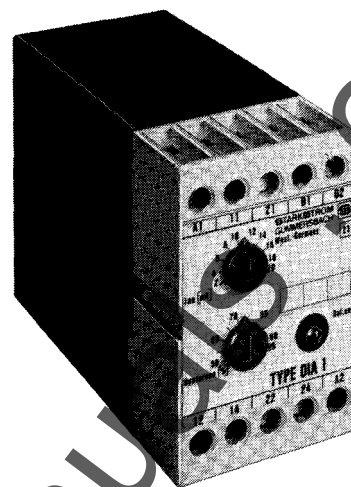


# Solid State Protective Relays

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Description	Class	Pages
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Modifications, Logic and Wiring Diagrams .....	8430	3
Application Information .....	8430	4

The Class 8430 Type D Solid State Protective Relays offer the accuracy and reliability of solid state sensing circuitry with the isolation of hard output contacts. The Type D Protective Relays feature a complete line of devices for a wide range of applications all designed into a uniform 45mm wide case. This space-saving case design along with the ability to mount on 35mm DIN rail provides the opportunity to mount all necessary protective devices in one compact location. The relay line also features the following:



- Gold plated hard silver contacts
- Individual testing of relays
- Box lug terminals
- In-Out wiring
- Single pole double throw contacts standard
- Optional double pole double throw contacts

**VOLTAGE AND CURRENT MONITORING RELAYS**

Description	Adjustable Range	Maximum Input Signal	Type	Price
<b>AC/DC CURRENT RELAY</b> The AC/DC Current Relay monitors either ac or dc current. The relay will energize when the monitored current reaches a value set on the face of the device that is within the adjustable range of the relay. The relay then remains energized until the current drops to a value, also set on the face of the device, that is 50% to 95% of the current the relay is set to energize at. The relay requires a supply voltage source at all times a current is being monitored.	2-20mA 10-100mA 0.1-1A 0.5-5A 1-10A	40mA 200mA 2A 10A 12A	DIA-1 DIA-2 DIA-3 DIA-4 DIA-5	<b>\$262.</b>
<b>AC/DC VOLTAGE RELAY</b> The AC/DC Voltage Relay monitors either ac or dc voltage. The relay will energize when the monitored voltage reaches a value set on the face of the device that is within the adjustable range of the relay. The relay then remains energized until the voltage drops to a value, also set on the face of the device, that is 50% to 95% of the voltage the relay is set to energize at. The relay requires a supply voltage source at all times a voltage is being monitored.	50-500mV 0.5-5V 5-50V 25-250V 50-500V	200V 500V 500V 600V 800V	DUA-1 DUA-2 DUA-3 DUA-4 DUA-5	<b>262.</b>
<b>DC POLARITY DEPENDENT CURRENT RELAY</b> The DC Polarity Dependent Current Relay operates in the same manner as the Type DIA polarity independent version, with the additional feature of operating only under the correct polarity.	2-20mA 10-100mA 0.1-1A 0.5-5A 1-10A	40mA 200mA 2A 10A 12A	DGA-1 DGA-2 DGA-3 DGA-4 DGA-5	<b>215.</b>
<b>DC POLARITY DEPENDENT VOLTAGE RELAY</b> The DC Polarity Dependent Voltage Relay operates in the same manner as the Type DUA polarity independent version, with the additional feature of operating only under the correct polarity.	50-500mV 0.5-5V 5-50V 25-250V 50-500V	200V 500V 500V 600V 800V	DGV-1 DGV-2 DGV-3 DGV-4 DGV-5	<b>215.</b>

**MOTOR PROTECTION RELAYS**

Description	Type	Price
<b>PHASE FAILURE RELAY</b> The Phase Failure Relay protects three phase motors by monitoring the following: 1. Phase Failure — the loss of one of the three phases. 2. Phase Voltage Unbalance — an undervoltage on a phase. 3. Phase Reversal — prevents motor starting in the wrong direction. The phase unbalance detection level is adjustable from 5% to 15%. The Type DAS monitors the voltage of the three phases and therefore requires no current transformers.	DAS	<b>\$208.</b>
<b>THREE PHASE SEQUENCE RELAY</b> The Three Phase Sequence Relay detects when one of the phases of a three phase system is reversed thus preventing the starting of the motor in the reverse direction.	DPF	<b>116.</b>
<b>THERMISTOR RELAY</b> The Thermistor Relay operates from the signal of an externally connected thermistor. Thermistors are commonly embedded in motor stator windings to monitor temperature. The relay is energized when supply voltage is applied and remains energized until a resistance of 3K $\Omega$ nominal (range = 2.5K $\Omega$ to 3.5K $\Omega$ ) is reached upon which the relay is de-energized. The relay remains de-energized until the resistance drops to 1.9K $\Omega$ nominal (range = 1.5K $\Omega$ to 2.3K $\Omega$ ).	DVR	<b>76.</b>



**MODIFICATIONS AVAILABLE**

Option	Type Addition*	Available on Type	Price Addition
One additional double throw contact	W	DIA, DUA, DGA, DGV, DAS, DPF, DVR	\$17.

\* The Type Addition letter is added to the device designation.  
Example: 8430 DIAW-1 110V 60HZ.

**STANDARD SUPPLY VOLTAGES**

Frequency	Type	Voltage (+ 10%, - 20%)
50 or 60 HZ	DIA, DUA, DGA, DGV, DVR	24, 42, 48, 110, 220, 240, 380, 415, 440, 500
	DAS, DPF	220, 380, 415, 440, 500

**ORDERING INFORMATION REQUIRED**

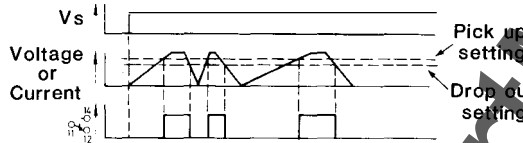
1. Class and type number.
2. Voltage and frequency of supply voltage for Types DIA, DUA, DGA, DGV, DVR, or line voltage for Type DAS and Type DPF.

Example: 8430 DIA-1 110V 60HZ  
or 8430 DAS 220V 60HZ

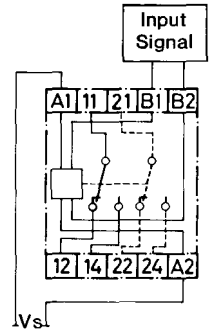
**LOGIC AND WIRING DIAGRAMS**

Note:  $V_s$  represents supply voltage. Dashed Lines on wiring diagrams represent optional contact.

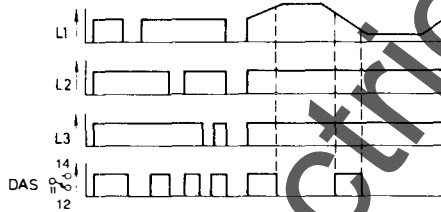
Logic Diagram  
Type DIA  
DUA  
DGA  
DGV



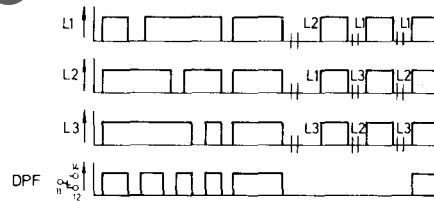
Wiring Diagram  
Type DIA  
DUA  
DGA  
DGV



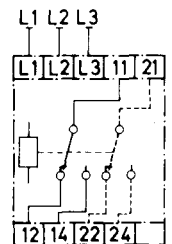
Logic Diagram: Type DAS



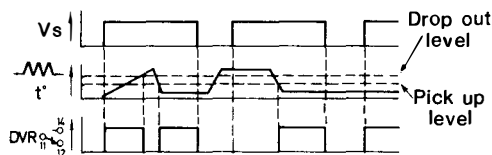
Logic Diagram: Type DPF



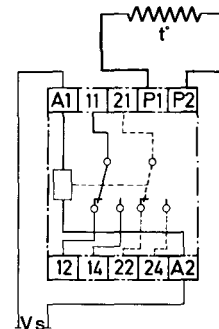
Wiring Diagram  
Type DAS  
DPF



Logic Diagram:  
Type DVR



Wiring Diagram: Type DVR



APPLICATION INFORMATION

Maximum Electrical Contact Ratings

Number of Double Throw Contacts	Volts	AC Ratings			
		Inductive			Resistive
		Make VA	Break VA	Continuous Amps	Continuous Amps
1 contact	250VAC	2200	660	10	10
2 contacts	250VAC	1300	250	6	6

**Burden:** 2VA

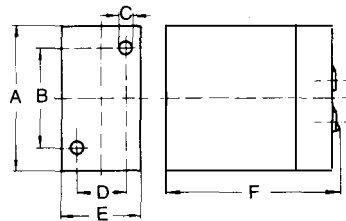
**Ambient Temperature Range:** -10°C to +50°C

**Weight:** 6 kg (1.3 lb.)

**Mounting:** Relays are designed for direct mounting to a 35mm DIN rail or may be directly mounted in any position to a panel through the use of a snap-on base plate mounting adaptor supplied with the relay. The DIN mounting rail is available as Class 8501 Type NT-13.

