing block may be used to restart from an analog value, hold or abort the running program if power has been off for more than a specified time period.

Running programs may be edited by adjusting the values of any programmed segment. A portion of a program or the entire program may be repeated up to 100 times as specified in a program recycle count value or indefinitely.

A companion setpoint programmer event block is available to provide up to 16 event outputs based on the step number. This block's outputs may be directed to digital outputs or to internal statuses for logic operations. An event may be turned ON or OFF any number of times in a program based on the segment number.

Two setpoint programs operating on the same time base may be synchronized using the synchronize block. This block automatically starts the second program when the first program is started and maintains synchronization when either program is placed in hold.

Setpoint Scheduler

A suite of Setpoint Scheduler blocks may be configured for multi-setpoint control. The suite is comprised of a Master block, Auxiliary Setpoint block, Auxiliary Event block, State Switch Block, and State Flags block. The Master block supports up to 8 ramp or soak outputs operating on a common time base. The auxiliary block supports up to 8 soak only outputs and the event block supports up to 16 event outputs. A single schedule may be up to 50 segments in length and includes auxiliary block data. Up to 10 schedules may be stored in the controller's memory.

Setpoint guarantee is provided for the master block setpoints with a single symmetrical value for each setpoint output. Actions for the guarantee soak may be set on a per segment basis for OFF, high setpoint deviation, low setpoint deviation or both high and low setpoint deviations.

Each segment of the Setpoint Scheduler allows entry of a next segment recycle location and a number of recycles up to 998, or infinite. This function allows unlimited recycle nesting and continuous recycle operation. A jog function allows a single jump to a designated segment number through a digital input to the State Switch block.

Setpoint Schedules off the same operating modes and digital controls as setpoint programs. On-line editing of a running schedule is supported through dedicated operator interface displays.

Eight character labels and four character engineering units are provided for each process variable of the master and auxiliary setpoint blocks. Labels and on/off descriptions are also provided for the Digital Event block.

Recipes

Up to 50 recipes may be stored in the controller. Recipes can consist of up to 50 tagged analog or digital variables. This allows setpoint profiles (up to 4), schedules and/or other variables such as associated loop setpoints, bias values, alarm setpoints, setpoints to external controllers, digital states, etc. to be downloaded concurrently by recipe name.

Logic

The controller offers up to 96 digital inputs or outputs and uses digital function blocks to perform Boolean logic operations and sequences. The digital function blocks may be programmed to operate on a fixed 100-millisecond update rate or on the slower analog measurement scan rate as determined during configuration.

Alarms

Alarm monitoring may be assigned to the digital status of analog alarm blocks, or other digital block status. Each PID loop also provides up to four alarms of various types. Alarm flexibility is also expanded using the alarm block which allows selective set-up of alarm hysteresis, deviation alarms, on delay, selective latching, and a disable input to control when the alarm is active.

Active alarm indication is provided on all operator displays and alarm group displays are provided to view and acknowledge active alarms. An alarm detail display is provided for each alarm point which indicates the time and data of last alarm occurrence and offers 40 characters of user specified text for alarm actions or notes.

Up to 120 alarms may be configured and applied to loop alarms or digital tags.

Communications

An optional serial communication card is available that provides two RS485 serial communication ports. Both ports support the Modbus RTU protocol, one functioning as a Slave, the other as a Master.

Slave Communications: The multi-drop Slave communication port may be networked with up to 31 UMC800 controllers or other Modbus compatible devices to a single PC or host device. The communication protocol allows read and write operations to the data parameters of the controller, including analog and digital inputs and outputs, loop parameters, calculations, setpoint programs and schedules.

Master Communications: The Master communication port supports read and write operations for up to 16 Modbus compatible devices. The data transferred via this port is integrated into the user's control strategy through read and write function blocks. A single function block supports reading and writing up to 4 parameters each to a slave device. Two additional blocks are available that support reading up to 16 parameters or writing up to 8 parameters. Multiple function blocks may be assigned to a single external device. The data exchanged with external devices is limited to a 2-second maximum rate.

Ethernet/Modbus RTU: An optional bridge card is available that provides an Ethernet to Modbus RTU interface. The optional card is located in an I/O rack slot. The card is configured with a standard IP address and will communicate with up to 16 Modbus RTU slave devices. The card is utilized with 3rd party software that provides the TCP/Modbus driver and OPC capability.

