

## MOD 30ML™ Multiloop Controllers

- Multiple PID loops, math, logic and sequence control
- Highly visible, configurable operator display with remote faceplate option
- Flexible built-in, modular and extended digital I/O
- Dual communications networks independently configurable for peer-to-peer or Modbus RTU
- Redundant, removable NOVRAM backs up configuration and current process parameters
- Built-in features for protecting process, plant equipment, and personnel while minimizing downtime.
- FM & CSA Certified  
Class 1, Div. 2, Groups A,B,C,D;  
CE EMI/EFI and LVD compliant
- Graphic-driven, function block configuration
- OPC Communications



The MOD 30ML is a multiloop, multifunction controller with flexible I/O, powerful control algorithms and a configurable operator interface. It is part of MicroMod's suite of hardware, software and systems for process control, supervision and management, including the PAK series of pre-engineered application solutions. MOD 30ML combines the continuous control power of a DCS with the discrete I/O handling and easy sequence configuration of a PLC, in one compact package. The bright vacuum-fluorescent display provides familiar, easy operation of even the most complex processes, and the dual communication networks allow integration into virtually any plant monitoring system.

**FUNCTIONALITY**

MOD 30ML controllers can perform up to six single loops or four cascade control strategies, as well as math and logic functions, characterization and signal conditioning, sequence control, and integrated continuous/discrete control.

The following blocks are available in the standard control library. In most cases, there are many more instances of the block available than would be used in even the most advanced control strategy.

PID Control	Multiple combinations of P, I and D Gain, Reset and Pre-Act scheduling Feed forward External feedback Adaptive gain and reset Deadtime compensation Local/remote setpoint with ratio and /or bias Auto/manual Manual reset, Procedureless Manual Reset Setpoint and output tracking Setpoint selection Setpoint and output limiting Configurable Power Restart Values	Timer	Used to perform timing functions such as delayed start and/or stop, pulse duration, interval timing, or periodic self reset timing. A timer can be configured as an up or down timer for a maximum duration of 1193 hours, 2 minutes, 47.295 seconds. Control functions include: <ul style="list-style-type: none"> <li>• Direction (up/down)</li> <li>• Reset time value</li> <li>• Load a user-definable reset value</li> <li>• Disable and hold at current value</li> <li>• W rap</li> <li>• Limits</li> </ul>
Math/Logic	User-specified expressions with logical, arithmetic, and conditional operators including: <ul style="list-style-type: none"> <li>• Arithmetic: add, subtract, multiply, divide</li> <li>• Comparator: less, less or equal, greater, greater or equal, equal, not equal</li> <li>• Logic: and, or, not and, not or, not</li> <li>• exponential, absolute, natural log, log_10, integer, raised to the power</li> <li>• square root, momentary</li> </ul>	Totalizer	Counts an analog input signal. Features include: Threshold, Up, Down, W rap, Scale Factor, Predetermined Count 1 & 2 and Limit Status.
Sequence	Batch, logic and other types of sequential control based on if-then-else logic statements that allow the user to skip steps, specify several steps for various outputs, and go back to previous steps. Each block supports <ul style="list-style-type: none"> <li>• 128 128 inputs</li> <li>• 64 64 outputs</li> <li>• 512 steps</li> </ul> Sequence blocks can be linked together to increase input/output capacity	Linearization	Produces a linearized value based on: <ul style="list-style-type: none"> <li>• Linear</li> <li>• Square and Modified Square</li> <li>• Square Root and Modified Square</li> <li>• Root</li> <li>• Piecewise</li> <li>• Inverse Piecewise</li> <li>• Thermocouple (B, E, J, K, N, R, S, T)</li> <li>• RTD Types (Platinum 0.00385, 0.0003923, 0.003902, 0.003911, and Nickel 0.00672)</li> </ul>
Characterization (Piecewise) Table	Supports 60 pairs of X, Y floating point coordinates for user defined linearizations or recipe data. Blocks can be cascaded for additional pairs.	Setpoint Ramp/Hold	Up to 100 individually guaranteed ramp or hold segments with repeating profiles, tracking function, four segment event states, reset, stop, run, hold and skip commands
Supervisory Message	Reads, writes, sets, tunes or configures an attribute internally or over the ICN to other controllers	Process Alarm	Produces a discrete signal to advise of an irregular process condition based on: LESS, LESS/EQUAL, GREATER, GREATER/QUAL, EQUAL, NOT EQUAL, Deviation
Analog & Digital Input Function	Provides input filtering, action, normalization, linearization, action and scaling		

## HARDWARE PLATFORM

The basic hardware platform includes the carrier board, CPU, vacuum fluorescent display assembly, and terminations. The instrument uses non-volatile RAM to store the user database and all current and operating parameters.

