

FactoryMation®

INDUSTRIAL CONTROL PRODUCTS

TECO

SG2 SMART RELAY



PRODUCT BROCHURE

TECO SG2 SMART RELAY

Input Supply

- 12VDC
- 24VDC
- 85-240VAC

Built-in HMI

(Full-featured Units)



- 8 function keys, 4 user defined keys
- 31 customizable message screens

2YR
WARRANTY

QUALITY CONSTRUCTION
& DURABILITY



Available I/O

MAX I/O
56 POINTS

Snap-on
Expansion
Modules

- Base Units: 10, 12, or 20 points
- Expansion Modules: 2, 4, or 8 points
- Inputs: Digital, Analog, PT100
- Outputs: Relay, Transistor, Analog

Memory Capacity

Retentive
FLASH
Memory

Real-time
Clock &
Calendar

300 Ladder
Rungs

260 Function
Block Instructions

- 126 Internal auxiliary instructions
- 31 Timer instructions
- 31 HMI instructions
- 31 Counter instructions
- 31 Real-time clock instructions
- 31 Analog compare instructions
- 240 Data registers
- 15 PID instructions
- 15 Multiplexer instructions (2 bit)
- 62 Math instructions (+, -, x, ÷)
- 15 Analog ramp instructions
- 2 PWM instructions
- Shift instruction



Note: Some options require the use of specific base units

OTHER POWERFUL FEATURES

- Dual purpose analog 0-10V / DC digital inputs on DC power models
- Removable memory cartridge for program backup, transferring programs to multiple PLR's, or ship updates to onsite customers
- Optional "V" Series units include RS-485 Modbus port
- IP20 enclosed case (all but bareboard)
- Removable spare memory cartridge option
- 2 channel high-speed DC inputs (1 kHz) for single channel encoder or pulse catch
- PWM DC output, 1CH / 16-bit
- DIN-rail or panel mount

MAXIMUM EXPANSION

EXPAND UP TO A MAX OF **56 I/O**!



Note: All SG2 "V-type", "H-type", and "K-type" units are expandable. Maximum expansion allows for 3 digital modules, 2 analog output modules, 2 analog input modules (1 each of SG2-4PT and SG2-4AI). When used, SG2-4AI must be installed last.

POWERFUL OPTIONS

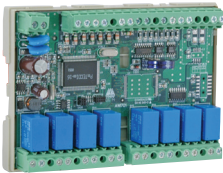
Full-Featured



Expansion Modules



Bareboard Type



Part Number	Input Power	Inputs	Outputs	Display	Communications	Max I/O*
SG2-12HR-12D	12 VDC	6 DC, 2 Analog	4 Relay	3	N/A	12*
SG2-20HR-12D	12 VDC	8 DC, 4 Analog	8 Relay	3	N/A	20*
SG2-12HR-D	24 VDC	6 DC, 2 Analog	4 Relay	3	N/A	48
SG2-12HT-D	24 VDC	6 DC, 2 Analog	4 Trans.	3	N/A	48
SG2-20HR-D	24 VDC	8 DC, 4 Analog	8 Relay	3	N/A	56
SG2-20HT-D	24 VDC	8 DC, 4 Analog	8 Trans.	3	N/A	56
SG2-20VR-D	24 VDC	8 DC, 4 Analog	8 Relay	3	Built-in MODBUS	56
SG2-20VT-D	24 VDC	8 DC, 4 Analog	8 Trans.	3	Built-in MODBUS	56
SG2-10HR-A	85-240 VAC	6 AC	4 Relay	3	N/A	34*
SG2-20HR-A	85-240 VAC	12 AC	8 Relay	3	N/A	44*
OEM "Blind" Models, No Keypad, No Display, Expandable						
SG2-12KR-D	24 VDC	6 DC, 2 Analog	4 Relay	N/A	N/A	48
SG2-20KR-D	24 VDC	8 DC, 4 Analog	8 Relay	N/A	N/A	56
SG2-10KR-A	85-240 VAC	6 AC	4 Relay	N/A	N/A	34*
SG2-20KR-A	85-240 VAC	12 AC	8 Relay	N/A	N/A	44*
Expansion Modules						
SG2-8ER-D	24 VDC	4 DC	4 Relay	N/A	N/A	N/A
SG2-8ET-D	24 VDC	4 DC	4 Trans.	N/A	N/A	N/A
SG2-8ER-A	85-240 VAC	4 AC	4 Relay	N/A	N/A	N/A
SG2-8ER-12D	12 VDC	4 DC	4 Relay	N/A	N/A	N/A
SG2-4AI	24 VDC	4 Analog In	N/A	N/A	N/A	N/A
SG2-2AO	24 VDC	N/A	2 Analog Out	N/A	N/A	N/A
SG2-4PT	24 VDC	4 Pt100 In	N/A	N/A	N/A	N/A
OEM "Bareboard" Models, No Keypad, No Display, Not Expandable						
SG2-12CR-D	24 VDC	6 DC, 2 Analog	4 Relay	N/A	N/A	12
SG2-20CR-D	24 VDC	8 DC, 4 Analog	8 Relay	N/A	N/A	20
SG2-10CR-A	85-240 VAC	6 AC	4 Relay	N/A	N/A	10
SG2-20CR-A	85-240 VAC	12 AC	8 Relay	N/A	N/A	20