Approximate Dimensions:

Dual Dimensions	A	B	C	D	E	F
Inches	2.76	2.36	.20	1.38	1.77	4.41
mm	70	60	5	35	45	112



Classes 8010  
8020, 8030  
OCTOBER, 1982  
(Minor Revision 12/82)



# ***SY/MAX***<sup>®</sup> **Programmable Controllers**

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See Page 2



**SQUARE D COMPANY**

**CONTENTS**

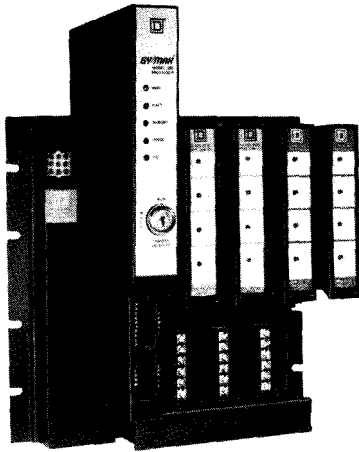
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Programmable controllers are used in a variety of applications to replace conventional control devices such as relays and solid state logic. When compared with conventional control means, programmable controllers (PC's) allow ease of installation, quick and efficient system modifications, more functional capability, troubleshooting diagnostics and a high degree of reliability. Typical applications include automated material handling, machine tool, and assembly machine control, wood and paper processing control, injection

**GENERAL**

molding machine control and process control applications such as film, chemical, food, and petroleum.

The SY/MAX designation is used to describe a family of programmable controller equipment. Family members include processors, input/output equipment, programmers and peripheral equipment developed to be interchangeable with other family members.



SY/MAX Model 300 Programmable Controller



SY/MAX CRT Programmer

**SYSTEM HARDWARE AND PROGRAMMING EQUIPMENT**

The SY/MAX Family of controllers consists of two groups of equipment: 1) system hardware and 2) programming equipment. System hardware is used to control the actual operation, while the programming equipment is used to

enter the user control program into the system hardware. Once the program is entered the programming equipment can be used for monitoring, program alteration, or message displays but is not required for system operation.

**SYSTEM HARDWARE**

System hardware consists of a processor, one or more I/O rack assemblies, power supplies and I/O modules. The I/O racks and associated I/O modules communicate with external I/O control devices such as limit switches, motor start-

ers, etc. System hardware may also consist of a single Model 100 PC which incorporates all necessary hardware in a single package.

**PROGRAMMING EQUIPMENT**

The SY/MAX Family programming equipment consists of either a Hand-Held or CRT programmer for entering ladder diagram programs. A separate Loader/Monitor for monitor-

ing and changing data after the program has been entered can also be ordered.

**SUPPORT LITERATURE**

Support literature in the form of Technical Manuals, and individual Instruction Bulletins is available for the

SY/MAX Family.

**SY/MAX TECHNICAL MANUALS**

SY/MAX Technical Manuals include a collection of Instruction Bulletins in a convenient 3-ring binder format (see Instruction Bulletin table below to determine which Instruction Bulletins are included in each Technical Manual). This format allows easy updating of technical manuals as new products and literature are introduced.

Description	Part Number*	Price
SY/MAX-20 Processor to Class 8030 I/O Interface Technical Manual	30598-500-50 ★	\$25.
Model 300 Processor Technical Manual	30598-501-50 ▲	25.
Comprehensive Class 8010, 8020, 8030 Technical Manual	30598-504-50	25.

\* Latest Technical Manual available will automatically be supplied — suffix number may change

★ Included with each Class 8030 Type CRM-10 SY/MAX-20 I/O Interface Module

▲ Included with each Class 8020 Type SCP-3XX SY/MAX Model 300 Processor

CLASS  
8010  
8020  
8030

# SY/MAX<sup>®</sup> PROGRAMMABLE CONTROLLERS

## INTRODUCTION — Cont'd

OCTOBER, 1982

### SY/MAX INSTRUCTION BULLETINS

Individual SY/MAX Instruction Bulletins are also available. Each covers a specific product or group of products. The above Technical Manuals include Instruction Bulletins based on the schedule below. Individual copies of Instruction Bulletins are available on a no charge basis. For complete sets, order The Comprehensive Technical Manual from above.

Instruction Bulletins					Included in Technical Manual			
Product Category	Class	Type	Description	Number	30598-			
					500-50	501-50	504-50	
Processors	8020	SCP-1XX	Model 100 Programmable Controller	30598-101-01	*		X	
	8020	SCP-3XX	Model 300 Processor Hardware	30598-103-01		X	X	
	8020	SCP-3XX	Model 300 Programmable Controller System Layout, Installation, Connection, and Start-up	30598-173-01		X	X	
Digital I/O	8030	CIM-101	120V AC/DC Input Module	30598-111-01	X	X	X	
	8030	CIM-131	12-24V AC/DC Input Module	30598-112-01	X	X	X	
	8030	CIM-141	48V AC/DC Input Module	30598-113-01	X	X	X	
	8030	CIM-151	TTL Input Module	30598-114-01	X	X	X	
	8030	CIM-161	240V AC/DC Input Module	30598-115-01	X	X	X	
	8030	CIM-191	Input Simulator Module	30598-116-01	X	X	X	
	8030	COM-221	120 VAC Output Module	30598-118-01	X	X	X	
	8030	COM-231	240 VAC Output Module	30598-119-01	X	X	X	
	8030	COM-241	9-55 VDC Output Module	30598-120-01	X	X	X	
	8030	COM-251	60-160 VDC Output Module	30598-121-01	X	X	X	
	8030	COM-261	TTL Output Module	30598-122-01	X	X	X	
	8030	COM-271/281	Reed Relay Output Modules	30598-123-01	X	X	X	
	8030	COM-291	Output Simulator Module	30598-124-01	X	X	X	
	8030	DIM-101	120V AC/DC Deluxe (Isolated) Input Module	30598-126-01	X	X	X	
	8030	DIM-141	6-48V AC/DC Deluxe (Isolated) Input Module	30598-127-01	X	X	X	
	8030	DIM-161	240V AC/DC Deluxe Input Module	30598-128-01	X	X	X	
	8030	DOM-221	120 VAC Deluxe Output Module	30598-130-01	X	X	X	
	8030	DOM-231	240 VAC Deluxe Output Module	30598-131-01	X	X	X	
	8030	DOM-241	9-55 VAC Deluxe Output Module	30598-132-01	X	X	X	
	8030	DOM-251	60-160 VDC Deluxe Output Module	30598-133-01	X	X	X	
	8030	DOM-225	120 VAC 5A Deluxe Output Module	30598-134-01	X	X	X	
	8030	DOM-235	240 VAC 5A Deluxe Output Module	30598-135-01	X	X	X	
	8030	GOM-221	120 VAC Isolated Output Module	30598-137-01	X	X	X	
	8030	CRK-XXX	Standard I/O Rack Assembly	30598-139-01	X	X	X	
	8030	DRK-XXX	Deluxe I/O Rack Assembly	30598-140-01	X	X	X	
	8030	GRK-XXX	Isolated I/O Rack Assembly	30598-141-01	X	X	X	
	8030	CBP-103	Dead Front Duct Cover Conversion Kit	30598-144-01	X	X	X	
	8030	CBP-104	Keying Pin Kit	30598-145-01	X	X	X	
	8030	CRM-10	SY/MAX-20 I/O Interface Module	30598-147-01	X		X	
	8030	CRM-115/116	Bus Expander Driver & Terminator Modules	30598-148-01		X	X	
	8030	PS-XX	Power Supply	30598-156-01		X	X	
	Programming Equipment	8010	SPR-200/210	CRT Programmer (without SY/MAX-20 Capability)	30598-165-01	▲		X
		8010	SPR-201/211	CRT Programmer SY/MAX-20 Supplement	30598-166-01	◊		X
8010		SPR-100	Hand-Held Programmer	30598-164-01	‡		X	
8010		SLM-100	Loader/Monitor	30598-163-01	■		X	
8010		SLR-100/110	Cartridge Tape Loader/Recorder	30598-162-01	♦		X	
8010		SPK-200	Key Cap Kit — used with CRT/888 PC	30598-181-01			X	

\* Latest Instruction Bulletin available will automatically be supplied — suffix number may change. Individual Instruction Bulletins are available on a no charge basis. For a complete set, order the Comprehensive Technical Manual from above.

- ★ Included with each Class 8020 Model 100 Programmable Controller.
- ▲ Included with each Class 8010 Type SPR-200, 201, 210, and 211 CRT Programmer.
- ◊ Included with each Class 8010 Type SPR-201, 211 CRT Programmer.
- ‡ Included with each Class 8010 Type SPR-100 Hand-Held Programmer.
- Included with each Class 8010 Type SLM-100 Loader/Monitor.
- ♦ Included with each Class 8010 Type SLR-100, 110 Cartridge Tape Loader/Recorder

### PROCESSOR INSTRUCTION SET AND CAPABILITIES

	Model 100 PC	Model 300 Processor		SY/MAX-20 Processor	
		Standard	Deluxe	Non-Form VA	Form VA
Relay Logic	X	X	X	X	X
Latch/Unlatch Relays	X	X	X	X	X
Data Transfer	X	X	X	X	X
Timers .01 sec.		X	X		
.1 sec.	X	X	X	X	X
1 sec.				X	X
.1 min.		X	X		
Counters (Up/down)	X	X	X	X	X
Master Control Relay	X	X	X		
Synchronous Shift Registers	X	X	X		X
Asynchronous (FIFO) Shift Registers					X
Math (+ - * ÷)			X		X
Data Comparisons	X	X	X	X	X
Bit Read and Control	X	X	X	X	X
Transitional Output	X	X	X		X
Register Fencing	X	X	X		
Print (Alpha numeric messages)			X		
Write (communication to other processors)			X		
Read (communication to other processors)			X		
Alarm (communication to other processors)			X		
Respond to Write, Read commands from other processors	X	X	X		
I/O Forcing	X	X	X	X	X
Run Mode Programming		X	X	X	X

### GENERAL PROGRAMMABLE CONTROLLER CAPABILITIES

	Model 100 PC	Model 300 Processor	SY/MAX-20 Processor
Memory Size	420 Words	2K words	2K words
Memory Type	RAM or UV PROM	RAM or UV PROM	EAROM
I/O Capacity	40	128	511
I/O Voltages	120 VAC	TTL to 240 VAC	TTL to 240 VAC
Relay Equivalents	64	128	511
Storage Register	38	96	80



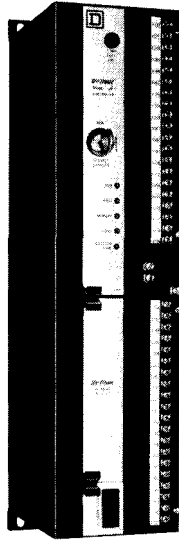


# SY/MAX<sup>®</sup> PROGRAMMABLE CONTROLLERS

## PROGRAMMABLE CONTROLLER/PROCESSORS

CLASS  
8010  
8020  
8030

### SY/MAX MODEL 100 PROGRAMMABLE CONTROLLER



SY/MAX Model 100 Programmable Controller

The SY/MAX Model 100 Programmable Controller is a completely self contained PC with integral processor, power supply and I/O. There is a choice of a 20 I/O (12 inputs, 8 outputs) or 40 I/O (24 inputs, 16 outputs) package. It can be ordered with either 420 words of RAM memory with battery back-up or UV PROM Memory. The Model 100 PC is capable of either vertical or horizontal mounting. It's label is configured for vertical mounting. If horizontal mounting is preferred order the optional Horizontal Label Set. For minimum height the Model 100 PC may be mounted on it's side. Order the Low Profile Mounting Bracket set.

