

## 353 RetroPAK Controllers

- **Replace obsolete Moore 352 and Siemens 353 controllers**
- **Easy migration for operators and engineers**
- **Fits the same panel cut-out**
- **Peer-to-peer, Modbus RS-485, and Ethernet Modbus/TCP networks**
- **Removable memory module stores complete configuration & operating status**
- **Graphical configuration program**  
**Library of factory-configured options**  
**and Moore 352 & Siemens 353 function blocks**



*The Logical Migration*

*Standard 2-year Warranty*

The 353 RetroPAK is a standalone, microprocessor-based industrial controller designed to replace the Moore 352 and Siemens 353 controllers. It can serve as a single-loop or multiloop controller, with math, logic and sequence functions. It's the ideal migration path to current technology designed, manufactured and supported in the USA.

The 353 RetroPAK uses state-of-the-art, surface mount technology. Like the Moore 352 and Siemens 353, the basic hardware platform includes the carrier board, CPU, display assembly, and terminations. The non-volatile RAM not only stores the configured database, but backs up all current tuning, state, and operating parameters.

The base RetroPAK controller provides:

- 3 analog inputs
- 2 current outputs
- 3 discrete inputs (2.5 - 28Vdc)
- 2 relay outputs or 2 digital outputs

Two of the standard analog inputs are universal, so low-level inputs such as thermocouple and RTD can be accommodated without ordering extra options. The third input is 4-20mA. The Expanded version provides two additional 4-20mA inputs and a third 4-20mA output. (*Other I/O configurations are available; contact MicroMod.*)

Two serial communication ports are standard. One is dedicated to the ICN peer-to-peer network for communication to other RetroPAK controllers. The other is selectable as either Modbus RS-485 or Ethernet Modbus/TCP for connecting to PCs, operator panels and other hosts.

The RetroPAK display is bright, robust, and operator-friendly. Plain-language operating, alarm, and tuning displays provide more information without having to interpret codes, and multiple display screens are viewed using the TAG key.

The Factory Configured Options (FCOs) can be loaded and set up from the front keypad of the controller. To add or delete blocks, or to develop a custom configuration, use Visual Application Designer, a graphical, function block-based program that includes a library of 352 and 353 function blocks.

The Portable Memory Module backs up the configuration and, when left on an operating controller, live process parameters. It can be used to copy configurations to other RetroPAK controllers and help maintenance technicians get a process back up and running without having to reconfigure or re-tune the controller.

**INFORMATIVE, HIGH VISIBILITY DISPLAY**

The pixel-based vacuum fluorescent display is highly visible and extremely robust. It provides a choice of up to six fonts and seven levels of brightness for ease of operation.



**Standard Loop Display**

- Easy to read, at-a-glance process information
- Easy to operate

**Alarm Displays**

Easy to identify, review, and acknowledge process and diagnostic alarms



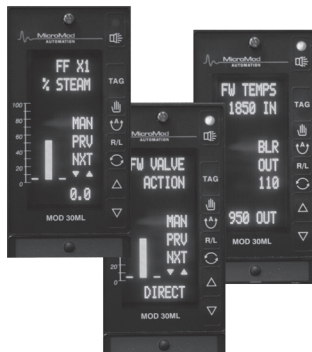
**Tuning Displays**

Password-protected entry of tuning parameters, characterizer values, and other information



**Application-Specific Displays**

Custom displays can be configured for sequence and batch operation, discrete device operation, recipe selection, and more. All keys are user-programmable.



**Maintenance & Troubleshooting**

View raw input values, detailed diagnostic information, and Station Event Queue

**SAFETY AND SECURITY**

The RetroPAK incorporates features for protecting the process and ensuring continued safety and operation.

**Signal Quality Detection** - All inputs and outputs have quality detection and an associated alarm bit.

**Power fail/recovery settings** - define output states, control parameter values, and other variables

**Failsafe output settings** - the option to select failsafe values, either 'previous' or a user-determined value, on field outputs should the controller I/O lose communication with the CPU.

**Single-point isolation & short-circuit protection** - Inputs, outputs and built-in communications are individually isolated, channel-to-channel and channel-to-ground. Each I/O point includes short-circuit and cut-wire detection with associated diagnostics

**Database & tuning parameter backup** - The Portable Memory Module option contains a backup copy of the controller's configured database. If installed on an operating controller, it is updated every 50ms with current process parameters. Continuous checksums ensure against corruption of Memory Module data.

**STANDARD CONFIGURATIONS**

Factory Configured Options configuration can be enabled and set up from the front panel. To add or delete function blocks, use the Visual Application Designer software.