* Higher I/O counts are possible by adding 24VDC Expansion Modules

ACCESSORIES

SG2 Programming Cable



Accessories		
SG2-ULINK	SG2 Programming Cable (USB to SG2)	
SG2-PM05	SG2 Memory cartridge	
SG2-SW	SG2 & OP10N Programming software. Available on USB Drive or FREE via download.	
FM-USB232A-C	USB (type A plug) to Serial (DB-9 male) Converter cable, 18 in. cable length	
ECB0465	IP65 Enclosure, built-in DIN rail, hinged translucent cover, snap-in mounting for SG2 (see Enclosure section)	fits 10 or 12 I/O units
ECB0865		fits 20 I/O units
ECB1265		fits 20 I/O units + 2 exp units

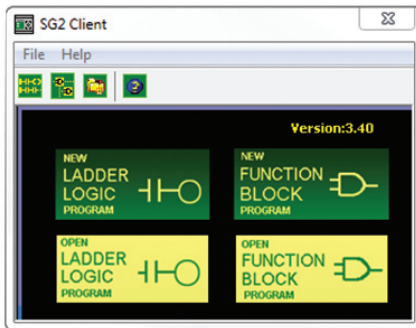
IP65 Enclosures



FREE PROGRAMMING SOFTWARE

SG2 SOFTWARE

Program using ladder logic or function block interface. Dual mode off-line simulations allow testing of entire program within the programming environment or graphically with our virtual PLR. Available for **FREE** download at www.factorymation.com/software-downloads.



SG2 Menu Screen

Flexible and Easy to Use

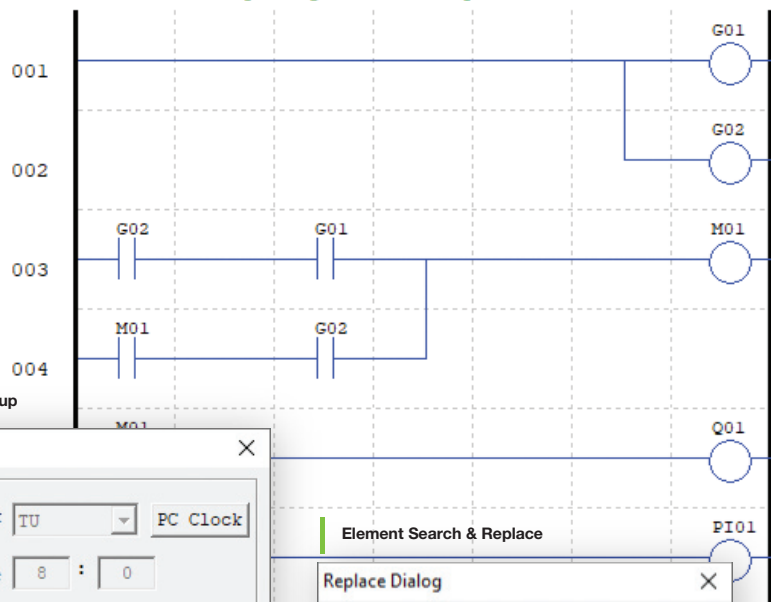
- Easy to use, full featured programming environment
- Relay Ladder Logic or Function Block Diagram programming
- Full program simulation without the need for SG2 hardware
- Program monitor for control and monitoring of PLC and keypad