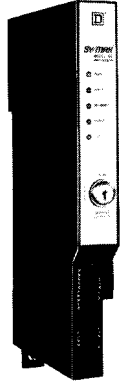
Description*	Class	Type	Price
Programmable Controller with 12 inputs, 8 Outputs, and 420 Words RAM Memory . . . . .	8020	SCP-111	\$560.
Programmable Controller with 24 inputs, 16 Outputs, and 420 Words RAM Memory . . . . .	8020	SCP-121	950.
Programmable Controller with 12 inputs, 8 Outputs, and 420 Words UV PROM Memory . . . . .	8020	SCP-112	605.
Programmable Controller with 24 inputs, 16 Outputs, and 420 Words UV PROM Memory . . . . .	8020	SCP-122	995.
Spare Model 100 RAM Memory Module . . . . .	8020	SMM-100	100.
Spare Model 100 UV PROM Memory Module . . . . .	8020	SMM-110	145.
Replacement Battery for use in Model 100 Programmable Controller . . . . .	8020	SMM-115	25.
Low Profile Mounting Bracket Set . . . . .	8020	SMB-120	15.
Horizontal Label Set . . . . .	8020	SMB-130	5.

\* All I/O are rated for 120 VAC operation and utilize the same power source. See Appendix A for power ratings.

### SY/MAX MODEL 300 PROCESSOR

A typical SY/MAX Model 300 programmable controller system consists of the following:

- 1) One Class 8020 Processor
- 2) One or two Class 8030 I/O Rack Assemblies
- 3) Appropriate number of Class 8030 I/O Modules
- 4) One Class 8030 Power Supply and Cable
- 5) Appropriate set of Class 8010 Programming Equipment



SY/MAX Model 300 Processor

The Model 300 processor plugs into the CPU slot of the first I/O rack assembly and is available in two versions; Standard and Deluxe.

The Standard version can be supplied with 1/2K, 1K or 2K RAM memory, with an I/O capacity of 128 in increments of 4. The processor has 128 internal relay equivalents and 96, 4 digit storage registers for timers, counters, synchronous shift registers, and data storage. A single communication port is available for use with CRT or Hand-Held programmer, Loader/Monitor or Loader/Recorder, or direct connection to a Deluxe Model 300 processor.

The front panel has a security keyswitch to select RUN, HALT, or DISABLED OUTPUTS modes of operation. It also has five status indicator lights.

The Deluxe processor includes all capabilities of the Standard Processor plus the following, 1K and 2K UV PROM Memory Versions, Asynchronous shift register, 4 function math; PRINT (alpha-numeric message generation); WRITE (enter data into other Model 100 or 300 Processor); READ (obtain data from other Model 100 or 300 Processor); and ALARM (send preset codes to other Model 100 or 300 Processors). The Deluxe processor provides two communication ports.

Description	Class	Type	Price
Standard Processor with 1/2K RAM Memory . . . . .	8020	SCP-311	\$300.
Standard Processor with 1K RAM Memory . . . . .	8020	SCP-312	550.
Standard Processor with 2K RAM Memory . . . . .	8020	SCP-313	750.
Deluxe Processor with 1/2K RAM Memory . . . . .	8020	SCP-321	500.
Deluxe Processor with 1K RAM Memory . . . . .	8020	SCP-322	750.
Deluxe Processor with 2K RAM Memory . . . . .	8020	SCP-323	950.
Deluxe Processor with 1K UV PROM Memory . . . . .	8020	SCP-332	786.
Deluxe Processor with 2K UV PROM Memory . . . . .	8020	SCP-333	986.

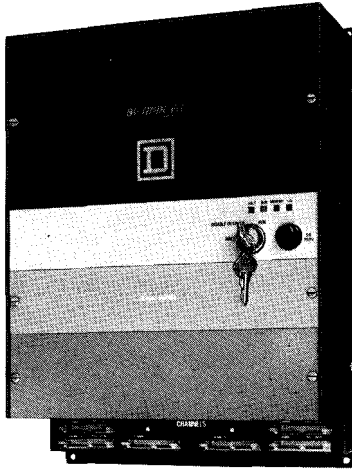
CLASS  
8010  
8020  
8030

# SY/MAX<sup>®</sup> PROGRAMMABLE CONTROLLERS

## PROGRAMMABLE CONTROLLER/PROCESSORS — Cont'd

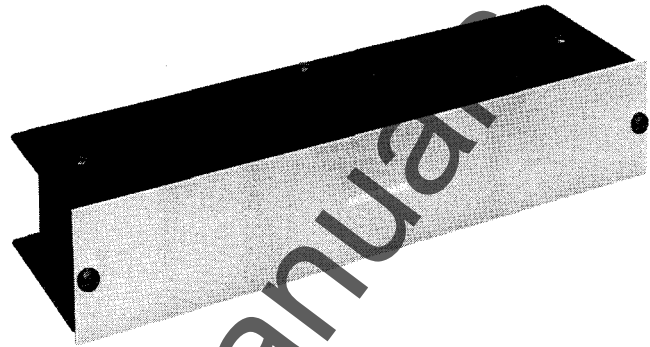
OCTOBER, 1982

### SY/MAX-20 Processor



SY/MAX-20 Processor

### SY/MAX-20 Memory Module



SY/MAX-20 Memory Module

The SY/MAX-20 processor is housed within a single, compact enclosure, and contains the system power supply, processor logic and memory module. (A program interface module also plugs into the processor during programming and monitoring). The power supply, within the processor, provides all logic power for any size system up to and including the largest number of input/output devices (511). There are no separate power supplies to mount or wire. The SY/MAX-20 Processor utilizes either Class 8030 or 8884 I/O.

All SY/MAX-20 processors have 511 internal outputs and 80 storage registers. Select processors with capability for either 256 maximum or 511 maximum (form VPS) external I/O from the table. If arithmetic capability is also required, form VA should be specified.

The SY/MAX-20 memory module contains 1K (1024) or 2K (2048) words of Electrically Alterable Read Only Memory (EAROM). Substituting a 2K memory module for a 1K memory module is all that is required to increase the memory size of the controller. The module is totally enclosed in a protective sheet metal housing and simply plugs into the processor.

Complete or partial program changes are possible by merely interchanging memory modules. No cartridge tape is needed for this type of program change. Using an interface module having trial memory permits automatic program copying onto blank memory modules for the purpose of creating spare programs or any number of alternative programs. For example, a machine or process diagnostic program could be stored on a spare module. A magnetic tape Loader/Recorder is, however, available for an alternate means of program storage.

Description ●	Class	Type	Form ▲	Price
Basic Processor* — accommodates up to 256 External I/O . . . . .	8884	SCP-20	—	\$ 861.
Processor* — accommodates up to 256 External I/O, with arithmetic . . . . .	8884	SCP-20	VA	1,186.
Processor* — accommodates up to 511 External I/O . . . . .	8884	SCP-20	VPS	1,811.
Processor* — accommodates up to 511 External I/O, with arithmetic . . . . .	8884	SCP-20	VA, VPS	2,136.

Description	Class	Type	Price
1K (1024) words . . . . .	8884	SMM-1000	\$350.
2K (2048) words . . . . .	8884	SMM-2000	900.

\* A Type SMM-1000 or SMM-2000 Memory Module MUST also be ordered to obtain an operational processor.  
 ● Provides 511 internal outputs and 80 12-bit storage registers. Processor operates on a 120VAC 50/60 Hz. power source. See Appendix C for processor power supply capacity.  
 ▲ Form VA provides the following added capabilities: addition, subtraction, multiplication, division, square root extraction, cascade, transition detection and shift register commands.

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**GENERAL**



Class 8030 I/O Modules



Class 8030 I/O Simulator Modules

Class 8030 includes SY/MAX input modules, output modules, I/O rack assemblies, interface modules, power supplies, and other I/O accessories.

The I/O modules provide the interface between the field device and the Model 300 or SY/MAX-20 Processor. The various size I/O rack assemblies provide mounting locations for the I/O modules, the Model 300 Processor and the interface modules. Interface modules are available to expand a one rack Model 300 system to an additional rack or to allow the use of Class 8030 I/O with the SY/MAX-20 Processor. Power supplies are available in a variety of I/O capacities and incoming voltage configurations for almost any Model 300 PC application.