UMC800 Controller Specifications

| Design | | |
|---------------------------------|---|--|
| I/O Module Configuration | CPU with two serial communication ports, power supply, and backplane assembly. Capable of supporting up to 16 input/output modules. | |
| Universal Analog Inputs | <i>Input Types</i> | mV, V, mA, T/C, RTD, ohms |
| | <i>Number of Inputs</i> | 4 to 64 in groups of four |
| | <i>Signal Source</i> | Thermocouple with cold junction compensation Line resistance up to 1000 ohms, T/C, mV, mA, V RTD Pt 100 ohms, 3-wire connections, 40 ohms balanced maximum |
| | <i>Input Impedance</i> | 10 megohms for T/C and mV inputs; >1 megohm for volt inputs |
| | <i>Input Isolation</i> | 400 Vdc point-to-point 3.75K Vac RMS A/D converter to logic |
| | <i>Stray Rejection</i> | Series mode >60 dB. Common mode at 120 Vac >130 dB. |
| | <i>Burnout</i> | T/C, mV, V (except following ranges) configurable to upscale, downscale, defined value, or none. <i>Volt:</i> -500 mV to 500 mV; -1 V to 1 V; -2 V to 2 V; -5 V to 5 V; 0 V to 10 V; -10 V to 10 V; inherent to zero volt <i>RTD:</i> Inherent upscale <i>mA:</i> Inherent downscale |
| | <i>T/C Break Detection</i> | Via current pulse |
| | <i>Accuracy (at reference conditions)</i> | Factory configured accuracy = ± 0.1 % of range Cold junction accuracy = ± 0.5 °C Field calibration accuracy = ± 0.05 % of range <i>Reference conditions:</i> Temperature = 25 °C \pm 3 °C (77 °F \pm 5 °F) Humidity = 10 % to 55 % RH non-condensing Line voltage = Nominal \pm 1 % Source resistance = 0 ohm Series mode and common mode = 0 V Frequency = Nominal \pm 1 % |
| | <i>A/D Converter Resolution</i> | 15 bits |
| Analog Outputs | <i>Temperature Effect on Accuracy</i> | 0.1 % maximum over the rated limits |
| | <i>Long Term Stability</i> | 0.1 % per year |
| | <i>Number of Outputs</i> | 4 to 16 isolated in groups of 4 |
| | <i>Isolation from Logic</i> | 3.75K Vac RMS |
| | <i>Accuracy</i> | Factory configured accuracy = 0.1 % at reference conditions Field calibration accuracy = 0.1 % |
| | <i>Temperature Effects</i> | 0.15 % per 10 °C in the rated limits |
| | <i>D/A Resolution</i> | 16 bits |
| | <i>Load</i> | 1K ohm @ 20 mA |

UMC800 Controller Specifications (continued)

| Design (continued) | | | |
|------------------------|----------------------------------|---|--|
| Digital Inputs | | AC Inputs | DC Inputs |
| | <i>Inputs per Module</i> | 6 | 6 (sink/source) |
| | <i>Input Voltage Range</i> | 80 Vac to 264 Vac | 10.2 Vdc to 26.4 Vdc |
| | <i>Peak Voltage</i> | 264 Vac | 26.4 Vdc |
| | <i>AC Frequency</i> | 47 Hz to 63 Hz | N/A |
| | <i>ON Voltage Level</i> | 75 Vac minimum | 9.5 Vdc minimum |
| | <i>OFF Voltage Level</i> | 20 Vac maximum | 3.5 Vdc maximum |
| | <i>Input Impedance</i> | 12 K @ 60 Hz | 2.7 K |
| | <i>Input Current</i> | 13 mA @ 100 Vac, 60 Hz 11 mA @ 100 Vac, 50 Hz | 4.0 mA @ 12 Vdc 8.5 mA @ 24 Vdc |
| | <i>Minimum ON Current</i> | 5 mA | 3.5 mA |
| | <i>Maximum OFF Current</i> | 2 mA | 1.5 mA |
| | <i>Base Power Required</i> | 50 mA maximum | 50 mA maximum |
| | <i>OFF to ON Response</i> | 5 ms to 30 ms | 1 ms to 8 ms |
| | <i>ON to OFF response</i> | 10 ms to 50 ms | 1 ms to 8 ms |
| Logic Inputs (6) | <i>Inputs per Module</i> | 6 dry contact | |
| | <i>Switching Voltage</i> | 5 Vdc | |
| | <i>Switching Current</i> | 5 mA | |
| Logic Inputs (16) | <i>Inputs per Module</i> | 16 dry contact (3 maximum cards per controller) | |
| | <i>Switching Voltage</i> | 5 Vdc | |
| | <i>Switching Current</i> | 5 mA | |
| Frequency/Pulse Inputs | | Frequency | Pulse |
| | Inputs per Module (4 maximum) | Up to 4 (combination of Frequency and Pulse Inputs to total 4 maximum) | Up to 4 (combination of Frequency and Pulse Inputs to total 4 maximum) |
| | Switching Voltage | 24 Vdc | 24 Vdc |
| | Frequency Range | 10 Hz to 100 KHz | Up to 1KHz |
| | Min. Pulse Width | 2.5 μ sec. @ 100 KHz 50 μ sec. @ 500 Hz to 5KHz 500 μ sec. @ 10 Hz to 500Hz | 100 μ sec. |
| | Duty Cycle | 10% to 90% | ---- |

UMC800 Controller Specifications (continued)