Relay Ladder Logic Programming

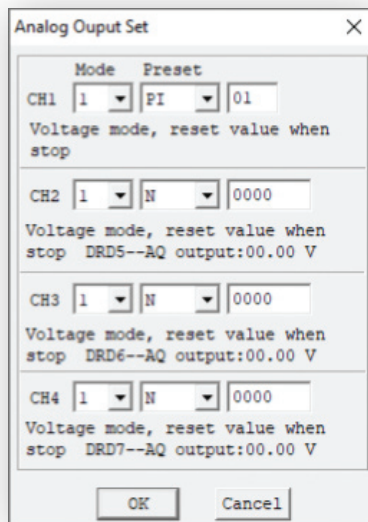
- Intuitive ladder instruction toolbar
- Symbol assignment to external I/O and internal memory
- Fill in the blank instruction editor
- Contact and coil search and replace
- Front Panel HMI configuration

Capacity: 1181 free space.

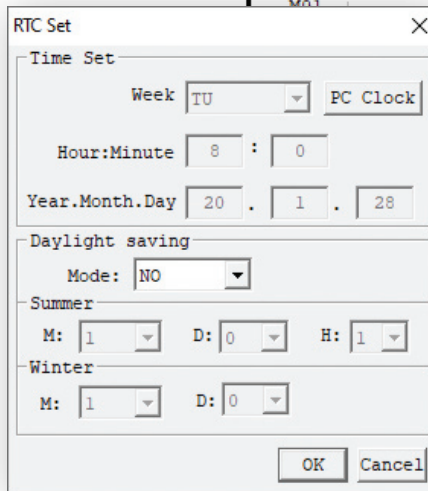
Ladder Program



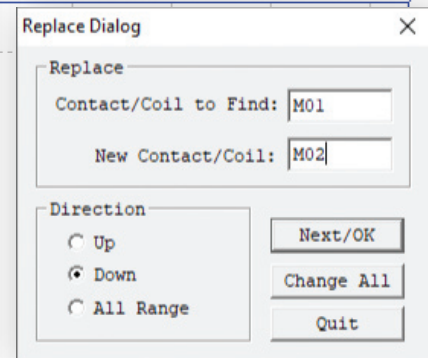
Analog Setup



Real Time lock Setup

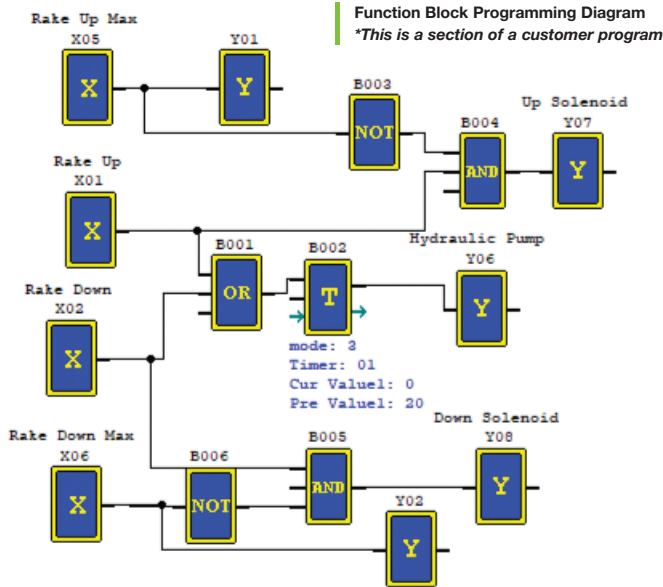


Element Search & Replace



Ladder Instruction Toolbar





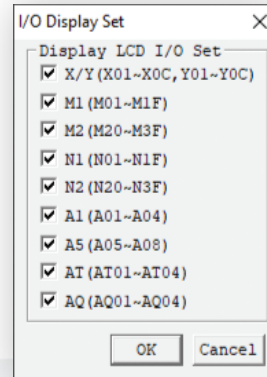
Click & Place Function Block Toolbar



Function Block Programming

- Intuitive block to block program flow
- Click and place function block toolbar
- Individual function setup dialog windows