Input and output modules plug into the I/O rack assemblies. Each I/O module provides four inputs or outputs. The I/O requirements of any system is evaluated in three steps:

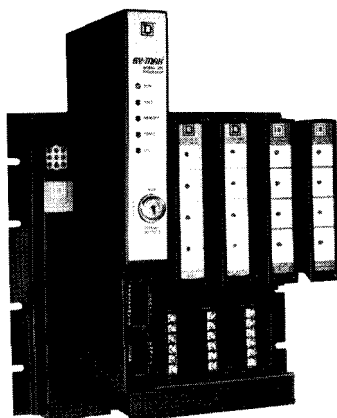
1. All input and output requirements are recognized and each voltage type is totalled independently.
2. The totals are divided by four (and rounded up to the next highest digit) to indicate the number of modules required. The appropriate modules are then selected (Type CIM-101 etc.)

3. Compatible I/O rack assemblies are selected with type and quantity determined by recognizing that there are 4, 8, and 16 slot racks in standard, deluxe, and isolated configurations.

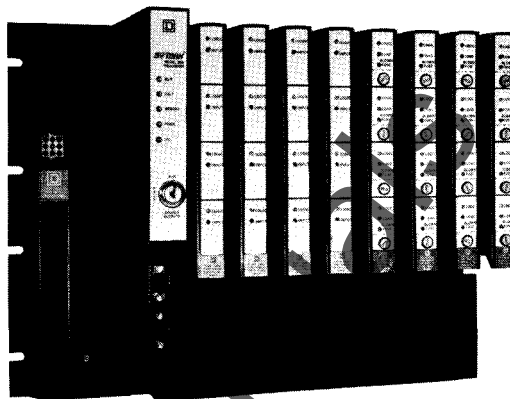
At this point, space for expansion should be considered for adding additional I/O modules as required in the future.

Inexpensive input and output simulator modules are available and plug directly into the I/O rack assemblies. These modules are useful as diagnostic aids for testing and troubleshooting programmable controller systems. They also provide an inexpensive means for program development and de-bugging. The toggle switches on the input module (one for each input) allow the selection of the "ON" or "OFF" states. Each output circuit in a module has a red LED to indicate the presence of an "ON" signal. (Both modules ignore the wiring to the rack terminals and operate independently of these connections). After program development and de-bug is completed, the I/O simulator modules can be removed and replaced by other I/O modules allowing the programmable controller system to operate the machine or process.

**FOUR FUNCTION INPUT MODULES**



SY/MAX Model 300 PC with Standard I/O



SY/MAX Model 300 PC with Deluxe I/O

Input modules accept AC or DC voltage signals from the input devices such as pushbuttons and limit switches and convert them into digital logic signals required by the processor.

The four function input modules are available in Standard or Deluxe versions. Standard Inputs Modules feature one LED indicator for each input which indicates the presence of an input signal. Deluxe Input Modules include two LED indicators per input — one that indicates a signal to the input module from the field device and one that indicates that the input signal is recognized by the module. Thus it is

possible to detect signal presence at the input terminal and proper functioning of the module itself.

Standard input modules can be used in any I/O rack (TYPE CRK, DRK or GRK). Deluxe input modules require either the deluxe or isolated I/O rack assemblies (Type DRK or GRK). The Type DIM-101 and DIM-141 Deluxe Input Modules, if used with the Type GRK Isolated I/O Rack, will allow the use of separate power sources for each input (isolated inputs). Type DIM-161 Deluxe Input Modules are not isolated.

Description*		Use With I/O Rack Assemblies			Class	Type	Price
		CRK	DRK	GRK			
Standard Input Modules	120 VAC/VDC Input Module, 4 Inputs . . . . .	X	X	X	8030	CIM-101	\$41.
	12-24 VAC/VDC Input Module, 4 Inputs . . . . .	X	X	X	8030	CIM-131	41.
	48 VAC/VDC Input Module, 4 Inputs . . . . .	X	X	X	8030	CIM-141	41.
	TTL Input Module, 4 Inputs ● . . . . .	X	X	—	8030	CIM-151	41.
	240 VAC/VDC Input Module, 4 Inputs . . . . .	X	X	X	8030	CIM-161	44.
	Input Simulator Module, 4 Simulators . . . . .	X	X	X	8030	CIM-191	30.
Deluxe Input Modules	120 VAC/VDC Deluxe (Isolated) Input Module, 4 Inputs . . . . .	—	X	X	8030	DIM-101	52.
	6-48 VAC/VDC Deluxe (Isolated) Input Module, 4 Inputs . . . . .	—	X	X	8030	DIM-141	52.
	240 VAC/VDC Deluxe Input Module 4 Inputs . . . . .	—	X	X	8030	DIM-161	55.

\* See Appendix A for input ratings.  
● Customer supplied 5VDC power supply is required

**FOUR FUNCTION OUTPUT MODULES**

Output Modules provide AC or DC output signals to such field devices as motor starters, solenoids, pilot lights, etc.

Output modules are available in Standard, Deluxe, or Isolated versions. Each standard output module has one LED indicator for each output to indicate the presence of an "ON" signal from the processor. All output circuits are fused. The deluxe output modules feature three LED indicators for each output: LOGIC LED indicator illuminated when the processor has issued a command to turn the output on; LOAD LED indicator illuminated when output voltage is provided at the output terminals; and BLOWN FUSE LED indicator illuminated when output fuse has

blown. The deluxe output module also features front accessible fuses for easy servicing and blown fuse reporting to the processor. The Type GOM-221 Isolated Output Modules, when used with a Type GRK I/O rack, allow use of a separate power source for each output providing isolated outputs. Isolated outputs are useful in Motor Control Center (MCC) applications.

Standard modules are compatible with all I/O rack assemblies (Type CRK, DRK, and GRK). Deluxe output modules require the deluxe rack assemblies (Type DRK). Isolated I/O rack assemblies (Type GRK) and isolated output modules are used to obtain isolated outputs (power source isolation for each output).



Description*	Use With I/O Rack Assemblies			Class	Type	Price	
	CRK	DRK	GRK				
Output Modules	120V VAC Output Module, 4 Outputs . . . . .	X	X	X	8030	COM-221	\$61.
	240V VAC Output Module, 4 Outputs . . . . .	X	X	X	8030	COM-231	65.
	9-55 VDC Output Module, 4 Outputs . . . . .	X	X	X	8030	COM-241	61.
	60-160 VDC Output Module, 4 Outputs . . . . .	X	X	—	8030	COM-251	61.
	TTL Output Module, 4 Outputs ● . . . . .	X	X	X	8030	*COM-261	*61.
	Reed Relay (Form A Normally Open ▲ Contacts) Output Module, 4 Outputs . . . . .	X	X	X	8030	COM-271	61.
	Reed Relay (Form B Normally Closed ▲ Contacts) Output Module, 4 Outputs . . . . .	X	X	X	8030	COM-281	61.
Output Simulator Module, 4 Simulators . . . . .	X	X	X	8030	COM-291	30.	
Deluxe Output Modules	120V VAC Deluxe Output Module, 4 Outputs . . . . .	—	X	—	8030	DOM-221	87.
	240 VAC Deluxe Output Module, 4 Outputs . . . . .	—	X	—	8030	DOM-231	91.
	9-55 VDC Deluxe Output Module, 4 Outputs . . . . .	—	X	—	8030	DOM-241	87.
	60-160 VDC Deluxe Output Module, 4 Outputs . . . . .	—	X	—	8030	DOM-251	87.
	120 VAC 5 Amp Deluxe Output Module, 2 Outputs . . . . .	—	X	—	8030	DOM-225	87.
	240 VAC 5 Amp Deluxe Output Module, 2 Outputs . . . . .	—	X	—	8030	DOM-235	91.
Isolated Output Module	120 VAC Isolated Output Module, 4 Outputs . . . . .	—	X	X	8030	GOM-221	80.

- \* See Appendix A for output ratings
- Customer supplied 5VDC power supply is required
- ▲ Reed relay outputs are individually isolated when used in Type GRK Isolated Racks

**FOUR FUNCTION I/O RACK ASSEMBLIES**

I/O Rack Assemblies are available in Standard, Deluxe, or Isolated versions capable of holding 4, 8, or 16 I/O modules in any combination of inputs or output modules. I/O rack assemblies provide the mounting slots for the various four function I/O modules and for a processor and/or an interface module. Terminals are supplied on the rack assemblies to make the necessary field wiring connections between I/O modules and the external field devices. Standard Rack Assemblies provide wiring duct. Deluxe rack assemblies provide

wiring duct and dead front construction.

To determine I/O module and rack assembly compatibility, see the Input and Output Module Tables above.

All rack assemblies include one CPU slot. Select versions of rack assemblies include a register slot for I/O expansion or future addition of special purpose modules.

Description	Class	Type	Price	
Standard I/O Rack Assemblies	4 Slot I/O Rack Assembly . . . . .	8030	CRK-100	\$110.
	8 Slot I/O Rack Assembly . . . . .	8030	CRK-200	190.
	8 Slot I/O Rack Assembly with Register Slot . . . . .	8030	CRK-210	205.
	16 Slot I/O Rack Assembly with Register Slot . . . . .	8030	CRK-300	350.
Deluxe I/O Assemblies	8 Slot Deluxe I/O Rack Assembly with Register Slot . . . . .	8030	DRK-210	235.
	16 Slot Deluxe I/O Rack Assembly with Register Slot . . . . .	8030	DRK-300	400.
Isolated I/O Rack Assemblies	4 Slot Isolated I/O Rack Assembly with Register Slot . . . . .	8030	GRK-110	125.
	8 Slot Isolated I/O Rack Assembly with Register Slot . . . . .	8030	GRK-210	235.

**MISCELLANEOUS I/O HARDWARE**

Miscellaneous SY/MAX I/O hardware is available to complete an installation. I/O and register slot cover plates are offered to protect the unused slots of the rack assembly.

A jumper kit is offered to provide a convenient means to connect I/O terminal common points together.