| Design (continued) | | | |
|------------------------|--------------------------------|---|-------------------------------|
| Digital Outputs | | AC Outputs | DC Outputs |
| | <i>Outputs per Module</i> | 6 | 6 (current sinking) |
| | <i>Operating Voltage</i> | 15 Vac to 240 Vac | 10.2 Vdc to 26.4 Vdc |
| | <i>Output Type</i> | SSR (Triac) | NPN open collector |
| | <i>Peak Voltage</i> | 264 Vac | 40 Vdc |
| | <i>AC Frequency</i> | 47 Hz to 63 Hz | N/A |
| | <i>ON Voltage Drop</i> | <1.5 Vac (>0.1 A) <3.0 Vac (<0.1 A) | 1.5 Vdc maximum |
| | <i>Maximum Load Current</i> | 0.5 A per point or 2 outputs at 2.0 A, 4 outputs at 0.5 A | 0.3 A per point |
| | <i>Maximum Leakage Current</i> | 4 mA (240 Vac, 60 Hz) 1.2 mA (100 Vac, 60 Hz) 0.9 mA (100 Vac, 50 Hz) | 0.1 mA @ 40 Vdc |
| | <i>Maximum Inrush Current</i> | 10 A for 10 ms | 1 A for 10 ms |
| | <i>Minimum Load</i> | 10 mA | 0.5 mA |
| | <i>Base Power required</i> | 20 mA /ON pt. 250 mA maximum | 100 mA maximum - 5 V |
| | <i>OFF to ON Response</i> | 1 ms | 1 ms |
| | <i>ON to OFF response</i> | 1 ms +1/2 cycle | 1 ms |
| | <i>Fuses</i> | 1 per output, 1.5 A slow blow | 1 per output 1 A fast blow |
| Relay Outputs | <i>Outputs per Module</i> | 6 | |
| | <i>Contact Rating</i> | 4 A, 120 Vac, 2 A, 250 Vac on resistive load | |
| | <i>Contact Type</i> | SPST normally closed (NC), individually configurable to normally open (NO) via jumper | |
| DC Power Module | <i>Outputs per Module</i> | 4 independent outputs | |
| | <i>Output Voltage Rating</i> | +15 Vdc, -15 Vdc, ± 0.1 V maximum | |
| | <i>Fusing</i> | Individually fused, field replaceable | |
| | <i>Output Current</i> | 20 mA (each output preset to 10 mA) | |
| | <i>Output Ripple</i> | < 120 mV | |
| | <i>Isolation</i> | 300 V input-output | |
| Ethernet/Modbus Bridge | <i>Input</i> | Ethernet RJ45 connector | |
| | <i>Output</i> | Modbus RTU Master Port | |
| | <i>Devices supported</i> | Up to 16 | |
| | <i>Device types</i> | UMC800, UDC700, UDC1000, VDC1500, UDC2300, UDC3300, UDC6300, DPR100 C/D, DPR180/250, VRX180, DR4300, DR4500 | |

UMC800 Controller Specifications (continued)

| Design (continued) | |
|--------------------------------|---|
| Scan Rate | <p>1 to 4 analog inputs: 333 msec. 5 to 8 analog inputs: 500 msec. 9 to 12 analog inputs: 700 msec. 13 to 16 analog inputs: 900 msec. 17 to 20 analog inputs: 1100 msec. 21 to 24 analog inputs: 1300 msec. 25 to 28 analog inputs: 1500 msec. 29 to 32 analog inputs: 1700 msec. 33 to 36 analog inputs: 1900 msec. 37 to 40 analog inputs: 2100 msec. 41 to 44 analog inputs: 2300 msec. 45 to 48 analog inputs: 2500 msec. 49 to 52 analog inputs: 2700 msec. 53 to 56 analog inputs: 2900 msec. 57 to 60 analog inputs: 3100 msec. 61 to 64 analog inputs: 3300 msec.</p> <p>Total analog scan time may increase beyond the analog input scan time as determined by the quantity of functions configured in the controller. Fast Logic digital I/O and assorted function blocks will be serviced one time every 100 msec.</p> |
| Power Supply | <p><i>Standard:</i> 100 Vac to 240 Vac, 50 Hz or 60 Hz; or 100 Vdc to 240 Vdc. <i>Optional:</i> 24 dc or ac, 50 Hz or 60 Hz</p> |
| Power Consumption | 100 VA maximum |
| Wiring | Removable terminal blocks with cross-slotted screw terminals; accept 16 to 22 gauge wires. |
| Communications | <p>Two ports for external connections</p> <ul style="list-style-type: none"> • <i>CONFIG (Configuration Port):</i> This RS232 port is dedicated to the connection of the controller file to a PC running the Control Builder Configuration software. • <i>HMI:</i> This RS422 port is dedicated to the connection of the operator interface. <p><i>Optional:</i> RS485 Serial Communication, Modbus™ RTU Protocol <i>Connection:</i> 2 twisted pair with shield, single twisted pair with external jumper <i>Distance:</i> 600 meters (2000 feet) Half duplex <i>Number of units/link:</i> 31 <i>Baud Rates:</i> 9600, 19.2K, 38.4K</p> |
| System Interconnections | <p>Operator Interface <i>Maximum Distance Between Controller File and Operator Interface:</i> 50 feet (2000 feet with external power supply) <i>Cable Type:</i> 15 conductor, shielded <i>Cable termination:</i> 15-pin "D" connector at the controller end; screw type terminal strip required at operator interface end. Operator interface power is supplied through the interface cable/connectors.</p> <p>PC Configurator <i>Maximum Distance Between Controller File and PC Configurator:</i> 50 feet <i>Cable Type:</i> Standard 9-pin RS232 null modem cable <i>Cable termination:</i> 9-pin "D", male cable connector required (controller has female)</p> |
| Dimensions | <p><i>Inches:</i> 13.25 wide x 11.87 high x 6 deep <i>Millimeters:</i> 333.5 wide x 299.2 high x 152.4 deep</p> |
| Mounting | <p>Surface mounting with four screws in back of chassis Optional mounting brackets are available.</p> |
| CE Conformity | This product is in conformity with the protection requirements of the following European Council Directives: 73/23/EEC , the Low Voltage Directive, and 89/336/EEC , the EMC Directive. Conformity of this product with any other "CE Mark" Directive(s) shall not be assumed. |
| Safety Protection | <p>IEC 1010 installation category 2 for personal protection compliant Compliant with UL, UL 1092 (draft)/UL 916 process control equipment and CSA, C22.2 No. 1010-1 Standard. NOTE: 24 Vdc/ac power certification pending.</p> |