I/O Display Set
*Same as Ladder



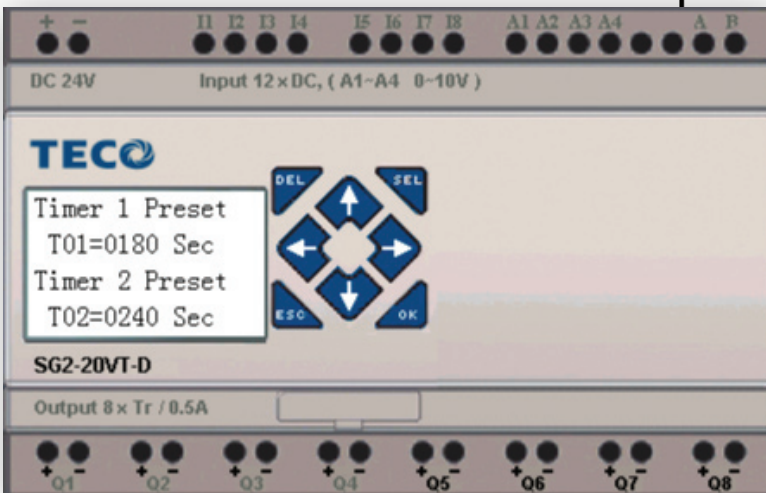
label	symbol
B001	
X01	Rake Up
X02	Rake Down
Y06	Hydraulic Pump
B002	
Y07	Up Solenoid
Y08	Down Solenoid
X05	Rake Up Max
X06	Rake Down Max
B003	
B004	
B005	
B006	
I01	

Symbol Editor
*Same as Ladder

SG2 OnBoard HMI

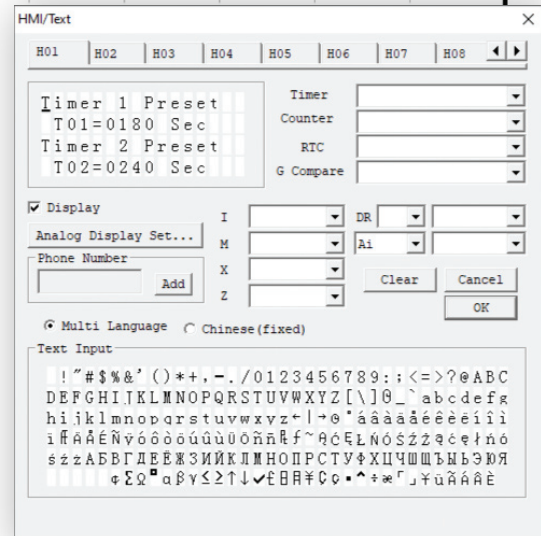
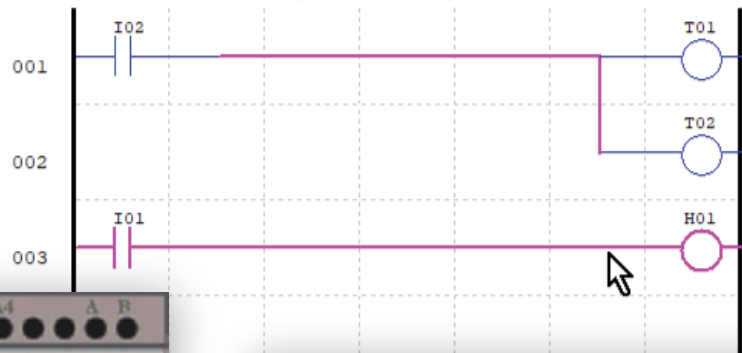
- Up to 31 programmable screens
- 8 keys for navigation, and data entry and monitoring.
- Works with ladder or FBD programs

HMI Display for the Ladder Diagram on Right



Capacity: 1191 free space.