For use with the Type CRK Standard Rack Assemblies, a Dead Front Duct Cover Kit is offered to cover wires connected to the I/O rack terminals. The kit consists of wire ducting capable of covering all wiring for a 64 function (16 slot) I/O rack assembly. A Dead Front Duct Cover is standard on Type DRK Deluxe I/O rack assemblies.

Description	Class	Type	Price
Register Slot Cover Plate . . . . .	8030	CBP-101	\$ 9.
I/O Slot Cover Plate . . . . .	8030	CBP-102	7.
Dead Front Duct Cover Kit — use with Type CRK I/O Rack Assemblies* . . . . .	8030	CBP-103	25.
Keying Pin Kit . . . . .	8030	CBP-104	20.
Common Terminal Jumper Kit ● . . . .	8030	CBP-105	20.

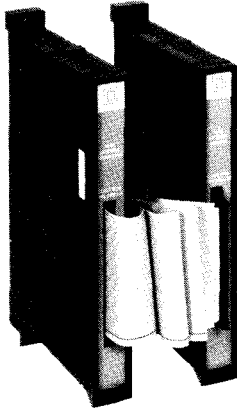
- \* One kit provides wire ducting for a 64 function (16 slot) I/O rack assembly
- One kit provides common jumper bar sufficient to connect two sets of eight terminals

CLASS  
8010  
8020  
8030

**SY/MAX<sup>®</sup> PROGRAMMABLE CONTROLLERS**  
INPUT/OUTPUT — Cont'd

OCTOBER, 1982

**CLASS 8030 INTERFACE MODULES**



Bus Expander Modules



SY/MAX-20 I/O Interface Module

Class 8030 I/O rack assemblies are available in 16, 32, and 64 I/O function sizes. To increase the number of I/O's available to the Model 300 processor beyond 64 a second I/O rack assembly must be added. The I/O Bus Expander modules allow a Model 300 processor to communicate with a second I/O rack assembly (maximum rack configuration is 2 racks). The Bus Expander consists of two modules which connect via a ribbon cable. The driver module (Type CRM-115) plugs into the register slot of the rack assembly containing the processor. It is important to make sure that the rack which houses the processor also has a register slot. The Terminator/Cable module (Type CRM-116) plugs into the CPU slot of the second rack. Both units are needed to complete an expansion. The bus expander modules are only used with the Model 300 Programmable Controller.

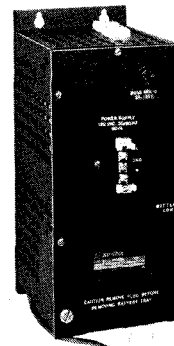
The Type CRM-10 SY/MAX-20 I/O interface module allows communication between the Class 8884 SY/MAX-20 processor and the Class 8030 I/O's. The interface module installs in the CPU slot of a Class 8030 rack assembly and connects via an I/O Data Cable (Class 8884 Type SDC-210) to an I/O data channel connector on the SY/MAX-20 processor. Each Class 8030 I/O rack assembly used with the SY/MAX-20 processor requires one Class 8030 Type CRM-10 I/O Interface Module and one Class 8884 Type SDC-210 I/O Data Cable. NOTE: It is more economical to purchase the largest rack possible, i.e., one Type CRK-300 Rack Assembly vs. two Type CRK-200 Rack Assemblies. Up to four I/O rack assemblies may be attached to a SY/MAX-20 processor channel connector. No Class 8030 Type PS Power Supply is required since the Class 8030 I/O receive their power directly from the SY/MAX-20 processor.

Description	Class	Type	Price
Bus Expander/Driver Interface Module*	8030	CRM-115	\$ 75.
Bus Expander/Terminator Module (Includes 40 inch — 102cm cable)*	8030	CRM-116	75.
SY/MAX-20 I/O Interface Module — one required for each Class 8030 I/O Rack Assembly used with a Class 8884 SY/MAX-20 Processor	8030	CRM-10	225.
SY/MAX-20 I/O Data Cable (36 inches — 91 cm long)	8884	SDC-210	36.

\* CRM-115 and 116 are used as a pair to allow a second I/O Rack Assembly to be used with a SY/MAX Model 300 programmable controller system.

**CLASS 8030 POWER SUPPLIES AND ACCESSORIES**

Power Supplies are used to provide 5VDC power to SY/MAX Model 300 Programmable Controllers Systems. One Class 8030 Type PS Power Supply is required for each SY/MAX Model 300 system. No Class 8030 Type PS Power Supplies are required when using the Class 8030 I/O modules and racks with the Class 8884 SY/MAX-20. SY/MAX Model 100 Programmable Controllers have built-in power supplies and do not require an 8030 PS Power Supply.



SY/MAX Power Supply



Description*		Class	Type	Price
Power Supplies	64 I/O Capacity with 120 VAC Incoming Power (Includes CC-10 Cable) . . . . .	8030	PS-10	\$132.
	128 I/O Capacity with 120 VAC Incoming Power (Includes CC-10 & CC-20 Cables) . . . . .	8030	PS-20	300.
	64 I/O Capacity with 240 VAC Incoming Power (Includes CC-10 Cable) . . . . .	8030	PS-40	132.
	128 I/O Capacity with 240 VAC Incoming Power (Includes CC-10 & CC-20 Cables) . . . . .	8030	PS-50	300.
Spare Power Supply Cables	128 I/O Capacity with 24 VDC Incoming Power (Including CC-10 & CC-20 Cables) . . . . .	8030	PS-70	350.
	Power Supply Cable for 1st I/O Rack Assembly containing CPU — 30 inches long (76 cm) . . . . .	8030	CC-10	15.
	Power Supply Cable for 2nd I/O Rack Assembly — 42 inches long (107cm) . . . . .	8030	CC-20	15.

\* For power supply loading and capacity information. See Appendices A and B

**PROGRAMMING EQUIPMENT**

Class 8010 programming equipment includes a number of devices for programming, altering and monitoring Square D Programmable Controllers.

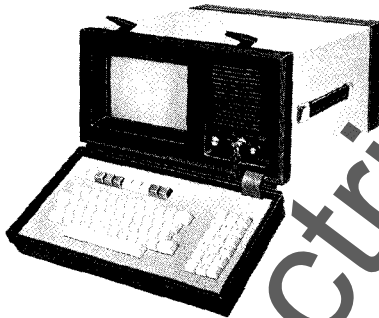
The Class 8010 Hand-Held Programmer will program ladder diagram circuits, timers, counters and shift registers. It will also allow I/O to be forced ON or OFF, as well as monitor and change data. The Hand-Held Programmer will operate with the SY/MAX Model 100 and 300 Programmable Controllers.

The Class 8010 Type SPR CRT Programmers are able to display complete ladder diagram rungs on a large 9" screen along with providing advanced programming, monitoring and altering capabilities. With the CRT programmer it is possible to program report generation as well as communi-

cation commands necessary for Processor to Processor communications.

Class 8010 Type SPR CRT programmers are capable of programming SY/MAX Model 100 and 300 and Class 8881 Programmable Controllers. Certain models of the CRT programmer will also program the Class 8884 SY/MAX-20 Programmable Controller.

The Class 8010 Type SLM Loader/Monitor is designed to allow an operator to load and/or monitor data. It does not allow an operator to modify the program. The Loader/Monitor can receive messages generated from "PRINT" commands within the Deluxe Model 300 Processor. This allows the Loader/Monitor to be used for prompting and/or alarm message display.



CRT Programmer



Hand-Held Programmer



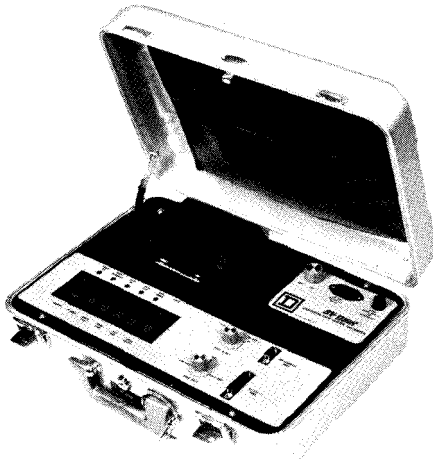
Loader/Monitor

CLASS  
8010  
8020  
8030

# SY/MAX<sup>®</sup> PROGRAMMABLE CONTROLLERS

## PROGRAMMING EQUIPMENT — Cont'd

OCTOBER, 1982



Cartridge Tape Loader/Recorder

For storing programs the Class 8010 Type SLR Cartridge Tape Loader/Recorder can be used. This high speed (9600 Baud) cartridge tape system allows ladder diagram programs and storage register data to be stored and retrieved for permanent record or circuit design and prototyping. It can be used with a CRT Programmer or by itself to access the processor. It can also be controlled by a Deluxe Model 300 processor for on-line data storage and retrieval.

A UV PROM memory eraser is offered. This device is used to erase programmed PROM memory chips so that programs can be reentered.

See Appendix D for programming equipment compatibility between all the Square D processors.