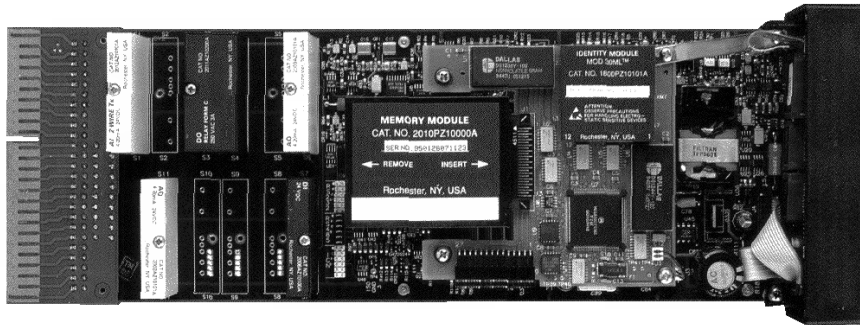
The controller is available in several form factors: standard panel mount, split architecture with a remote faceplate, or MOD 30 (1700 series) replacement version. *(For more information on MOD 30 replacement see spec sheet S-RETROPAK-MOD30).*

The panel mount and split architecture versions of MOD 30ML include a fifty-position, two-piece terminal block assembly for direct connection of field wiring at the back of the instrument. The terminal blocks can be temporarily unplugged from the controller to facilitate wiring.

The back of the MOD 30 replacement version is designed to accept the MOD 30 Instrument Cable (1750 series) so that field wiring on the 1720N Termination Panel can remain in place. *(For more information refer to specification sheet S-RETROPAK-MOD30).*

The split architecture format allows flush mounting inside a panel or cabinet, with a remote faceplate up to eight feet (244 cm) away from the CPU assembly. The Split Architecture version requires less than eight inches (20 cm) behind the panel.

The controller power supply is available in 24Vdc and 110/220Vac. The AC version also supports 120-350Vdc.



## PROCESS I/O

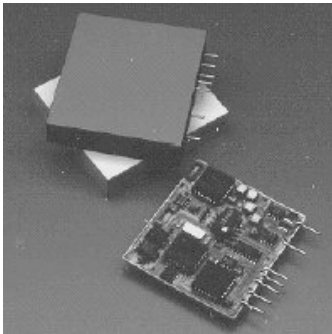
### Universal Built-In I/O

All versions of MOD 30ML controller include:

- Two built-in analog inputs, independently configurable as current (0-20mA or 4-20mA), volts (0 – 10V range), millivolts, 2- or 3-wire RTD, or thermocouple type B,E,J,K,N,R,S,T
- Two independent, isolated transmitter power supplies
- Two current outputs (user-ranged, 0-20mA)

### Optional On-Board I/O

Each controller comes expansion-ready to accept up to eleven plug-in, single-point analog and digital I/O modules. All analog and solid-state digital I/O modules are fully isolated channel-to-channel and channel-to ground.



Available plug-in modules are:

- Current input, with or without transmitter power supply
- 3-wire, 100 ohm RTD or 2-wire, 1000 ohm RTD input with upscale burnout detection
- Thermocouple input with upscale burnout detection (Supports all standard thermocouple types; cold junction compensation provided)
- Volt/millivolt input
- Isolated digital input (2.5-28Vdc, 4-16Vdc, 10-32Vdc, 12-32Vac)
- Non isolated (contact sense) digital input
- Isolated digital output (5-60Vdc, 5-200Vdc, 12-140Vac, 24-280Vac)
- Non isolated digital output
- Mechanical relay output (two Form A outputs, two Form B outputs or one Form C output)

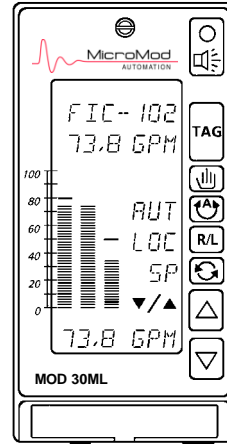
### Digital Expansion I/O

In addition to the plug-in modules, using the Extended I/O Interface module MOD 30ML can accommodate up to 100 remote digital I/O points using PLC-style I/O blocks. The Interface module occupies two of the eleven expansion slots on the controller. Communication to the remote I/O is via a twisted, shielded pair of wires. Remote I/O is configured using the same engineering tool as the built-in and modular I/O.

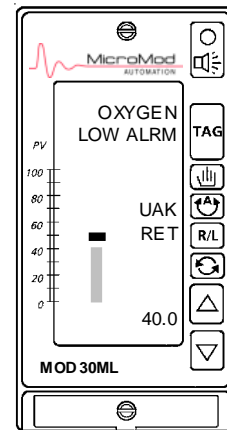
**OPERATOR DISPLAY**

The bright, highly visible vacuum fluorescent front screen provides a high level of information for ease of operation. The display has its own processor which controls display functions and updates.