Ladder for OnBoard HMI

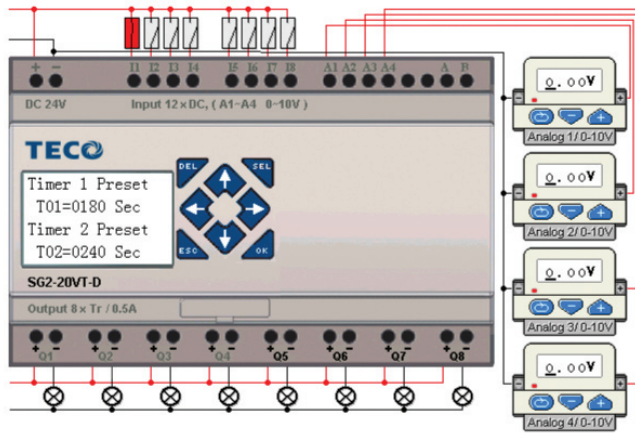


Onboard HMI Setup Window

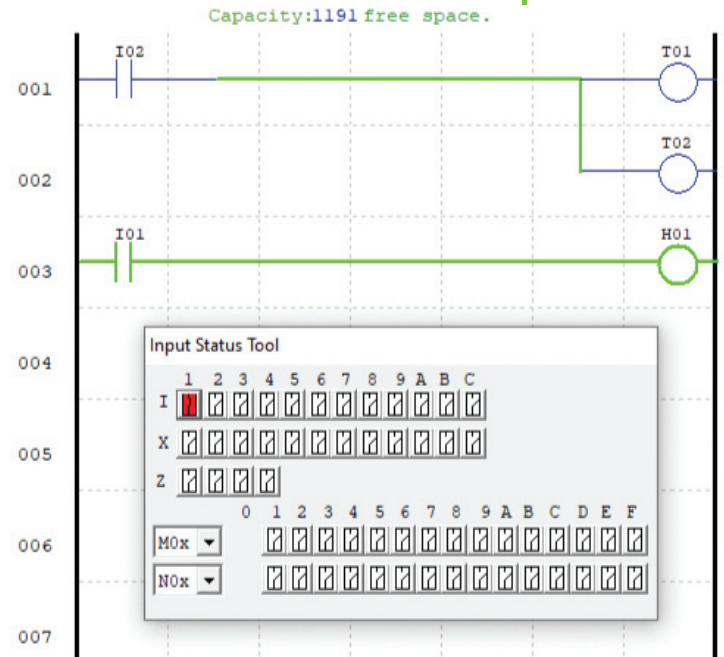
Virtual PLR Simulator

- Test programs before commissioning in the field
- Simulate all memory types
- Use the OnBoard HMI to interface with connected SG2
- Simulate Ladder or FBD programs

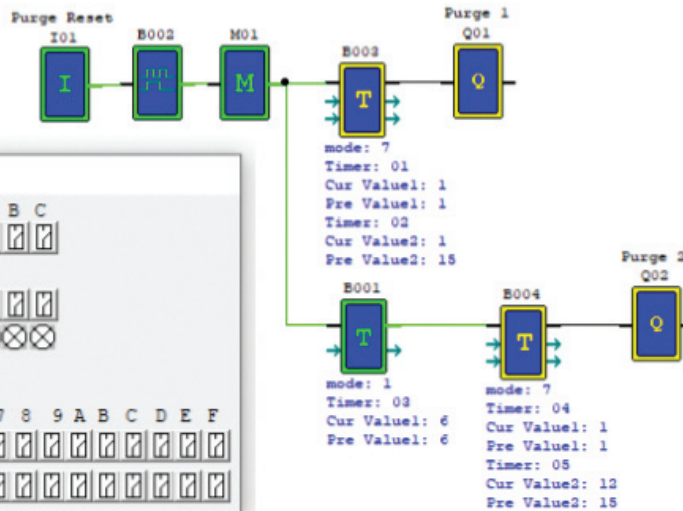
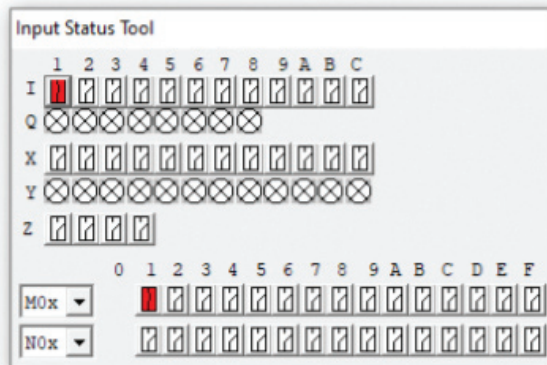
Ladder Logic Simulator