| Environmental Conditions | | | | |
|---|--|---|----------------------------------|----------------------------------|
| | Reference | Rated | Extreme | Transportation and Storage |
| Ambient Temperature °F °C | 77 ± 5 25 ± 3 | 32 to 131 0 to 55 | 32 to 140 0 to 60 | –40 to 151 –40 to 66 |
| Ambient Relative Humidity | 10 % to 55 % RH non-condensing | 10 % to 90 % RH non-condensing | 5 % to 90 % RH non-condensing | 5 % to 95 % RH non-condensing |
| Mechanical Acceleration Duration | 0 g 0 ms | 1 g 30 ms | 5 g 30 ms | 20 g 30 ms |
| Vibration | 10 Hz to 60 Hz— amplitude 0.07 mm (peak-to-peak) 60 Hz to 150 Hz— acceleration 1 g | 0 Hz to 14 Hz— amplitude 2.5 mm (peak- to-peak) 14 Hz to 250 Hz— acceleration 1 g | | |

Specifications are subject to change without notice.

TABLE 2 – Controller Control Feature Summary

| Feature | Description |
|-------------------------------|--|
| Control Loop/Outputs | 8 standard (current, time proportional, 3-position step, dual output [heat/cool]) 16 optional (16 current time proportional or three position step) |
| Control Loop Types | PID A, PID B, Duplex A, Duplex B, Ratio, Cascade, % Carbon, Dewpoint, Relative Humidity, On-Off |
| Auto-tuning | Accutune II, fuzzy logic overshoot suppression, applicable to all control loops |
| Function Blocks | 250 |
| Function Block Types | Greater than 70 |
| Setpoint Programs | 4 (independent programs) <i>Ramp Types:</i> Ramp Rate or Ramp Time <i>Time Units:</i> Hours or Minutes <i>Segment Time:</i> 0-99,999.999 hours or minutes <i>Program Cycles:</i> Up to 100 or infinite, configurable segment range |
| Programmer Events | 16, assignable to DO or internal status |
| Setpoint Profiles | 70 profiles of 50 segments each |
| Setpoint Scheduler | One (1) <i>Ramp type:</i> Ramp time <i>Time units:</i> Hours or minutes <i>Segment time:</i> 0.001 to 9999.999 hours or minutes <i>Cycles:</i> Per segment to 999 or infinite |
| Auxiliary Scheduler Setpoints | Up to 8 setpoints, soak only |
| Schedule events | Up to 16, assignable to DO or internal status |
| Setpoint Scheduler Schedules | 10 Schedules, 50 segments each |
| Recipes | 50 stored |
| Recipe Parameters | Up to 50—including profile numbers, analog or digital variables |

TABLE 3 – Input Actuators (Refer to Notes on next page)

| PV Input | Range | |
|------------------------------------|---|--|
| | °F | °C |
| Thermocouples | | |
| J | –58 to 302 32 to 752 –328 to 1598 | –50 to 150 0 to 400 –200 to 870 |
| L | –58 to 302 32 to 752 –328 to 1598 | –50 to 150 0 to 400 –200 to 870 |
| K | 32 to 752 32 to 1472 32 to 2192 –328 to 1598 | 0 to 400 0 to 800 0 to 1200 –200 to 1370 |
| R | –4 to 3200 | –20 to 1760 |
| S | 32 to 2912 –4 to 3200 | 0 to 1600 –20 to 1760 |
| N | 32 to 752 32 to 1472 32 to 2192 –328 to 2372 | 0 to 400 0 to 800 0 to 1200 –200 to 1300 |
| T | –58 to 302 32 to 302 122 to 302 –328 to 752 –130 to 464 | –50 to 150 0 to 150 50 to 150 –200 to 400 –90 to 240 |
| U | –58 to 302 32 to 302 122 to 302 –328 to 752 | –50 to 150 0 to 150 50 to 150 –200 to 400 |
| NiNiMoly (NNM68) | 32 to 2552 | 0 to 1400 |
| NiMo-NiCo (NNM90) | 32 to 2552 | 0 to 1400 |
| WW26 <i>Reference Range</i> | –4 to 4208 <i>750 to 4200</i> | –20 to 2320 <i>400 to 2300</i> |
| W5W26 <i>Reference Range</i> | –4 to 4208 <i>750 to 4200</i> | –20 to 2320 <i>400 to 2300</i> |
| PR 20-40 <i>Reference Range</i> | 32 to 3272 <i>1110 to 3300</i> | 0 to 1800 <i>600 to 1800</i> |
| B <i>Reference Range</i> | 104 to 3308 <i>752 to 3308</i> | 40 to 1820 <i>400 to 1820</i> |
| Platinel | –94 to 1382 32 to 2516 | –70 to 750 0 to 1381 |