In normal operating mode each screen shows three bargraphs representing Process, Setpoint, and Output. Three eight-character alpha-numeric lines indicate the Loop Tag; the numeric process value; and the numeric value of the variable indicated by the Status Indicator (typically Output and Setpoint). Three-character Status Indicators display controller Mode (Auto/Manual), Setpoint status (Local/Remote), and the variable whose value is being displayed on the bottom line of the screen. The up/down arrow keys are used for changing this value (e.g. setpoint, output, bias). The standard ramping method allows the operator to select the desired value without any overshoot. However, the ramp keys can be configured for various modes such as time-based ramping to provide familiarity and reduce operator retraining.



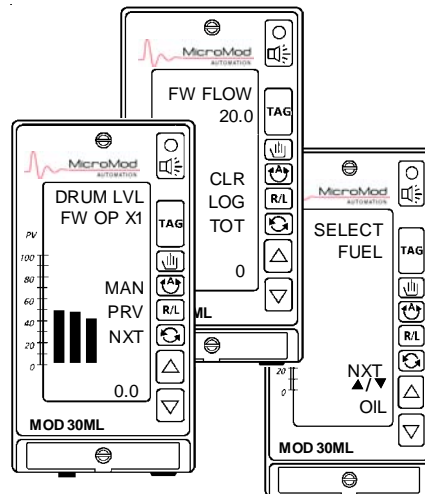
Active process and diagnostic alarms are indicated by the flashing red LED on the keypad, and/or flashing display and audible alarm. Complete alarm information including value, alarm type (high, low, deviation etc.) and user-configured label can be viewed by pressing the Alarm key. A Return key allows the operator to switch directly from the Alarm display to the operating display for the variable in alarm condition. Any number of alarms may be configured for an analog or a digital signal, and there is no limit to the total number of alarms per controller.



Control loops are tuned from Tuning displays, accessed by a user-specified password. Standard tuning parameters, recipe values, and X/Y table coordinates can be entered through the faceplate, without the need for a handheld terminal or computer. The Visual Application Designer software provides graphics and trendwindows for easy tuning from a personal computer.

In addition to standard displays, application-specific screens can be configured for sequence and batch operations, discrete device operation, recipe selection, and multiple variable indication. Keys can be assigned different functions on a per-display basis through a script language. The number of screens per controller is limited only by operator preference and plant operating philosophy. It is also possible to configure "hidden" screens accessed through a tuning-level password.

The MOD 30ML also displays raw input values for commissioning and startup, as well as detailed diagnostic information before and during normal operation. An Event Queue of up to 1024 entries is maintained by the instrument, and can be viewed from the controller faceplate.



## COMMUNICATIONS

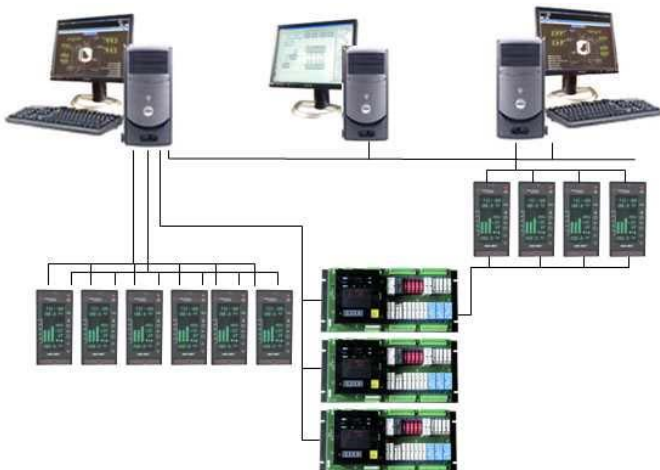
Serial communication is a standard feature of every controller. The base instrument includes one built-in port, jumper-selectable ABB's peer-to-peer Instrument Communication Network (ICN) or as Modbus RTU over RS-485 or RS-232.

When selected as RS-232, the instrument can communicate to a PC via a cable from the front panel on a standard controller (Note: NEMA 4X versions do not provide this jack). On a Modbus network the MOD 30 ML can act as a slave device, where a PC or other host is the master, or as the master to other devices such as recorders, valve positioners, or PLCs. As a slave device MOD 30ML uses an Extended Modbus RTU protocol which supports its unique data types such as floating point registers, but is compatible with standard Modbus devices.

The ICN provides peer-to-peer communication with other MOD 30ML controllers, MODCELL Multiloop Processors, ABB Kent-Taylor MOD 30, and Local Control Panels. It also allows communication to a PC through a Communication Link.