352	353	
FCO 01/02	FCO 101/102	Single-Loop Controller with Tracking or Non-Tracking Setpoint
FCO 03/04	FCO 103/104	External Set Controller with Tracking or Non-Tracking Setpoint
FCO 05	FCO 105	Ratio Set Controller
FCO 06		Loading Station
	FCO 106	Single-Loop Controller with Operator Setpoint Limits
FCO 07/08		A/M Transfer Station with or without Bias
	FCO 107	Dual Loop Controller
FCO 09		Indicating Station
FCO 20	FCO 121	Single-Station Cascade Controller
FCO 21		Single-Loop Feedforward Controller
	FCO 122	Cascade Loop Controller with Operator Setpoint Limits

**FUNCTION BLOCK LIBRARY**

The 353RetroPAK configuration software has a library of Function Block compounds which provide most of the functionality and connections of the original blocks, so you don't have to relearn the configuration process. In addition, the RetroPAK has its own powerful set of native function blocks for even more flexibility.

**352 Function Block Compounds:**

FB01	Analog Input #1	FB24	Square Root Extractor	FB49	General Purpose Transfer #1
FB02	Analog Input #2	FB25	Analog Input #4	FB50	Logic #4
FB03	Analog Output #1	FB26	Analog Input #5	FB51	Hi/Lo Limit #2
FB04	Digital Output #1	FB27	Analog Input #6	FB52	Hi/Lo Signal Selector #1
FB05	Digital Output #2	FB29	Analog Output #2	FB54	Hi/Lo Signal Selector #2
FB06	Digital Input #1	FB30	Digital Input #2	FB55	General Purpose Transfer #2
FB07	Ratio	FB31	Digital Input #3	FB56	Logic #5
FB08	Bias	FB32	Relay Output #1	FB57	Logic #6
FB09	Hi/Lo Limit #1	FB33	Relay Output #2	FB58	Deviation Amplifier #2
FB10	Override Selector	FB34	Math #1	FB59	Inverter #1
FB11	E/I Transfer	FB35	Math #2	FB60	Inverter #2
FB12	Alarms	FB36	Math #3	FB61	Analog Output #3
FB13	Controller #1	FB37	Math #4	FB62	General Purpose Hold #2
FB14	A/M Transfer	FB38	Gain & Bias #1	FB63	General Purpose Track & Hold #2
FB15	Operator Display	FB39	Gain & Bias #2	FB64	Quad Comparator
FB16	Integrator/Totalizer	FB40	Lag	FB65	Delay Timer
FB17	Setpoint Track & Hold #1	FB41	Lead	FB67	One Shot Timer
FB18	Gen. Purp. Track & Hold #1	FBLL	Lead/Lag	FB68	Flip-Flop
FB19	General Purpose Hold #1	FB42	Rate Limiter	FB69	Logic #7
FB20	Logic #1	FB44	10-Segment Characterizer	FB70	Logic #8
FB21	Logic #2	FB45	Controller #2	FB99	Analog Input #3
FB22	Deviation Amplifier #1	FB46	Setpoint Track & Hold #2	FBIND	Analog Indicator
FB23	Dual Transfer Switch	FB48	Logic #3		

**353 Function Block Compounds:**

A/M	Auto/Manual	FTG	Falling Edge Trigger	RCT	Repeat Cycle Timer
ADD	Addition	GB	Gain & Bias	RLM	Rate Limiter
AIN	Analog Input	HLD	Hold	ROT	Retentive On-Timer
AINU	Analog Input Universal	LIM	Limit	ROUT	Relay Output
ALARM	Alarm	LL	Lead/Lag	RSF	RS Flip-Flop
AND	AND Logic	MTH	Math	RTG	Rising Edge Trigger
AOUT	Analog Output	MUL	Multiplication	SCL	Scaler
BATOT	Batch Totalizer	NND	NAND Logic	SEL	Signal Selector
BIAS	Bias	NOR	NOR Logic	SETPT	Setpoint
CHR	Characterizer	NOT	NOT Logic	SPLIM	Setpoint Limit
CMP	Comparator	ODA	Operator Display for Analog Variables	SRF	SR Flip-Flop
DAM	Deviation Amplifier	ODC	Operator Display for Controllers	SRT	Square Root
DIN	Digital Input	OR	OR Logic	SUB	Subtraction
DOUT	Digital Output	ORSL	Override Selector	TH	Track & Hold
DIV	Division	OST	One Shot Timer	TOT	Totalizer
DYT	Delay Timer	PBSW	PB Switch	TSW	Transfer Switch
E/I	External/Internal Transfer	PIDAG	PID Controller (all types)	XOR	Exclusive OR Logic
EXP	Natural Exponentiation	QHD	Quickset Hold		
EXT	Exponentiation	RATIO	Ratio		