TABLE 3 – Input Actuations (continued)

| PV Input | Range | |
|-----------------|--|---|
| | °F | °C |
| RTD/Ohms | | |
| Pt 100 at 0°C | -58 to 302 32 to 212** 32 to 392 32 to 752 -328 to 1472 -130 to 464 | -50 to 150 0 to 100** 0 to 200 0 to 400 -200 to 800 -90 to 240 |
| Ni 50 ohms | -112 to 608 | -80 to 320 |
| Ni 508 ohms | -112 to 302 | -80 to 150 |
| Cu 10 ohms | -4 to 482*** | -20 to 250*** |
| Ohms | 0 to 200 0 to 2000 | |
| JIS | -58 to 302 32 to 212** 32 to 392 32 to 752 -328 to 932 | -50 to 150 0 to 100** 0 to 200 0 to 400 -200 to 500 |
| Linear | | |
| Milliamperes | 0 to 20 4 to 20 | |
| Millivolts | 0 to 10 -10 to 10 0 to 20 -20 to 20 0 to 50 -50 to 50 10 to 50 0 to 100 -100 to 100 0 to 500 -500 to 500 | |
| Volts | 0 to 1 -1 to 1 0 to 2 -2 to 2 0 to 5 -5 to 5 1 to 5 0 to 10 -10 to 10 | |

- Notes:**
1. Ranges with ** have an accuracy of 0.25 %.
 2. For non-linear temperature transmitter, the transmitter range MUST be identical to the input range of the recorder.
 3. The mA inputs has to be connected with a 250-ohm resistor across the input terminals.
 4. Ranges with *** have an accuracy of 0.5 %.

Optional Data Archiving

The optional Data Archiving feature provides background storage of process information on a 3.5-inch floppy disk (or optional Zip disk) for analysis by an off-line computer equipped with Honeywell Data Analysis Software (SDA). Data stored files may not be reviewed from the operator interface. The instrument can support both continuous and discontinuous (batching) modes of storage for trends, unit data samples, alarms and digital events. Available trend storage rates are from two seconds to 30 minutes per sample in predefined increments. Two trend files of up to 12 points each are supported.

A point log file to take a "snapshot" of process data for up to 12 points is also provided. Point log samples can be scheduled to occur at a user-specified time or by a digital event in the controller. The maximum sample rate for point log data is 60 seconds per sample. The Point log file has a maximum capacity of 2000 records per file.

Alarm recording is available to store up to 150 on and off alarm actions. Alarm data includes the point tag, a 16-character point description, and the time and date of alarm occurrence.

Digital event recording is also available to store up to 150 on and off transitions of digital events in the controller. Event data includes the point tag, a 16-character point description, and the time and date of event occurrence.

Data collection may be started through key actions from the operator interface keyboard or from digital status signals from the controller. Active storage is indicated by an "S" in the status line of the operator interface display.

The disk capacity (in time) is calculated and displayed once all storage initialization is complete. This eliminates the need for manual calculations and gives the operator the exact duration of the disk. (See formula below to calculate storage time.) All file types in the data archiving feature may be configured to stop collecting data when the file is full or to continue in a circular storage mode (roll-over) where the oldest data is discarded as new data is collected. When roll-over is not selected, a disk full warning indication is provided in the status line of the display. A status pin on the system function block of the controller may be programmed to activate a relay when the disk full warning is active. The percent full limit may be changed by the user as required. A storage buffer in the operator interface allows changing the disk media without the loss of process data.

The data to be collected, along with storage rates and start/stop controls are contained in a data storage file that is loaded through the disk drive of the operator interface or through the controller configuration serial port. Data storage parameters may be defined using the Control Builder Configuration Software or through a separate User Utility Software program for a PC. Storage parameters may not be established through the operator interface, thereby simplifying operator actions and reducing the potential for accidental entry errors.

Honeywell SDA – Software for Data Analysis

SDA software provides off-line data analysis for reviewing process data

stored on the disk on a PC under a Microsoft® Windows® operating environment.

The software allows viewing trend data in both horizontal and vertical trend graph formats, in tabular formats, X-Y plots, simultaneous display of multiple trend files, split screens to compare two trend displays, panning (scrolling), value and box zooming and compression. Trend data files may be converted to DIF or CSV formats for use in commercial spread sheet and word processor packages. Alarms and events are also presented in a tabular format.

UMC800 User Utility Software

The User Utility Software accessory is available to allow the development of data storage files, ramp/soak setpoint profile files, setpoint schedule files, and recipe files on a PC. In addition to these off-line functions, when the computer running the User Utility Program is connected to the RS-232 configuration port of the controller, maintenance utilities such as analog input and output calibration sequences and diagnostic interrogation may be executed. The schedules, profile and recipe files created on the computer may be transferred to the operator interface via disk or they may be loaded into the system through the RS-232 configuration port of the controller. In addition, configuration upload and download may be executed independent from the Control Builder Software program.

UMC800 OPERATOR INTERFACE

Refer to Models 551, 552, 1041 Operator Interface Specification, document 51-52-03-30 for details.

UMC800 CONTROL BUILDER SOFTWARE OVERVIEW

All controller and operator interface configuration is performed using UMC800 Control Builder software on a separate PC operating with Windows™ 95 or Windows™ NT. All configuration is performed off-line (computer disconnected from the controller and operator interface). The configuration is downloaded in a separate operation as a complete file through a dedicated RS-232 communication port on the controller. Once a configuration is installed into the controller and operator interface, the Control Builder software may be used to monitor areas of the configuration to verify proper operation.