A second serial communication port can be added using a plug-in module for RS-232 Modbus, RS-485 Modbus or ICN. The communication protocol for the second port is independent of the protocol selected for the built-in port.

OPC Servers, developed to OPC Specification 2.0, are available for Extended Modbus and for ICN communication. Using these servers, MOD 30ML can be integrated with MicroMod's MicroPWC operations and information software or any available OPC client package. The servers also provide DDE and Fast-DDE for non-OPC clients such as Microsoft Excel.



## SAFETY AND SECURITY

MOD 30ML is unique in providing features for protection of process, personnel, and plant equipment.

### Recovery after power failure

Power fail/recovery settings are available for every parameter, so that outputs, steps, control modes and setpoint values assume a known good value, either 'previous' or user-configured, after a power outage. In addition, warm- and cold-start options allow different settings depending on a user-specified time period before power is restored. The configured information is stored in the controller's memory and is not dependent on external power. This feature can accelerate the restart process and significantly reduce downtime.

### Failsafe output settings

The user has the option to select failsafe values, T either 'previous' or a user-selected value, on all outputs should the controller I/O lose communication with the CPU. These values are independently configurable for each output, and reside in the modules. The Digital Expansion I/O also provides for failsafe settings.

### Backup of database and tuning parameters

The Portable Memory Module, available as an option, contains a backup copy of the controller's configured database. When installed on an operating instrument, it is updated every 50ms with current process parameters including PID and sequence output values and status, tuning values, sequence steps, calculation results etc. Continuous checksums insure against corruption of Memory Module data. In the event an instrument needs replacement, the Memory Module can be installed on the new controller for instant, as-you-were recovery of operations. The Memory Module can also be write-protected so that a known good database can be downloaded either manually or on power-up.

### Single-point isolation and Cut-wire detection

Inputs, outputs and built-in communications are individually isolated, channel-to-channel and channel-to-ground. This helps eliminate propagation of noise and spikes on signal and power lines when the controller is properly installed. Each I/O point includes short-circuit and cut-wire detection with associated diagnostics, and a digital flag that can be used to initiate alternate control logic such as safe shutdown. Out-of-range and quality diagnostics are also associated with each point.

## CONFIGURATION

A MOD 30ML controller includes all control functionality as standard. The user simply selects which strategies or blocks are required for the application during configuration.

Simple PID loops (up to six) and cascade control strategies (up to four) with standard process alarms can be configured through the front face of the instrument using the keypad. Built-in templates allow menu-driven entry of configuration parameters.

For more advanced strategies requiring calculations, logic, signal selection, sequencing or custom displays, the Visual Application Designer software provides a Windows-based environment for creating, editing, downloading, documenting and debugging MOD30ML databases. The graphical, function block configuration environment makes it easy to relate the process flow to the configuration. It provides automatic, on-screen documentation of the configuration, including signal source and destination, and “Smart” connections automatically snap to the correct block inputs. On-line, context sensitive help is available for each block and function.

Live debug and runtime facilities allow on-line verification of the database and process logic, and trend windows simplify loop tuning at commissioning time. There is also a set of drawing tools that can be used to construct runtime displays or place dynamic process symbols next to the algorithm blocks in the configuration for easier debugging, without using a separate HMI package. A Smart Symbols gallery contains a library of standard configurations and static and dynamic process symbols. The user can create additional libraries with application-specific compounds and symbols.

Automatic report generation includes tabular reports containing all blocks in the system, their internal parameters, and all connections, as well as graphical reports showing the database diagram exactly as it is drawn. Once the database has been defined and saved, it is downloaded to individual MOD 30ML Multiloop Controllers using either the Extended Modbus or ICN OPC Server. An operating controller maintains its output while receiving a download of a new database.

## MOD 30 RETROFIT

MOD 30ML multiloop controllers were designed as the next generation of the popular MOD 30 Instrument series. They include combined features and functions of the MOD 30 Controller XL, Math Unit and SLU and offer many improvements such as:

- A highly visible, more informative display
- More flexible I/O
- Open communications
- Front-face tuning
- Windows-based, graphic configurator

The MOD 30ML provides a similar look and feel, but is easier to operate. It also retains the features that made MOD 30 one of the most secure controllers on the market, such as the memory module and cut-wire detection, and supports ICN communications with existing MOD 30 instruments, the Local Control Panel, and Communications Link.

For easy hardware retrofit, MOD 30ML is available in MOD 30 Conversion style hardware. It fits into the same panel cutout and mounting bezel as the MOD 30 instruments, and the back termination assembly accepts cable (175xN) from the MOD 30 Standard Termination Panel (1720N), so that field wiring can remain in place.

The MOD 30 replacement version of MOD 30ML can be ordered factory-installed with the same I/O complement as the MOD 30 Controller XL (1701R), or you can choose the I/O that best matches the application.