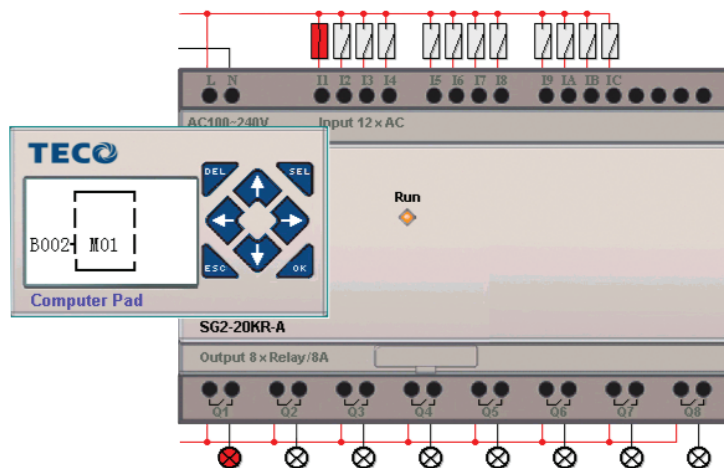
OnBoard HMI simulator for the Ladder Diagram on Right



Function Block Simulator



OnBoard HMI Function Block Simulator



SG2 General Specifications

Power Supply	
Input Power Voltage Range	12VDC Models: 10.4-14.4V 24VDC Models: 20.4-28.8V 110/220VAC: 85-265VAC
Power Consumption	12VDC: 12-point, 150mA 20-point: 150mA 24VDC: 12-point, 90mA 20-point: 150mA 100-240VAC: 90mA
Wire Size (All Terminals)	26 to 14 AWG
Programming	
Programming Languages	Ladder/Function Block
Program Memory	300 Lines or 260 Function Blocks
Programming Storage Media	Flash
Execution Speed	10ms/cycle
Built-in HMI	
Customizable Screens	31 (H Coils)
LCD Display	4 Lines x 16 Characters
Function Keys	8, 4 User-defined (Z Inputs)
Auxiliary Coils	
Maximum Number	126 (63 M-coils, 63 N-coils)
Timers	
Maximum Number	31 T-coils
Timing Ranges	0.01s-9999min
Counters	
Maximum Number	31 C-coils
Highest Count	999999
RTC (Real Time Clock)	
Number Available	31 R-coils
Resolution	1 min
Time Span Available	Week, Year, Month, Day, Hour, Min
Daylight Savings Feature	Yes
Power Off RTC Retention	240 Hours
Compare Instructions (Analog, Timer, or Counter Values)	
Number Available	31 G-coils
Compare Functions	EQ, LT, GT, LE, GE, NE

PID Control (Proportional-Integral-Derivative)	
Maximum Number	15 Loops (PI Coils)
Math Instructions	
Number Available	62 (31 AS Coils, 31 MD Coils) Up to 124 Additional (Plus Unused T, C, R, G coils)
Math Operations	+ - x /
Data Multiplexer Instructions	
Number Available	15 (MX Coils)
Resolution	2-bit, 4 Data Registers
Data Registers	
Number Available	240 (DR Coils, 16-bit)
Shift Instruction	
Number Available	1 8-bit (S Coil)
Analog Ramp Instructions	
Number Available	31 (AR Coils)
Environmental	
Enclosure Type	IP20
Maximum Vibration	1G According to IEC60068-2-6
Operating Temperature Range	-4° to 131°F (-20° to 55°C)
Storage Temperature Range	-40° to 158°F (-40° to 70°C)
Maximum Humidity	90% (Relative, Non-condensing)
Vibration	0.075mm Amplitude; 1.0g
Weight	10-point: 230g; 8-point: 190g;
Agency Approvals	cUL , CE, UL, UL File# E205406
Discrete Inputs	
Current Consumption	4mA @12VDC; 3.2mA @24VDC; 1.3mA @100-240VAC
Input Signal "OFF" Threshold	12VDC: < 2.5VDC; 24VDC: < 5VDC; 110/220VAC: < 40VAC
Input Signal "ON" Threshold	12VDC: > 7.5VDC; 24VDC: > 15VDC; 110/220VAC: > 79VAC
Input On Delay	DC: 5ms; 240VAC: 50ms;
Input Off Delay	DC: 3ms; 240VAC: 50ms;
Transistor Type	3-wire PNP Sensor compatible
High Speed Input Frequency	1kHz
Standard Input Frequency	< 40 Hz
Required Protection	Inverse voltage protection required