Controller configuration development is performed using "Drag and Drop" techniques for positioning graphic icons on a PC display from a list of available functions. Signal flow connections from icon to icon complete the controller configuration. The Control Builder software will create a graphic diagram 1 page high by 20 pages wide. The completed diagram may be printed on 20 pages of 8.5" x 11.5" paper. Each configuration is saved as a single PC file. Multiple files may be saved on the PC. The Control Builder can concurrently open multiple configuration files. See

Figure 3 for a diagram of a sample configuration.

Completed configurations may also be saved on disk and loaded into the controller through an optional disk drive on the operator interface, eliminating the need for a direct connection of a PC to the controller.

Each analog signal flow line of the configuration may be labeled with an 8-character tag name, 6-character engineering unit definition, and may have a decimal point location specified. Digital signal lines may be identified with an 8-character tag name and 6-character ON and OFF label.

Signal tags are used by the operator interface to present on-line status.

Control Builder software may also be used to reconstruct an existing controller configuration by uploading the configuration from the controller for maintenance or diagnostic purposes. Security may be applied to configurations to develop view only files.

The Operator Interface configuration is performed by completing pre-defined screen definition templates.

The Control Builder Diagram function blocks may be monitored and tested using the serial communications connection to the controller. Both analog and digital values may be forced to test the program.

Remote Access - Remote controller access via dial-up modem is available via the communication setup. An external modem is required at the controller and is connected to the standard RS 232 configuration port. Remote access functions include on-line monitoring, configuration upload and download.

Control Builder Help

An on-line Help Menu with a Topic list and Find function is provided as a guide for using the Control Builder in developing the control strategy, using function blocks, setting up recipes, etc. It also includes full descriptions of all function blocks and associated pins. Context Sensitive Help is available for all user selections within tabbed dialog boxes, describing entry selection, tips on use, etc. This extensive Help capability largely eliminates the need for user manuals, making the configuration task simpler.

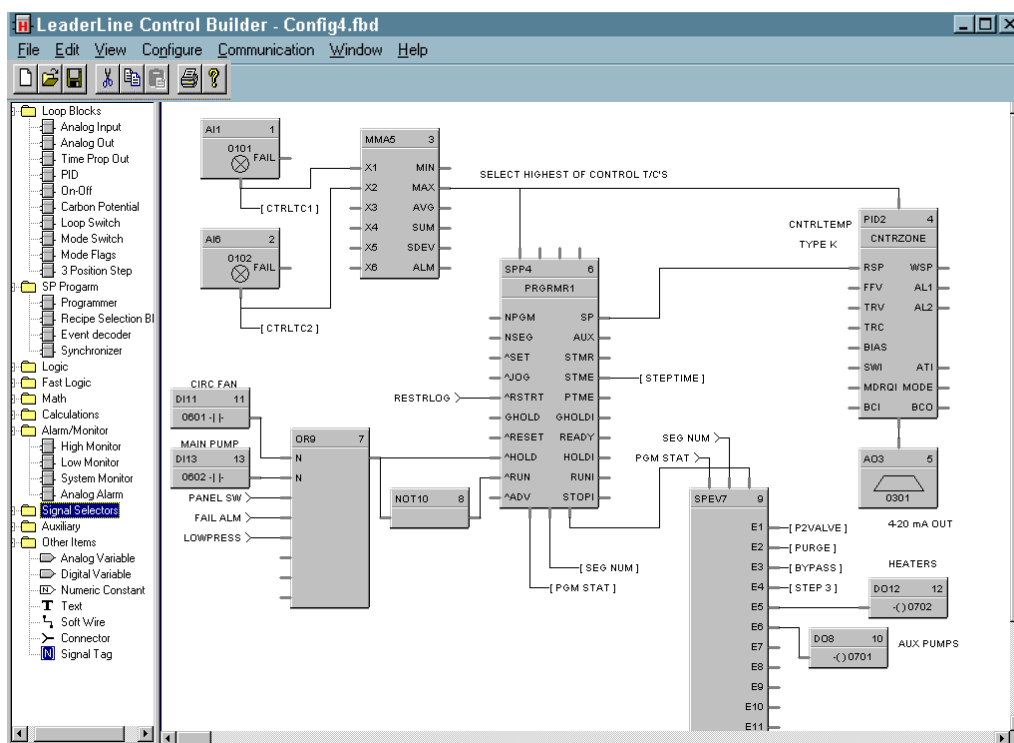


Figure 3—Sample Configuration Diagram

Main Window Menus

Table 6 provides a summary of available Main Menu selections.