**Refer to Specification Sheet S-RETROPAK-MOD30 for more detail and ordering information.**

## GENERAL SPECIFICATIONS

### PID Loops

Six single or four cascade

### Execution Time

Using built-in I/O: 100mSec.  
Module I/O: 150mSec. or greater  
(depends on strategy size)

### Operating Range

AC option: 85-250V rms, 50-400Hz  
DC option: 20-50V dc  
MOD 30 termination style: 24V dc

### Fuse

2.5 Amps (ac), 4.0 Amps (dc)

### Power Consumption (120V rms, 60Hz, Full load)

50W maximum

### Data Retention (Non volatile RAM memory and Portable Memory Module)

Typically 10 years with instrument unpowered

### Operating temperature

0 to +50°C

### Storage Temperature

-40 to +75°C

### Humidity

5 to 95% RH, noncondensing

### Open Input Fault Detection

Controller recovery is user configurable for all inputs

### Fault Output

Built-in outputs - last value or 0%  
Module outputs - user defined between  
0 and 100%

### ICN Baud rate

31.25K Baud

### Modbus Baud rate

150 to 38.4K Baud

## PHYSICAL SPECIFICATIONS

### Height

Bezel - 5.69" (144.5 mm)  
Panel cutout - 5.47" (138.9 mm)

### Width

Bezel - 2.87" (72.9 mm)  
Panel Cutout - 2.69" (68.3mm)

### Safety Approvals

General Purpose  
FM Approved and CSA Certified Class I, Division 2,  
Groups A, B, C, D (standard version only)

### Depth

#### Standard version :

Behind the panel - 15.75" (400 mm)  
Front of panel - 1.13" (28.7 mm)

#### Split Architecture (flushmount):

Behind the panel - 4.125" (150 mm)\*  
Front of panel - 1.13" (28.7 mm)  
\*includes mounting bracket

### Weight

Base instrument with identity module: 4.7 lbs.  
Fully module loaded: 6.0 lbs.

### Mounting

Standard version instrument mounts directly in a panel or may be mounted in a 1705FZ Instrument Trim Bezel. Split Architecture faceplate mounts directly in a panel, and instrument chassis mounts on a flat surface using bracket provided.

Maximum distance between Split Architecture faceplate and instrument chassis is 8 feet (244mm)

**PERFORMANCE SPECIFICATIONS**

**Built-In Analog Inputs & Outputs**

**Analog Inputs (2)**

<b>Transmitter Power</b>	24V dc, isolated (each input)				
<b>Range / Span</b>	<b>Configured as:</b>	<b>Min</b>	<b>Max.</b>	<b>Span Min.</b>	<b>Impedance</b>
	Millivolts	-10	120	10	10MΩ min.
	Volts	0	6,0	0,1	10MΩ min.
	Milliamps	0	22	1,0	100Ω nominal
	Resistance	500 ohms			

**Input Temperature Linearization**

Thermocouple – per standard NBS 125 y IEC 584  
 RTD – per standard IEC751 & DIN43760

<b>Measurement Range Limits – Thermocouple or RTD</b>	<b>°F Low</b>	<b>°F High</b>	<b>°C Low</b>	<b>°C High</b>
Type B	392	3308	200	1820
Type E	-328	1832	-200	1000
Type J	-346	1400	-210	760
Type K	-328	2501	-200	1372
Type N	32	2372	0	1300
Type R&S	32	3214	0	1768
Type T	-430	752	-257	400
RTD	-328	1562	-200	850

Note: performance accuracy of Type B thermocouple cannot be guaranteed below 752°F (400°C).

RTD – 3-wire platinum, 100 ohms per DIN 43760 (IEC751), range 0-430 ohms (normal) or 0-55 ohms (low).

**Common mode rejection**

45Vdc

**Isolation** Complete galvanic isolation using transformers and opto-isolators

**Analog Outputs (2)**

<b>Range</b>	0 to 22mA, non-isolated, with user-adjustable span (1 mA min.)
<b>Load</b>	22mA at 1000 ohms maximum

**Modular Inputs & Outputs – Analog Input Modules**

**Voltage 2001A**

Range	(0-100%) ±10V dc, ±100 mV dc
Low limit	-11V, -110mV
High limit	+11V, +110 mV
Input resistance	1 Megohm
Noise filter	3db a 5 Hz, 3 db a 3 Hz
Resolution	16 bits
Sensitivity	0.4mV, 4uV
Accuracy	(calibrated) 0.1%
Isolation	250V rms
Maximum survivable input	±300V dc o 250V ca
Common mode rejection	100 db a 60 Hz minimum
Normal mode rejection	40 db a 60 Hz minimum