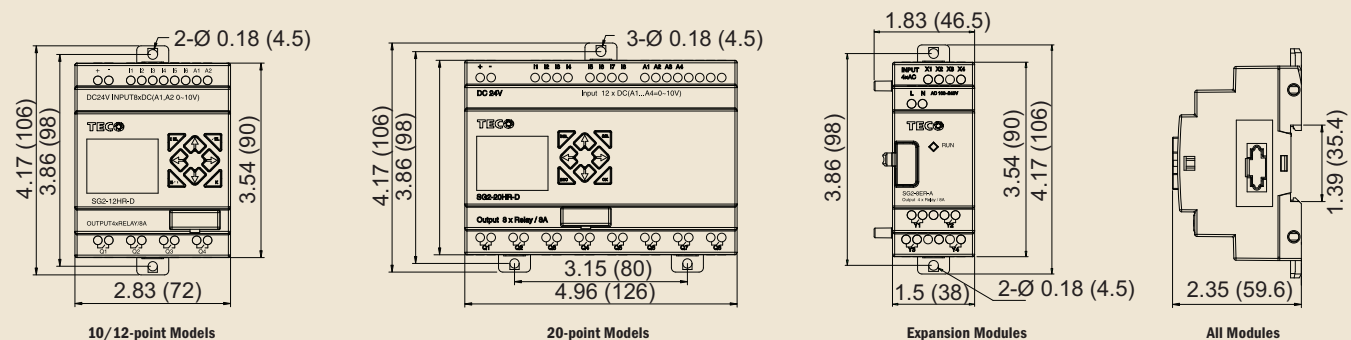
Analog Inputs	
Resolution	12 bit
Acceptable Input Range	Base module: Analog input: 0-10VDC voltage, 24VDC when used as discrete input Expansion module: Analog input: 0-10VDC voltage or 0-20mA current
Input Signal "OFF"	< 5VDC (as 24VDC discrete input)
Input Signal "ON"	> 9.8VDC (as 24VDC discrete input)
Isolation	None
Short Circuit Protection	Yes
Total Number Available	Base module: A01-A04 Expansion module: A05-A08
Temperature Input (SG2-4PT Expansion Module)	
Sensor Type	3-wire PT100
Temperature Input Range	-148° to 1112°F (-100°C to 600°C)
Resolution	0.18°F (0.1°C)
Accuracy	±1%
Relay Outputs	
Contact Material	Ag Alloy
Current Rating	8A
HP Rating	1/3HP@120V 1/2HP@250V
Maximum Load	Resistive: 8A/point; Inductive:
Maximum Operating Time	15ms (normal condition)
Life Expectancy (Rated)	100k operations
Minimum Load	16.7mA
Transistor Outputs	
Pulse Outputs	1 PWM and 1 PWM or Pulse Output
PWM Max. Output	0.5kHz (1ms on, 1ms off)
Standard Max. Output	100Hz
Voltage Specification	10-28.8VDC
Current Capacity	1A
Maximum Load	Resistive: 0.5A/point; Inductive:
Minimum Load	0.2mA
Analog Outputs (SG2-2AO Expansion Module)	
Analog Output Range	0V-10V (load > 500 ohm), 0-20mA
Resolution	10-bit
Full Scale Accuracy	2.5%

Communication Options

Built-in RS485 Communication (SG2-20Vx-x Units Only)	
Modbus-RTU	Master/Slave mode, 4800-115.2kb, supports Modbus function codes 1, 3, 5, 6, 16
DataLink	Link up to 8 Remote-I/O slave units (SG2-20Vx-x only) to 1-master unit at 8.4kb
Remote-I/O	Link up to 3 SG2-20Vx-x units (1-master, 2-slaves) at 38.4kb

Dimensions

in(mm)



OP10N HMI

The TECO OP10N monochrome HMI offers a simple but powerful user interface for the SG2 (Ver 3) Smart Relay. Monitor data registers in real time, change parameters, perform switching functions, list alarms, and transfer data between networked SG2's*.