TABLE 6 – Summary of Control Builder Main Window Menu Selections

| Main Menu Selection | Description |
|---------------------|--|
| File | <ul style="list-style-type: none"> • <i>New</i>: Displays a new Function Block diagram in the main window. • <i>Open</i>: Opens an existing Function Block diagram. • <i>Close</i>: Closes the active window. • <i>Save</i>: Saves the active configuration. • <i>Save As</i>: Can name the active configuration and select the directory where file is to be stored. • <i>Properties</i>: File properties and statistics are entered. • <i>Write Protection</i>: Can enter and confirm a password for the selected file. • <i>Unprotect</i>: Removes password protection from the selected file. • <i>Remove Write Protection</i>: Removes write protection from the selected file. • <i>Print</i>: Prints block diagram, block parameters, or tag properties. • <i>Print Preview</i>: Displays how each page will look when printed. • <i>Print Setup</i>: Can select printer, paper type, and orientation. • <i>Recent Files</i>: Lists the most recent files that were open. • <i>Exit</i>: Exits the Control Builder application. |
| Edit | <ul style="list-style-type: none"> • <i>Cut, Copy, Paste</i>: Editing functions for function block diagram items. • <i>Delete</i>: Deletes the currently selected item on the function block diagram. • <i>Find</i>: Directs to area of diagram for tagged variables and blocks. • <i>Go To</i>: Can enter the page number to which you want to go. • <i>Warning Label</i>: Can enable or disable the Open Input and Unassigned I/O warnings. |
| View | <ul style="list-style-type: none"> • <i>Toolbar</i>: Displays or hides the toolbar in the top of the Main window. • <i>Status Bar</i>: Displays or hides the status bar at the bottom of the Main window. • <i>Block List</i>: Displays or hides the Function Block Library Tree. • <i>Grid</i>: Can place a grid in the function block diagram. • <i>Normal</i>: Returns object to normal size (Zoom In). • <i>Zoom Out</i>: Can zoom out to see more of a document. |
| Configure | <ul style="list-style-type: none"> • <i>Execution Order</i>: Can change execution sequence—standard blocks, fast logic blocks. • <i>Setpoint Profiles</i>: Can add, delete, or edit programs, and set their properties. • <i>Recipes</i>: Can add, delete, or edit recipes, and set their properties. • <i>Setpoint Schedules</i>: Can add, delete, or edit Setpoint Schedules, and set their properties. • <i>Data Storage</i>: Select points and storage timers for data archiving. • <i>Events</i>: Select digital points to be annunciated as events. • <i>Display Tag Groups</i>: Can assign groups of tagged parameters to standard displays—multi-loop bar, multi-loop list, setpoint programmer, 12-point overviews, bargraphs, panels, 12-point annunciator arrays, alarm groups, pushbuttons, trends. • <i>Tag Order</i>: Can arrange the desired display order on the operator interface for Loops, SP Programmers, HOA Switches, Device Controls • <i>Start-up Display</i>: Text format for customized description of product. • <i>Message Display</i>: Can configure up to 10 text screens for Help key. • <i>Setpoint Scheduler Display</i>: Can assign labels to 8 Main Output labels, 8 Auxiliary Output labels, and 16 Event Output labels. • <i>Display Buttons (1-5)</i>: Can assign standard display sets to panel keys. • <i>OI Settings</i>: Set up OI security and security codes. • <i>OI File Names</i>: Set up file names for disk storage. |

TABLE 6 – Summary of Control Builder Main Window Menu Selections (continued)

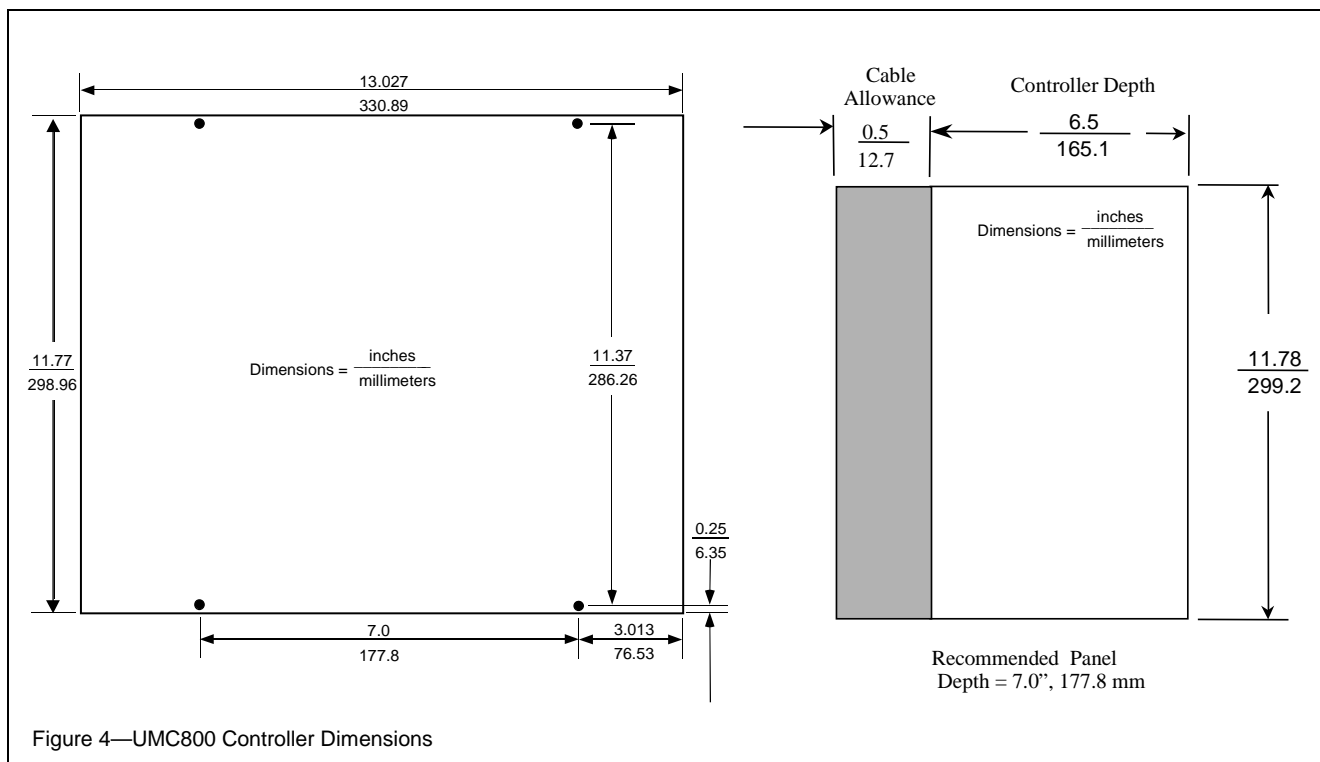
| Main Menu Selection | Description |
|-----------------------|---|
| Communications | <ul style="list-style-type: none"> • <i>Setup</i>: Chooses PC COM port and settings for communication with controller. • <i>Set Controller Comm A Port</i>: Can enable 485 Modbus communications port if CPU contains optional communications board. • <i>Set Controller Comm B Port</i>: Can enable 485 Modbus communications port. • <i>Download</i>: Downloads a selected controller configuration. • <i>Upload</i>: Uploads the present controller configuration. • <i>Monitor</i>: On-line monitors a selected function block, includes writes of analog and digital values. • <i>Controller Diagnostics</i>: Indicates how controller is functioning. • <i>I/O Module Diagnostics</i>: Indicates how the 16 I/O modules are functioning. • <i>Show Forces</i>: Indicates the blocks that have forced outputs. • <i>Local Loopback</i>: Tests the PC's communications port assigned. • <i>Remote Loopback</i>: Tests the communications connection to the controller. • <i>Error Statistics</i>: Displays a Communication Error Summary dialog box that indicates the types and number of communication errors. • <i>Dial Modem</i>: Displays Timeout then Select Number To Call dialog boxes to allow remote connection. • <i>Hang-up Modem</i>: Disconnects remote connection. |
| Window | <ul style="list-style-type: none"> • <i>Cascade</i>: Arranges windows so that they overlap. • <i>Tile Horizontally</i>: Arranges windows over and under each other. Each window is visible and none overlap. • <i>Tile Vertically</i>: Arranges windows side by side. Each window is visible and none overlap. • <i>(Open Window Designations)</i>: Lists all Function Block diagrams that are open and allows choosing one to be active. |
| Help | <ul style="list-style-type: none"> • <i>Help Topics</i>: Calls up the top level Help Contents page. • <i>About Help</i>: Displays copyright and software version information. |