**Current 2002A**

Range	(0-100%) 4 a 20mA
Low limit	0 mA
High limit	24 MA
Input resistance	2.5 ohms
Noise filter	3db a 5 Hz
Resolution	13 bits
Sensitivity	1.6 uA
Accuracy	0.2%
Isolation	250V rms
Maximum survivable input	50 mA dc (Differential)

**Current with 2-wire**

Range	4 a 20mA
Low limit	0 mA
High limit	27.5 mA
Input resistance	50 ohms
Noise filter	3db a 5 Hz
Resolution	14 bits
Sensitivity	1µA
Accuracy	0.2%
Isolation	250V rms
Normal mode rejection	40 db a 60 Hz minimum

**Thermocouple 2013A**

Types	B,E,J,K,N,R,S,T
Range	±100 mVd dc
Low limit	-110 mV
High limit	+110 mV
Input resistance	10 Megohms
Noise filter	3 db a 3 Hz
Resolution	16 bits
Sensitivity	4 uV
Accuracy	0.1%
Isolation	250V rms
Normal mode rejection	40 db a 60 Hz typical

## PERFORMANCE SPECIFICATIONS

### Modular Inputs & Outputs – Analog Input Modules (continued)

#### RTD 2009A

Type	Range	Low Limit	High Limit
2 wire	0-4000 ohms (1000 ohms nominal)	0 ohms	4200 ohms
3 wire	0-400 ohms (100 ohms nominal)	0 ohms	400 ohms
Input Resistance	100 ohms each wire		
Noise Filter	3 db a 5 Hz		
Resolution	2 wire: 0.08 ohms/count		
Accuracy (absolute)	2 wire: $\pm 2$ ohms		
Isolation	250 V rms		
common Mode Rejection	100 db a 60 Hz minimum		
Normal Mode Rejection	40 db a 60 Hz minimum		

### Analog Output module

#### Current Output 2003A

Range	(0-100%) 4 a 20 mA
Low Limit	0 mA
High Limit	25 mA
Open Circuit Voltage	26 volts maximum
Isolation	250V rms
Resolution	12 bits
Sensitivity	5 $\mu$ A
Accuracy	$\pm 0.2\%$
Load Limit	0 - 800 ohms

### Digital Input Modules

#### Isolated Digital Inputs 2004A

2004AP10...	...100A	...110A	...120A	...130A	...140A	...150A
Input Voltage Range	2.5-28V dc	4-16V dc	10-32V dc 12-32V ac	35-60V ac/dc	90-140V ac/dc	180-280V ac/dc
Low logic input	1V	1V	3V	9V	45V	80V
Maximum input current	30mA	45mA	25mA	6mA	11mA	6.5mA
Response time	1.5 ms	0.1 ms	5 ms	10 ms	20 ms	20 ms
Input resistance	900 ohms	300 ohms	1000 ohms dc 1500 ohms ac	10K ohms	14K ohms	43K ohms

#### Non-isolated Digital Inputs 2006A

Contact sense	5V/ 0.5 mA dc typical
Low logic input	0 a 0.65V dc to 50K ohms minimum
High logic input	2.2 a 24V dc to 50 ohms maximum
Maximum input current	2.5 mA dc
Response time	1 ms

### Digital Output Modules

#### Isolated Digital Output 2005A

2005AP21...	...100A	...110A	...120A	...130A/140A
Output voltage range	5-60V dc	5-200V dc	12-140V ac	24-280V ac
Maximum output current	1A	0.55A	1A	1A
Response time	0.75 ms	0.75 ms	1/2 cycle	1/2 cycle

#### Non-isolated Digital Output 2007A

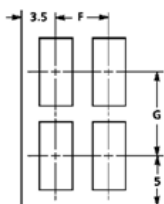
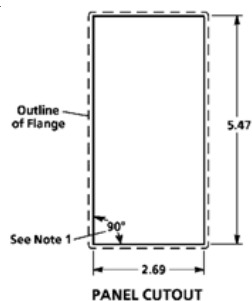
Output Voltage Range	+5 a +24V dc
Maximum output current	100 mA dc
Maximum leakage current	100 $\mu$ A dc
Response time	100 $\mu$ s

#### Mechanical Relay Output 2011A

Types	Two independent relays (NO/NO, NC/NC, NO/NC)
Contact load	3A a 250Vac or 30V dc per relay
Contact resistance	0.10 ohms maximum
Isolation	250V rms (contact to coil)
Response time	10ms