## SPECIFICATIONS

### ELECTRICAL & ENVIRONMENTAL

#### Power Supply

AC: 85-250V rms, 50-400Hz

DC: 24Vdc nominal (20-50Vdc)

Fuse: 2.5 Amps (ac), 4.0 Amps (dc)

Power Consumption (120V rms, 60Hz, Full load):  
50 Watts maximum

Data Retention: Typically 10 years with controller  
unpowered

#### Ambient Temperature Range

Operating: 0 to +50°C

Storage: -40 to +75°C

Humidity: 5 to 95% RH, noncondensing

#### Open Input Fault Detection

User configurable for all inputs

#### Failsafe Output:

Built-in outputs - last value or 0%

Module outputs - user defined between 0 and 100%

### PHYSICAL

#### 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)

#### Depth

Behind the panel - 15.75" (400 mm)

Front of panel - 1.13" (28.7 mm)

#### Weight

6.0 lbs.

### COMMUNICATIONS

#### ICN Peer-to-Peer Network

Protocol Token-passing

BAUD Rate 31.25K BAUD

#### Modbus RTU

Protocol Modbus RTU

Electrical RS-485

BAUD Rate 150 to 38.4K BAUD

#### Ethernet

Protocol Modbus/TCP

Standard IEEE 802.3

Physical Layer 10/100Base-T

Connector RJ45

*Note: Ethernet network does not support peer-to-peer communication*

### INPUTS

#### Universal Analog Inputs (isolated)

Quantity	Basic: 2
Transmitter Power	24V dc, isolated (each input)
Range / Span	
Current	4-20 mA / 0-20 mA minimum span 1mA
Millivolt	-10 to 120mV minimum span 10mV
Volt	0 to 6 Vdc minimum span 0.1V
Resistance	500 ohms 20 Ω min. with 3,9KΩ resistor
Thermocouple	Type B, E, J, K, N, R, S, T
RTD	3-wire platinum, DIN 43760 (IEC751), range 0-430 ohms (normal) or 0-55 ohms (low)

#### Current Input (isolated)

Quantity	Basic: 1 Expansion: 2 additional
Range	(0-100%) 4-20mA, 0-20mA
Low Limit	0mA
High Limit	20mA

#### Discrete Inputs (isolated)

Quantity	Basic: 3
Input Voltage Range	10-32V dc; 12-32V ac
Low Logic Input	1V
Max. input current	30mA

### OUTPUTS

#### Analog Outputs (non-isolated)

Quantity	Basic: 2
Range	0 to 22 mA, non-isolated, with user-adjustable span (1 mA mín.)
Load	22 mA at 1000 ohms maximum

#### Analog Outputs (isolated)

Quantity	Expansion: 1
Range	(0-100%) 4 to 20 mA
Low Limit	0 mA
High Limit	25 mA

#### Mechanical Relay Outputs

Quantity	Basic: 2
Type	SPDT, NO
Contact	3A a 250V ac or 30V dc

#### Isolated Digital Output (solid-state relay)

Quantity	2 (Included as standard option)
Output voltage range	5-60V dc
Max. output current	1A

### ORDERING INFORMATION

1. RetroPAK is a licensed package. The following end-user information must be supplied with each order:  
End-user company name and complete address  
Contact name, telephone number, and e-mail address
2. If Custom Configuration services are selected, provide original database documentation or file for SLC or CLC controller
3. ViZapp software is required to configure RetroPAK controllers (not required if Custom Configuration services are selected)

	353RETRO				1	A	
	01 - 08	09	10	11	12	13	14-16
<b>353 RetroPAK</b>	353RETRO						
<b>I/O Complement<sup>1</sup></b> Basic I/O Expansion I/O		B E					
<b>Power Supply</b> 24V dc 85 to 250V ac			0 1				
<b>Network Communication</b> RS-485 Modbus RTU and ICN Peer-to-Peer Ethernet Modbus/TCP and ICN Peer-to-Peer <sup>2</sup>				1 2			
<b>Removable configuration module</b> Portable memory module					1		
<b>Design Level</b> RetroPAK Design Level						A	
<b>Custom Configuration</b> Not required Duplicate existing Siemens/Moore 352 configuration <sup>3</sup> Duplicate existing Siemens/Moore 353 configuration <sup>3</sup> Load duplicate RetroPAK database (multiple RetroPAKs with identical configurations)							STD 352 353 DUP

**Note 1:** 353Retro Basic provides two universal analog inputs, one 4-20mA input, two current outputs, three discrete inputs, and two SPDT relay outputs. Expansion adds two 4-20mA inputs and one current output. For other I/O configurations contact the factory.