### PROGRAMMERS

	Description	Class	Type	Price
CRT Programmers	120 VAC-For use with SY/MAX Model 100 & 300 and Class 8881* Programmable Controllers (Includes CC-100 Cable) . . . . .	8010	SPR-200	<b>\$2,200.</b>
	240 VAC-For Use with SY/MAX Model 100 & 300 and Class 8881* Programmable Controllers (Includes CC-100 Cable) . . . . .	8010	SPR-210	<b>2,200.</b>
	120 VAC-For Use with SY/MAX Model 100 & 300, SY/MAX-20 ● & Class 8881* Programmable Controller (Includes CC-100 and CC-103 Cables) . . . . .	8010	SPR-201	<b>2,800.</b>
	240 VAC-For Use with SY/MAX Model 100 & 300, SY/MAX-20 ● & Class 8881* Programmable Controllers (Includes CC-100 and CC-103 Cables) . . . . .	8010	SPR-211	<b>2,800.</b>
Other Programming Equipment	Hand-Held Programmer (includes cable) . . . . .	8010	SPR-100	<b>315.</b>
	Loader/Monitor (includes cable) . . . . .	8010	SLM-100	<b>400.</b>
	UV PROM Memory Eraser . . . . .	8010	SPR-150	<b>250.</b>
	NEMA 12 Lockable Cover For Loader/Monitor . . . . .	8010	SLM-110	<b>160.</b>
	CRT Programmer Keyboard Modification Kit (used to make above CRT Programmer compatible with Class 8881 Programmable Controllers) . . . . .	8010	SPK-200	<b>15.</b>
Cartridge Tape Loader/Recorder	120 VAC Loader/Recorder (includes CC-100 Cable) . . . . .	8010	SLR-100	<b>1,800.</b>
	240 VAC Loader/Recorder (includes CC-100 Cable) . . . . .	8010	SLR-110	<b>1,800.</b>
	Cartridge Tape (capacity for 300K bytes of program information) . . . . .	8010	SLR-120	<b>35.</b>

\* A Class 8881 Type PR-3 and Type CC-6 cable must be used to interface a Class 8010 CRT programmer to Class 8881 processor.  
 ● When using the Type SPR-201, 211 CRT Programmer to program the SY/MAX-20 processor one of the following interface modules must be used: 1) 8884 SIB-25 Form VM-2 Series D or later; 2) 8884 SIB-40 Series B or later. When using these interface modules with the Class 8884 Type SPR-25 CRT Programmer, the baud rate of the CRT must be set to 9600

### SY/MAX-20 INTERFACE MODULES

Description	Class	Type	Form	Price
Program Interface Module with 2K Trivial Memory . . . . .	8884	SIB-25	VM-2	<b>\$1,000.</b>
Computer Interface Module . . . . .	8884	SIB-40	—	<b>1,300.</b>

### MISCELLANEOUS CLASS 8010 COMMUNICATION CABLES

Description	Class	Type	Price
10 FT. 9 Pin Differential Cable (Model 100 or 300 CPU to CRT, to Cartridge Tape, or to another Model 100 or 300 CPU) . . . . .	8010	CC-100	<b>\$ 80.</b>
30 FT. 9 Pin Differential Cable (Model 100 or 300 CPU to CRT, to Cartridge Tape, or to another Model 100 or 300 CPU) . . . . .	8010	CC-101	<b>130.</b>
30 FT. 9/25 Pin Differential Cable (CRT Programmer to 8884 SIB-25 or SIB-40) . . . . .	8010	CC-103	<b>100.</b>
10 FT. 25 Pin RS-232C Cable (Cartridge Tape Loader/Recorder to CRT) . . . . .	8010	CC-110	<b>100.</b>
10 FT. 9/37 Pin Differential Cable (CRM-600 to Model 100 or 300 CPU) . . . . .	8010	CC-120	<b>80.</b>
Differential Cable Kit for building custom length cable equivalent to CC-100, 101. Includes all hardware necessary except the cable . . . . .	8010	CCK-102	<b>45.</b>





**PRINTERS AND ACCESSORIES**

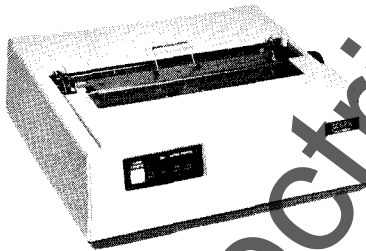
Printers with 80 or 132 character line printing capability can be used with the SY/MAX Programmable Controllers. These printers can be connected to the COMMS Port of the Deluxe Model 300 to receive "PRINT" commands for message generation or data logging purposes. They can also be connected

through the CRT for creating a hard copy printout of the program. NOTE: Cables must be ordered separately.

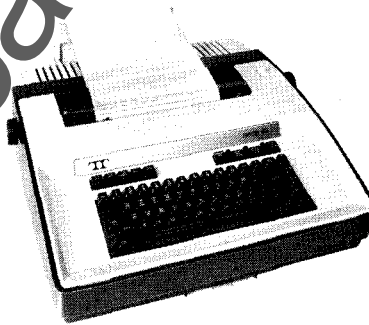
	Description	Class	Type	Price
Printers	OKIDATA Microline 82A Serial Dot Matrix Printer with 2K buffer (80 character lines, 120 cps, up to 9600 BAUD, RS-232 and current loop capability)*▲	8010	PP-12	\$ 985.
	OKIDATA Microline 82A Serial Dot Matrix Printer (80 character lines, 120 cps, up to 1200 BAUD, RS-232 only) ▲	8010	PP-13	690.
	Teletype Model 43 Printer with keyboard, 80 character lines, 300 BAUD, 30 cps ▲●	8010	PP-11	2,000.
	Teletype Model 40 Line Printer, 132 character lines, up to 9600 BAUD, 300 lpm ▲●	8010	PP-20	5,369.
Cables	25 Ft., 25 pin RS-232C Cable (PP-12, 13 to CRT Programmer)	8010	CC-152	100.
	25 Ft., 9/25 Pin Differential Cable (PP-12 to Model 100, 300 CPU)	8010	CC-153	100.
	★25 Ft. 25 Pin RS-232C Cable (Teletype Model 43 to CRT)	8010	CC-160	100.
	★25 Ft. 25 Pin RS-232C Cable (Teletype Model 40 to CRT)	8010	CC-170	100.

- \* Can be connected directly to a Deluxe Model 300 Processor
- ▲ Can be connected directly to a Class 8010 CRT Programmer
- Can be connected via a CRM-600 Adapter to a Deluxe Model 300 Processor.

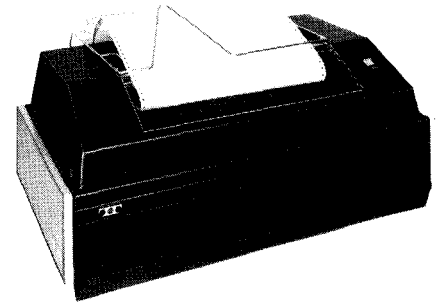
	Description	Class	Type	Price
Misc. Hardware	25 Pin RS-232C Port Test Plug	8010	CTP-10	\$ 35.
	9 Pin Differential Port Test Plug	8010	CTP-11	35.
	RS-232C To Differential Adapter (used to interface RS-232C compatible printers or modems directly to the communication COMMS port of the Deluxe Model 300 Processor)	8010	CRM-600	300.



OKIDATA Printer



Teletype Model 43 Printer



Teletype Model 40 Printer

CLASS  
8010  
8020  
8030

# SY/MAX<sup>®</sup> PROGRAMMABLE CONTROLLERS RENTAL EQUIPMENT

OCTOBER, 1982

Certain Class 8010, 8020 and 8030 Programmable Controller Products are available on a monthly rental basis. Rental, rather than purchase, may be desirable for such temporary

uses as programming, equipment start-up, or while equipment is being repaired.

### EQUIPMENT

Description	Class	Type	Monthly Rental Price
120 VAC CRT Programmer For Model 100 and 300 & Class 8881 Programmable Controllers . . . . .	8010	SPR-200	\$235.
120 VAC CRT Programmer For Model 100 and 300, Class 8881, & 8884 Programmable Controllers . . . . .	8010	SPR-201	300.
120 VAC Cartridge Tape Loader/Recorder* . . . . .	8010	SLR-100	180.
Deluxe Model 300 Processor with 2K RAM Memory . . . . .	8020	SCR-323	95.
4 Slot I/O Rack Assembly . . . . .	8030	CRK-100	12.
128 I/O Capacity 120 VAC Power Supply . . . . .	8030	PS-20	30.

\* Does not include Class 8010 Type SLR-120 Cartridge Tape. Purchase Cartridge Tape Separately.

### TERMS

Minimum rental period is one month. Rental charges are billed in advance. Invoicing will be for one month intervals only and will be in advance for the next month's rental.

Rental termination date is the date the returned equipment is received at Square D Company, Milwaukee Plant.

### PURCHASE OPTION

Credit toward the purchase of the rented or like equipment will be given upon receipt of a purchase order prior to termination of the rental, with the following credits given for rental payments;

- 100% of 1st month
- 80% of 2nd month
- 60% of 3rd month
- 40% of 4th month
- 20% of 5th month
- 0% of 6th month and thereafter

### RENTAL EQUIPMENT REPAIR

Service of rental equipment in customer's plant is not included in rental charge. Rented equipment must be returned to the Square D Milwaukee plant for repair, with shipping prepaid and absorbed by the customer. Replacement equipment will be shipped by Square D upon verbal notification of equipment needing repair, with shipping charges prepaid and absorbed by Square D. Replacement equipment will be

invoiced at new equipment purchase price with full credit issued upon receipt of equipment requiring repair. If required repairs are the result of improper use or treatment, or should equipment returned upon termination of rental require repair, as determined by the Square D Company, the customer will be invoiced in full for all necessary repairs on the basis of repair cost.

### REPAIR/EXCHANGE PARTS

#### GENERAL

Inoperable Class 8010, 8020, and 8030 Programmable Controller equipment, that is out of warranty, can be returned to Square D Company for either 1) repair or 2) exchange for equivalent rebuilt equipment (see list of available exchange items below). Inoperable equipment still under warranty is not covered by the Repair Exchange Policy, but is covered under the terms of the original warranty. The Re-

pair/Exchange Policy provides the benefits of quick replacement (shipment within 48 hours after receipt of a purchase order) and replacement at a fixed price that is substantially discounted from new equipment prices.

NOTE: 48 hour shipment cannot be guaranteed for more than 5 identical modules.