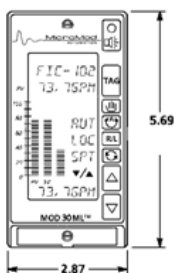
# MOUNTING DIMENSIONS

## Standard version

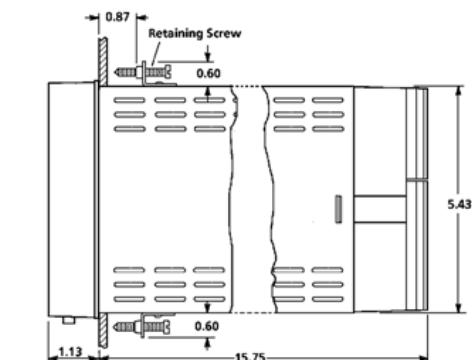


Center-to-Center Distance	F	G
Recommended	4	8
Minimum	3.5	7

PANEL CUTOUT



FRONT VIEW



RIGHT SIDE VIEW

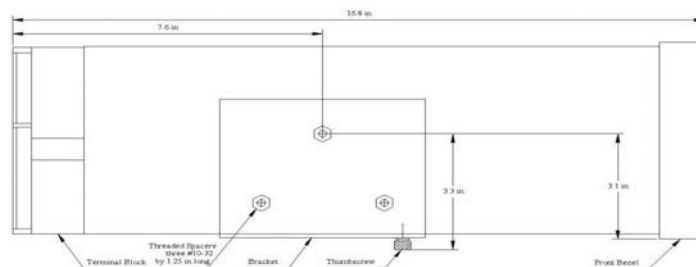
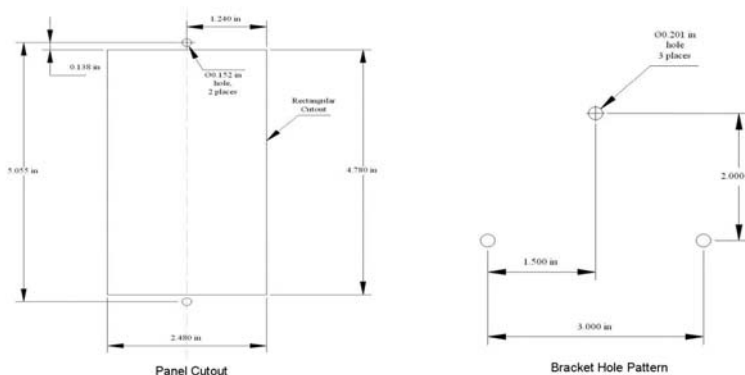
Inches	mm	Inches	mm
0.6	15.2	5.43	137.9
0.87	22.1	5.47	138.9
1.13	28.7	5.69	144.5
2.69	68.3	7	177.8
2.87	72.9	8	203.2
3.5	88.9	15.75	400
4	101.6		

1.5 inch (38.1mm) clearance for optional communications jack.

Notes:

1. When mounting housing in panel cutout or rack and panel mounted bezel, turn retaining screws until point of screw touches rear of panel or bezel. Overtightening of retaining screws will distort housing. Housing must be square after retaining screws are tightened.
2. NEMA 4 option contains a gasket and lower front panel screw. Also, communication jack and service manual switch not present.
3. 1801R bezel width is 2.735in (69.47mm). Panel cutout is the same.

## Split Architecture (flush mounted)



**Information:**

- 1 Available as standard Panel Mount or Split Architecture with remote faceplate (up to 8 feet)
- 2 All 1800R series controllers include two built-in universal analog inputs, two built-in current outputs and one built-in communications channel. All controllers are expansion-ready for additional plug-in modules
- 3 Select additional I/O and communication modules as required. Number of modules per instrument depends on:
  - number of active analog input modules (powering transmitters); blank position required between
  - position requirements of each module, e.g. 3-wire RTD requires 2 positions
  - whether 2nd communications channel and/or Extended I/O Interface are used
- 4 Select Visual Application Designer configuraton software from S-MOD-VIZAPP

<b>MOD 30ML PANEL-MOUNT</b>	06	07-08	09	10	11	12
<b>Base Controller</b>						
Standard bezel	1800RZ					
Narrow bezel (Foxboro replacement version)	1801RZ					
<b>Approvals</b>						
General Purpose		10				
CE (European Community destinations only)		12				
FM/CSA Class 1 Division 2 A,B,C,D		21				
<b>Power Supply</b>						
24V dc			0			
85 to 265V ac			1			
<b>Enclosure</b>						
Standard terminations				0		
Standard terminations, NEMA 4				3		
Standard terminations, NEMA 4 with conformal coating				4		
<b>Not Used</b>					0	
<b>Design Model</b>						B

<b>MOD 30ML SPLIT ARCHITECTURE</b>	06	07-08	09	10	11	12
<b>Base Controller</b>						
Split Architecture with remote faceplate (8 feet/243 cm max.)	1803RZ					
<b>Approvals</b>						
General Purpose (does not provide FM, CSA or CE certification)		10				
<b>Power Supply</b>						
24V dc			0			
85 to 265V ac			1			
<b>Enclosure</b>						
Standard terminations				0		
<b>Mounting</b>						
Flushmount (includes mounting bracket for wall or surface mounting)					1	
<b>Design Model</b>						A