- 192 x 64 pixel display
- 24-key keypad
- Two serial ports:
 - COM1 supports programming and point-to-point communications
 - RS485 supports multi-drop networks
- Supports Modbus RTU
- Password protection
- Import bitmaps
- Offline program simulation
- Bar graphs, trend charts, alarm logging



UL LISTED
UL File #E205406

Part Number	Description
OP10N	4.3" Monochrome Graphic Panel, 192 x 64 pixels, 4 Function Keys, Numeric Keypad, 2 serial ports, 24VDC input power
OP10-PL01	Cable (9-pin Serial, PC to 9-pin Serial, OP10N)
SG2-PL01	SG2 to OP10N (COM 1) Communication Cable
FM-USB232A-C	IOGEAR USB to Serial (DB-9 male) Converter Cable, 18" cable
SG2-SW	SG2 & OP10N Programming S/W. Available on USB Drive or FREE via download

CONNECTIONS

Communication with one SG2 via programming port



SG2-PL01

Multi-drop Modbus communications over RS485 network

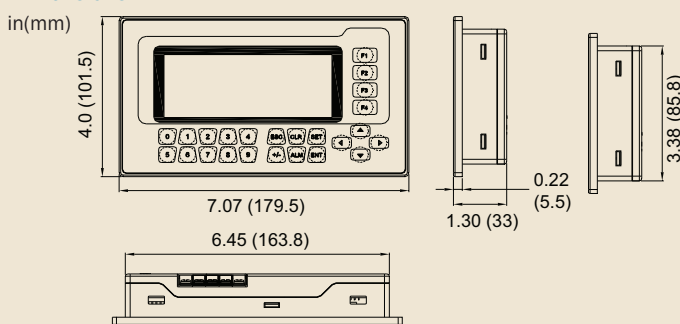


*SG2 must be V-series to communicate on RS485.

General Specifications

Power	DC24V, -15% ~ +10%
Current Consumption	80mA Max
Approvals	UL, CE
Communication Interface	COM1: (9-pin, D-SUB, female) RS-232/422; RS485: terminal screws
Environmental Rating	IP65 (front of panel)
Maximum Devices	8 without repeater; 255 with repeater
Dimensions	7.07 x 4.00 x 1.30" (179.5 x 101.5 x 33mm)
Weight	460g (~1 lb)
Environmental	
Operating Temperature	32° to 131°F (0° to 55°C)
Storage Temperature	-40° to 158°F (-40° to 70°C)
Relative Humidity	10% ~ 95%, non-condensing
Vibration	1.75mm displacement, 5 - 9Hz
Impact	15G, 11ms, vertical from X, Y, Z directions

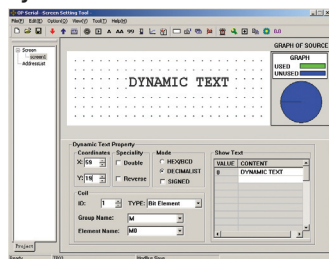
Dimensions



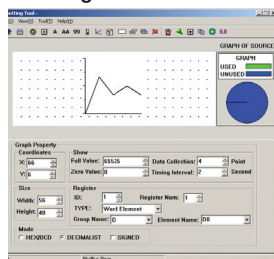
OP10N SOFTWARE

Program the OP10N using simple fill-in-the-blank object windows. Establish network links to remote devices. Create dynamic text, trend charts, bargraphs, alarm logs, and more. View and verify your program in simulation mode. Available for **FREE** download at www.factorymation.com/software-downloads.

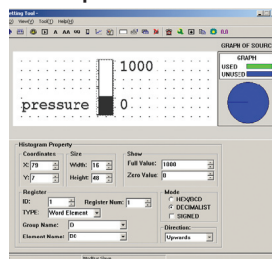
Dynamic Text



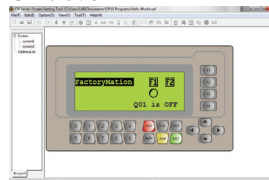
Trending



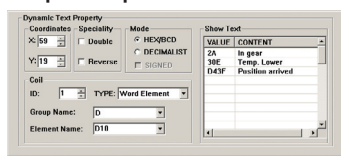
Bar Graphs



Simulation



Simple Setup



THE FACTORYMATION ADVANTAGE



Wide Selection
of Products



Over 40,000
Products in Stock



Industry
Leading Prices



Customization
Services



Fast & Free
Shipping

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