#### TERMS

Equipment covered under the Repair-Exchange Policy will be furnished in exchange for repairable equipment of equivalent part number. The replacement equipment fur-

nished will be shipped from our bank of rebuilt, and retested equipment and will be covered by our repair warranty.

### NON-REPAIRABLE EQUIPMENT

If the exchange equipment returned to Square D is deemed "not repairable," due to physical damage, an invoice will be issued in the amount of the catalog price for new equipment, less 10%, and a credit will be issued in the amount of the exchange invoice. The non-repairable equipment will be

returned to the customer, or discarded, at the customer's direction. If equipment for exchange is not received by Square D within 3 weeks after shipment of replacement equipment, it will be considered "not repairable" and invoiced accordingly.



CLASS  
**8010**  
**8020**  
**8030**

**WARRANTY**

Square D warrants that equipment covered by our Repair-Exchange Policy to be free from defects in materials and workmanship for a period of 90 days from date of shipment by Square D. If within such period any such equipment shall be proved to Square D's satisfaction to be defective, such equipment shall be repaired or replaced at Square D's option. This warranty does not apply (a) to equipment not manufactured by Square D, (b) to equipment which shall have been repaired or altered by others than Square D so as, in its judgement, to affect the same adversely or (c) to equipment which shall have been subjected to negligence, accident, or damage by circumstances beyond Square D's con-

trol, or to improper operation, maintenance or storage, or to the other than normal use or service.

All other terms are subject to Square D standard conditions of sale.

- NOTE: 1. Repair reports will not be issued for equipment returned on a repair/exchange basis.
2. Equipment returned for repair rather than exchange will be invoiced at a minimum of \$100.00 Net.

**CLASS 8020 MODEL 100 PROGRAMMABLE CONTROLLERS**

Description	Class	Type	Exchange Price
Programmable Controller with 12 Inputs, 8 Outputs, and 420 Words RAM Memory . . . .	8020	SCP-111	<b>\$224.</b>
Programmable Controller with 24 Inputs, 16 Outputs, and 420 words RAM Memory . . . .	8020	SCP-121	<b>380.</b>

**CLASS 8020 MODEL 300 PROCESSORS**

Description	Class	Type	Exchange Price
Standard Processor with 1/2K RAM Memory . .	8020	SCP-311	<b>\$120.</b>
Standard Processor with 1K RAM Memory . . .	8020	SCP-312	<b>220.</b>
Standard Processor with 2K RAM Memory . . .	8020	SCP-313	<b>300.</b>
Deluxe Processor with 1/2K RAM Memory . . .	8020	SCP-321	<b>400.</b>
Deluxe Processor with 1K RAM Memory . . . .	8020	SCP-322	<b>500.</b>
Deluxe Processor with 2K RAM Memory . . . .	8020	SCP-323	<b>600.</b>
Deluxe Processor with 1K UV PROM Memory . .	8020	SCP-332	<b>314.</b>
Deluxe Processor with 2K UV PROM Memory . .	8020	SCP-333	<b>394.</b>

**CLASS 8030 POWER SUPPLIES**

Description	Class	Type	Exchange Price
64 I/O Capacity with 120 VAC Incoming Power** . . . . .	8030	PS-10	<b>\$ 53.</b>
128 I/O Capacity with 120 VAC Incoming Power** . . . . .	8030	PS-20	<b>120.</b>

\*\* Does **not** include power supply cable.

**CLASS 8030 INTERFACE MODULES**

Description	Class	Type	Exchange Price
Bus Expander/Driver Interface Module . . . . .	8030	CRM-115	<b>\$30.</b>
Bus Expander/Terminator Module (Includes cable) . . . . .	8030	CRM-116	<b>30.</b>
SY/MAX-20 I/O Interface Module . . . . .	8030	CRM-10	<b>90.</b>

**CLASS 8010 PROGRAMMING EQUIPMENT**

Description	Class	Type	Exchange Price
CRT Programmer — 120 VAC For Model 100 & 300 & Class 8881 Programmable Controller* . . . . .	8010	SPR-200	<b>\$ 880.</b>
CRT Programmer — 120 VAC For Models 100 & 300, SY/MAX-20 & Class 8881 Programmable Controllers* . . . . .	8010	SPR-201	<b>1,120.</b>
Hand-Held Programmer . . . . .	8010	SPR-100	<b>126.</b>
Loader/Monitor . . . . .	8010	SLM-100	<b>160.</b>
Cartridge Tape Loader/Recorder:▲ . . . . .	8010	SLR-100	<b>720.</b>

\* Does **not** include communication cable(s).  
 ▲ Does **not** include Class 8010 Type SLR-120 Cartridge Tape. Purchase of Cartridge Tape is required.

**CLASS 8010 ACCESSORIES**

Description	Class	Type	Exchange Price
RS-232C to Differential Adapter . . . . .	8010	CRM-600	<b>\$120.</b>

**UPDATES**

Class 8010 Type SPR-200 or 210 CRT Programmers (which program the SY/MAX Model 100, Model 300 and Class 8881 Controllers) can be updated to Type SPR-201 or 211 respectively which also program the SY/MAX-20 Controller. This update may be accomplished by returning the SPR-200 or 210 to the Square D Milwaukee Plant using standard return authorization procedures.

Description	Price
Update 8010 SPR-200 or 210 to 8010 SPR-201 or 211 respectively (for SY/MAX-20 programming capability) . . . . .	<b>\$600.</b>

Class	Type	I/O Voltage Rating	Voltage Operating Range	Maximum Output Load Current ★	PC Power Supply Loading		Rack Compatibility		
					75% Duty Cycle	100% Duty Cycle	CRK	DRK	GRK
8030	CIM-101	120 VAC/DC	90-132 VAC/DC	NA	30mA	30mA	X	X	X
8030	CIM-131	12-24 VAC/DC	10-28 VAC/DC	NA	30mA	30mA	X	X	X
8030	CIM-141	48 VAC/DC	40-55 VAC/DC	NA	30mA	30mA	X	X	X
8030	CIM-151	TTL	0 to 0.8V Logic 0 2 to 8V Logic 1	NA	20mA	20mA	X	X	—
8030	CIM-161	240 VAC/DC	187-250 VAC/DC	NA	30mA	30mA	X	X	X
8030	CIM-191	Simulator	NA	NA	35mA	40mA	X	X	X
8030	DIM-101	120 VAC/DC	90-132 VAC/DC	NA	50mA	60mA	—	X	X
8030	DIM-141	6-48 VAC/DC	6-50 VAC/DC	NA	50mA	60mA	—	X	X
8030	DIM-161	240 VAC/DC	187-250 VAC/DC	NA	50mA	60mA	—	X	X
8030	COM-221	120 VAC	12-138 V 50/60 Hz	2A	100mA	120mA	X	X	X
8030	COM-231	240 VAC	24-250 V 50/60 Hz	2A	100mA	120mA	X	X	X
8030	COM-241	9-55 VDC	9-55 VDC	2A	90mA	110mA	X	X	X
8030	COM-251	60-160 VDC	60-160 VDC	2A	170mA	220mA	X	X	X
8030	COM-261	TTL	Open Collector 7V Active Pullup 2.4 to 5.5V	60mA@.4V 20mA@2.4V	95mA	120mA	X	X	—
8030	COM-271	—	2-120 VAC	1A	225mA	290mA	X	X	X
8030	COM-281	—	2-120 VAC	1A	225mA	290mA	X	X	X
8030	COM-291	Simulator	NA	NA	55mA	65mA	X	X	X
8030	DOM-221	120 VAC	12-138 VAC 50/60Hz	2A	100mA	120mA	—	X	—
8030	DOM-231	240 VAC	24-250 VAC 50/60Hz	2A	100mA	120mA	—	X	—
8030	DOM-241	9-55 VAC	9-55 VDC	2A	90mA	110mA	—	X	—
8030	DOM-251	60-160 VDC	60-160 VDC	2A	170mA	220mA	—	X	—
8030	DOM-225	120 VAC	12-138 VAC 50/60Hz	5A	75mA	75mA	—	X	—
8030	DOM-235	240 VAC	24-250 VAC 50/60Hz	5A	75mA	75mA	—	X	—
8030	GOM-221	120 VAC	12-138 VAC	2A	100mA	120mA	—	●	X
8030	CRM-115	NA	NA	NA	300mA	300mA	▲	X	X
8030	CRM-116	NA	NA	NA	100mA	100mA	X	X	X
8030	CRM-10	NA	NA	NA	400mA	400mA	X	X	X
8020	SCP-1XX	120 VAC	94-132 VAC 50/60Hz	2A	NA	NA	NA	NA	NA
8020	SCP-311	NA	NA	NA	1500mA	1500mA	X	X	X
8020	SCP-312	NA	NA	NA	1500mA	1500mA	X	X	X
8020	SCP-313	NA	NA	NA	1500mA	1500mA	X	X	X
8020	SCP-321	NA	NA	NA	1500mA	1500mA	X	X	X
8020	SCP-322	NA	NA	NA	1500mA	1500mA	X	X	X
8020	SCP-323	NA	NA	NA	1500mA	1500mA	X	X	X
8020	SCP-332	NA	NA	NA	2000mA	2000mA	X	X	X
8020	SCP-333	NA	NA	NA	2000mA	2000mA	X	X	X
8010	SLM-100	NA	NA	NA	600mA	600mA	NA	NA	NA
8010	SPR-100	NA	NA	NA	1000mA	1000mA	NA	NA	NA

X Totally compatible  
 ★ See appropriate Instruction Bulletin for derating  
 ▲ Cannot be used on CRK-100 & CRK-200 racks  
 ● Module will operate as non-isolated output module  
 NA Non Applicable

**APPENDIX B — CLASS 8030 POWER SUPPLY SPECIFICATIONS**

For proper operation the correct power supply must be used with the SY/MAX Model 300 programmable controller system. Power supplies with an incoming voltage of 120 VAC, 240 VAC and 24 VDC are available. Use the Table in Appendix A to calculate the total load the power supply will be required to handle. A 75% duty cycle means that 75% of the I/O are "on" at any given time. The majority of applications fall into the 75% duty cycle category. With few exceptions a power supply rated at 64 I/O will be able to handle 64 I/O. Model 100 Programmable Controllers and SY/MAX-20 Processors have integral power supplies and thus do not need an external supply.