UMC800 Control Builder Software Specifications

| | |
|-------------------------------|--|
| Design | |
| PC Requirements | Software runs on Windows '95, 98 or Windows NT. Minimum—66 MHz 486 PC with 16 MB of RAM VGA or greater screen resolution. |
| Configuration | Off-line configuration On-line monitoring allows user to test the developed configuration. |
| System Interconnection | Connected to controller through its dedicated RS232 port or to Comm A port through the Ethernet/Modbus bridge. <i>Maximum Distance Between Controller File dedicated RS232 port and PC Configurator: 50 feet</i> <i>Cable Type: Standard 9-pin RS232</i> <i>Cable termination: 9-pin "D" connector</i> |
| Disk Drive (optional) | <i>Format: 3.5 inch, 1.44 megabytes (all models); Zip drive (Model 1041)</i> |
| Modem | <p><i>PC Interface</i>: Supports Microsoft Windows Telephony API (TAPI) device independent modem communications. Baud rate = 9600.</p> <p><i>Controller Interface</i>: Connects to the controller RS-232 configuration port. <i>Most commercially available modems with equivalent specifications to those validated should function with the UMC800 controller.</i> The following modems have been validated: 3COM US Robotics 56K Data/Fax External Modem, Zoom 56K Dualmode External Modem, Best Data 56SX Data Fax External Modem.</p> <p>The modem must have the following capabilities:</p> <ul style="list-style-type: none"> RS232 interface Auto answer Can operate at 9600 baud, 8 data bits, 1 stop bit, and no parity Hardware handshaking can be disabled Software handshaking can be disabled Data Terminal Ready (DTR) input can be disabled Result codes can be suppressed Echo can be disabled Must be equipped with non-volatile memory (NVRAM) so that settings that are configured using command strings can be retained during a power-outage Must be able to load the NVRAM settings automatically on power-up |

Specifications are subject to change without notice.

Dimensions

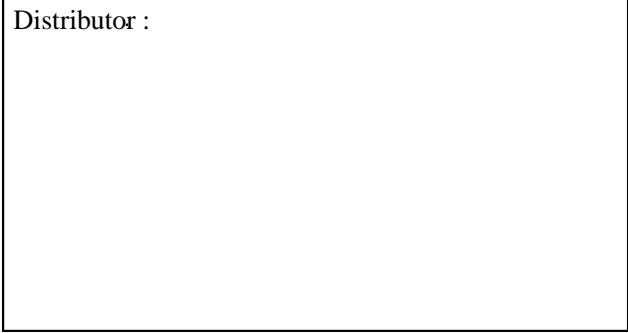


Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose**. Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Distributor :



For more information, contact Honeywell sales at 1-800-343-0228.

Honeywell

Sensing and Control
Honeywell
11 West Spring Street
Freeport, IL 61032