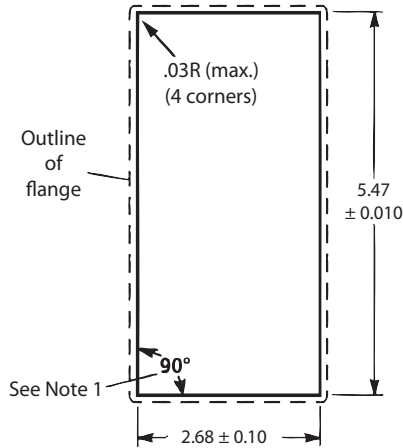
**Note 2:** RetroPAK controllers do not communicate directly with 352 or 353 controllers. Ethernet Modbus/TCP does not support peer-to-peer.

**Note 3:** Customer must provide current database files and documentation. Controller configured as per documentation supplied.

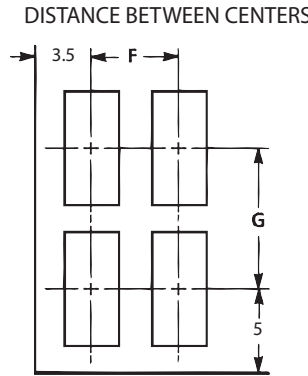
ACCESSORIES	
Termination resistor for peer-to-peer network (one required per network)	2030FZ00001A

CONFIGURATION DEVELOPMENT SOFTWARE	VIZAPP	-	XMB	-	353	-	USB	-	
Visual Application Designer	VIZAPP								
<b>Communications Interface</b> Modbus OPC			XMB						
<b>Functionality</b> Development					353				
<b>Software protection key</b> USB							USB		
<b>Extended Support Services</b> None One Year Technical Support & Version Updates									000 ESS

**MOUNTING DIMENSIONS**



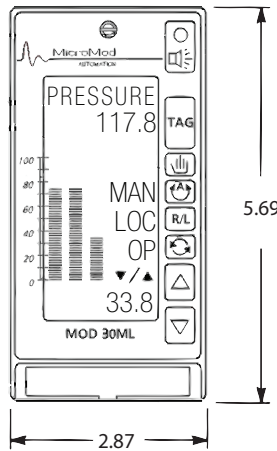
PANEL CUTOUT



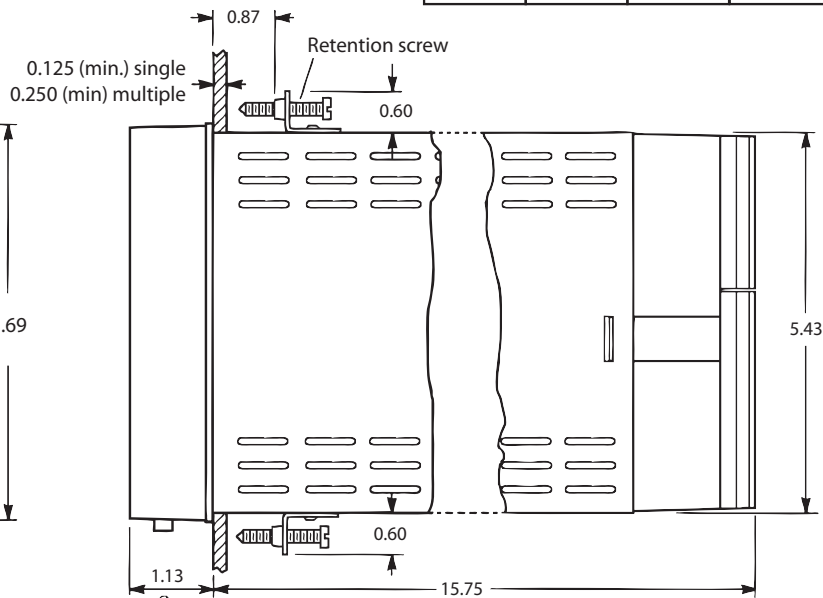
Center-to-Center distance when mounting multiple controllers

	F	G
Recommended	4	8
Minimum	3.5	7

inches	mm	inches	mm
0.6	15.2	5.43	137.9
0.87	22.1	5.47	168.9
1.13	28.7	5.69	144.5
2.69	67.31	7	177.8
2.87	72.9	8	203.2
3.5	88.9	15.75	400
4	101.6		



FRONT VIEW



RIGHT SIDE VIEW

**Note 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.

The Company's policy is one of continuous product improvement and the right is reserved to modify the information contained herein without notice.

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