Power Supply Type	PS-10	PS-20	PS-40	PS-50	PS-70
Input Voltage Range	102-132 VAC*		204-250 VAC*	195-250 VAC*	20-28 VDC
Approximate I/O Capacity	64	128	64	128	128
Output Current Capacity @ 0-40°C	4A	12A	4A	12A	10A
Output Current Capacity @ 40-50°C	4A	9A	4A	9A	9A
Output Current Capacity @ 50-60°C	3A	7A	3A	7A	7A

\* 47-63 Hz.



CLASS  
**8010**  
**8020**  
**8030**

For proper operation, the correct SY/MAX-20 Processor must be selected to provide an adequate amount of power for the I/O system selected. When using Class 8030 I/O, use Appendix A to calculate the total load the processor power supply will be required to handle and select the processor from the table below. With few exceptions, the non-Form VPS processor will handle 256 I/O and the Form VPS processor will handle 511 I/O. When using Class 8884 I/O, select the processor based on the number of I/O used.

Processor Form	None			VA			VPS	VA, VPS
	256			256			511	511
Max # I/O	256			256			511	511
Max Current For I/O*	0-50°C	0-55°C	0-60°C	0-50°C	0-55°C	0-60°C	0-60°C	0-60°C
	7A	5.75A	4.5A	6A	4.75A	3.5A	13.5A	12.5A

\* If the Class 8884 Type SPR-20 Hand-Held Programmer and Type SIB-20 Interface Module are being used, subtract 2.25A. If the Class 8884 Type SIB-25 or SIB-40 Interface Modules are being used, subtract 1A.

**APPENDIX D — PROGRAMMING EQUIPMENT, I/O, AND PROCESSOR COMPATIBILITY**

Group	Class	Type	Processors			
			Class 8020 Model 100	Class 8020 Model 300	Class 8884 SY/MAX-20	Class 8881
CRT Programmers	8881	PR-3 with PE-5 CRT	O	O	O	X
	8010	SPR-200	X	X	O †	X ●
	8010	SPR-210	X	X	O †	X ●
	8010	SPR-201	X	X	X	X ●
	8010	SPR-211	X	X	X	X ●
	8881	PE-5	O	O	O	X ●
	8884	SPR-25	O	O	X	O
Hand-Held Programmer	8884	SPR-20	O	O	X	O
	8010	SPR-100	X	X	O	O
Loader/Monitors	8010	SLM-100	X	X	O	O
	8881	LM-1	O	O	O	X
Loader/Recorders	8881	PE-1	O	O	X	X
	8010	SLR-100, 110	X	X	X ▲	X ●
UV Prom Eraser	8010	SLR-150	X	X	NA	NA
Printers	8010	PR-12	X ▲	X ■	X ▲	X ●
	8010	PR-11, 13, 20	X ▲	X ‡	X ▲	X ●
Interfaces	8881	PR-3	O	O	O	X
	8884	SIB-20	O	O	X	O
	8884	SIB-25	O	O *	X ◆ **	O
	8884	SIB-30	O	O	X ◆ **	O
	8884	SIB-40	O	O *	X	O
I/O	8030	I/O	NA	X	X	O
	8884	I/O	NA	O	X	O
	8881	I/O	NA	O	O	X

- X — Totally Compatible
- O — Not Compatible
- NA — Not applicable
- † Can be upgraded for SY/MAX-20 compatibility
- ▲ Requires a Class 8010 CRT as interface
- Requires a Class 8881 Type PR-3 interface
- ‡ Requires a Class 8010 CRT to print ladder diagram programs, or can be connected to a Deluxe Model 300 processor (Class 8010 Type CRM-600 Adapter required) to print messages
- Can be connected directly to a Deluxe Model 300 Processor or to a Class 8010 CRT
- ◆ Required when using Class 8010 Type SPR-201, 211 CRT with SY/MAX-20 Processor. (Use SIB-25 Series D or later or SIB-40 Series B or later)

**CLASS**  
**8010**  
**8020**  
**8030**

**SY/MAX<sup>®</sup> PROGRAMMABLE CONTROLLERS**  
**APPENDIX E — PROGRAMMABLE CONTROLLER ORDERING EXAMPLES**

OCTOBER, 1982

**EXAMPLE #1**

Need: 300 word RAM Memory Processor  
 20 120 VAC Inputs  
 10 120 VAC Outputs

Order: Qty. 1 Class 8020 Type SCP-121 Grand Total **\$950.** List D-17

**EXAMPLE #2:**

Need: 1/2K RAM Memory Processor  
 40 120 VAC Standard Inputs  
 10 120 VAC Standard Outputs

	EACH	SUBTOTAL
Order: Qty. 1 Class 8020 Type SCP-311	\$300.	\$ 300.
Qty. 10 Class 8030 Type CIM-101	41.	410.
Qty. 4 Class 8030 Type COM-221	61.	244.
Qty. 1 Class 8030 Type CRK-300	350.	350.
Qty. 1 Class 8030 Type PS-10	132.	132.
Grand Total		<b>\$1,436.</b>

List D-17

**EXAMPLE #3:**

Need: 1/2K RAM Memory Deluxe Processor  
 56 120 VAC Deluxe Inputs  
 40 120 VAC Deluxe Outputs

	EACH	SUBTOTAL
Order: Qty. 1 Class 8020 Type SCP-322	\$750.	\$ 750.
Qty. 14 Class 8030 Type DIM-101	52.	728.
Qty. 10 Class 8030 Type DOM-221	87.	870.
Qty. 1 Class 8030 Type DRK-300	400.	400.
Qty. 1 Class 8030 Type DRK-210	235.	235.
Qty. 1 Class 8030 Type CRM-115	75.	75.
Qty. 1 Class 8030 Type CRM-116	75.	75.
Qty. 1 Class 8030 Type PS-20	300.	300.
Grand Total		<b>\$3,433.</b>

List D-17

**EXAMPLE #4:**

Need: 2K Processor  
 104 120 VAC Standard Inputs  
 56 120 VAC Standard Outputs

	EACH	SUBTOTAL
Order: Qty. 1 Class 8884 Type SCP-20	\$861.	\$ 861.
Qty. 1 Class 8884 Type SMM-2000	900.	900.
Qty. 26 Class 8030 Type CIM-101	41.	1,066.
Qty. 14 Class 8030 Type COM-221	61.	854.
Qty. 2 Class 8030 Type CRK-300	350.	700.
Qty. 1 Class 8030 Type CRK-200	190.	190.
Qty. 3 Class 8030 Type CRM-10	225.	675.
Qty. 3 Class 8884 Type SDC-210	36.	108.
Grand Total		<b>\$5,354.</b>

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**APPENDIX F — ALPHABETICAL LISTING BY CLASS AND TYPE NUMBER**

**CLASS 8010**

Type	Price	Type	Price	Type	Price
CC-100	\$ 80.	CTP-10	\$ 35.	SLR-110	\$1,800.
CC-101	130.	CTP-11	35.	SLR-120	35.
CC-110	100.	PP-11	2,000.	SPK-200	15.
CC-120	80.	PP-12	985.	SPR-100	315.
CC-152	100.	PP-13	690.	SPR-150	250.
CC-153	100.	PP-20	5,369.	SPR-200	2,200.
CC-160	100.	SLM-100	400.	SPR-201	2,800.
CC-170	100.	SLM-110	160.	SPR-210	2,200.
CCK-102	45.	SLR-100	1,800.	SPR-211	2,800.
CRM-600	300.				

**CLASS 8030**

Type	Price	Type	Price	Type	Price
CBP-101	\$ 9.	COM-251	\$ 61.	DOM-225	\$ 87.
CBP-102	7.	COM-261	61.	DOM-231	91.
CBP-103	25.	COM-271	61.	DOM-235	91.
CBP-104	20.	COM-281	61.	DOM-241	87.
CBP-105	20.	COM-291	30.	DOM-251	87.
CC-10	15.	CRK-100	110.	DRK-210	235.
CC-20	15.	CRK-200	190.	DRK-300	400.
CIM-101	41.	CRK-210	205.	GOM-221	80.
CIM-131	41.	CRK-300	350.	GRK-110	125.
CIM-141	41.	CRM-10	225.	GRK-210	235.
CIM-151	41.	CRM-115	75.	PS-10	132.
CIM-161	44.	CRM-116	75.	PS-20	300.
CIM-191	30.	DIM-101	52.	PS-40	132.
COM-221	61.	DIM-141	52.	PS-50	300.
COM-231	65.	DIM-161	55.	PS-70	350.
COM-241	61.	DOM-221	87.		

**CLASS 8020**

Type	Price	Type	Price	Type	Price
SCP-111	\$ 560.	SCP-313	\$ 750.	SMB-120	\$ 15.
SCP-112	605.	SCP-321	500.	SMB-130	5.
SCP-121	950.	SCP-322	750.	SMM-100	100.
SCP-122	995.	SCP-323	950.	SMM-110	145.
SCP-311	300.	SCP-332	785.	SMM-115	25.
SCP-312	550.	SCP-333	986.		

**CLASS 8884**

Type	Form	Price	Type	Form	Price
SCP-20	—	\$ 861.	SMM-1000	—	\$350.
SCP-20	VA	1,186.	SMM-2000	—	900.
SCP-20	VPS	1,811.	SDC-210	—	36.
SCP-20	VA. VPS	2,136.			



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