**ACCESSORIES**

Downloading cable - for use with built-in RS-232 front port (included with configuration software)	109S1854
ICN Termination Assembly (1 per ICN network)	2030FZ00001A
Portable Memory Module (optional)	2010PZ10000A
Upgrade to Version 2 Identity Module	1800PZ10102C
Housing & termination assembly only (no instrument) - standard version	1800FZ00003A
Output Holder / Manual Loader (see S-MOD-1750N)	1750NZ10001A

The following plug-in I/O and communications modules are available for use with the Panel Mount and Split Architecture versions of MOD 30ML:

### I/O MODULES

	Positions	Power	
<b>Analog Input - isolated</b>			
Voltage (+/- 100mv, +/- 10V)	1	80mA	2001AZ10101B
Current (4-20mA)	1	80mA	2002AZ10101B
Current (4-20mA) with 2-wire transmitter power	(Note 1)	350mA	2012AZ10101B
RTD (2-wire, 1000 ohm nominal resistance)	1	80mA	2009AZ10220B
RTD (3-wire, 100 ohm nominal resistance)	2	80mA	2009AZ10130B
RTD for Cold Junction Compensation (1 per base instrument). Required if built-in input 1 is not used as tc+gc and thermocouple inputs are used.	1	80mA	2009AZ10240B
Thermocouple (supports type B,E,J,K,N,R,S,T and calibrated)	1	80mA	2013AZ10101B
<b>Analog Output - isolated</b>			
Current (4-20mA / 0-20mA)	(Note 1)	350mA	2003AZ10101A
<b>Digital Input - Isolated</b>			
2.5 to 28V dc	1	12mA	2004AP10100A
4 to 16V dc	1	12mA	2004AP10110A
10 to 32V dc, 12 to 32V ac	1	12mA	2004AP10120A
35 to 60V ac/dc	1	12mA	2004AP10130A
90 to 140V ac/dc	1	12mA	2004AP10140A
180 to 280V ac/dc	1	12mA	2004AP10150A
<b>Digital Output - Isolated</b>			
5 to 60V dc	1	12mA	2005AP21100A
5 to 200V dc	1	12mA	2005AP21110A
12 to 140V ac, SPST, NO	1	12mA	2005AP21120A
24 to 280V ac, SPST, NO	1	12mA	2005AP21130A
24 to 280V ac, SPST, NC	1	12mA	2005AP21140A
<b>Digital Input - Nonisolated</b>			
2.2V to 24V dc (contains internal 5V supply for direct hardwire connection)	1	10mA	2006AZ10100A
<b>Digital Output - Nonisolated</b>			
25V, 50mA TTL (open collector switch supports 5V TTL)	1	20mA	2007AZ10100A
<b>Mechanical Relay Output - isolated</b>			
Dual SPST, NO/NO (2 outputs)	2	140mA	2011AZ10100A
Dual SPST, NC/NC (2 outputs)	2	140mA	2011AZ10110A
Dual SPST, NO/NC (2 outputs)	2	140mA	2011AZ10120A
<i>Note: 2011AZ10200 Form C module is no longer available.</i>			
<b>Extended I/O Interface (Limited Availability) - see P-MOD-EXT_IO for remote I/O modules</b>			
Extended I/O Interface Module (one per Remote I/O Network; 2 max)	2	400mA	2020NZ10000B
<i>Note 1: These active current modules use one position, however they require that one module space on each side be unused.</i>			

### COMMUNICATION MODULES AND ACCESSORIES

<b>Communication Modules (one per instrument in addition to built-in communication channel)</b>			
Instrument Communications Network (ICN)*	2	300mA†	2030NZ10000B
Serial Communications for Modbus RTU:			
RS-232**	2	180mA	2033NZ10000A
RS-485, 4-wire**	2	180mA	2034NZ10000A
<b>Accessories</b>			
ICN Termination Assembl for Flushmount MODCELL (1 per ICN network)			2030FZ00002A
ICN Termination Assembl for MOD 30ML (1 per ICN network)			2030FZ00001A
Portable Memory Module (optional)			2010PZ10000A
Output Holder / Manual Loader (see S-MOD-1750N)			1750NZ10001A

\* One ICN module is required in the MOD 30 Replacement instrument if the built-in communications port is used for RS-232 through the front panel.

\*\* Provides pull-up/pull-down resistors for Modbus network, and address switch. Required when using MOD 30ML as master.

† 2030F terminator assembly adds 200mA for total ICN module load of 500mA to controller unit on which it is installed.

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Printed in USA

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