Programmable Controllers
GS-X1, GS-X2, GS-X3

Description

The GS-Xx range of panel mounted programmable single loop PID controllers aids optimization of production yield for thermal and other forms of processing.

Designed with native high speed Ethernet the GS-Xx range is an ideal component for digitized Industry 4.0 and "Industrial Internet of Things" applications.

Highly configurable, with precise, repeatable control and measurement performance, meeting accuracy specifications up to and including stringent aerospace regulatory requirements, the GS-Xx range remains simple to use and deploy.

The GS-X1 and GS-X2 are suitable replacements for the SX80 and SX90 respectively, example nomeclature has been prepared (see examples) to aid the ordering process and further documentation will be available to show the requirments for the physical change over.

Key features and options:

- Enhanced PID control with cutback function for fast response and minimal overshoot
- Precision 0.1% Inputs meeting accuracy requirements of AMS2750F and CQI-9
- Wireable function blocks including math, logic, and advanced control
- Fast Ethernet with RJ45 connector for IIoT and Industry 4.0.
- Modbus, Ethernet/IP and BACnet protocol support
- Up to 20 ramp/soak program profiles.

Associated equipment

- USB Backup cable available for convenient desktop configuration and back up; powers the instrument with or without a sleeve.
- iTools software for backup and configuration.

General

Controller Function	Single loop panel mount PID controller range with autotune, on/off and valve positioning (no slidewire required).
	Zirconia probe atmosphere control.
	Single loop profile/program.
	AC Mains voltage and 24Vdc power options.
Measurement Inputs	1 or 2 inputs. Accuracy ±0.1% of reading (refer to Universal Inputs table).
PID Control	2 PID sets are available as standard, with 8 as an optional extension (Each PID set offers a separate proportional band for heat and cool operation).
	Enhanced Autotuning control with cutback function to minimize overshoot and oscillation. Fast reacting precision control to setpoint changes or after process disturbances.
	Enhanced valve positioning (unbounded) algorithm.
	Gain scheduling allows PID selection for a wide range of operating situations, including deviation from setpoint, absolute temperature, output level and others.
	AC supply voltage monitoring for feedforward function. Process Variable (PV) and Setpoint (SP) feedforward functions.
Setpoint Programmer/Profiler	Options include 20 profiles of 8 steps (20 x 8), 10 x 24, 1 x 24 and 1 x 8.
	Holdback ("guaranteed soak"), event outputs, time to target, ramp rate, dwell, step and call segment types.
	Communication addresses are compatible with industry leading Programmable Controller.
	Additional timer functions are available.
User Function Block Wiring	Optional totalizer
	Math
	Logic and multiplexing
	BCD conversion
	Counter/timer and many other special function blocks available including 16 point linearization, zirconia and dual input switchover.
Limit Functions	EN ISO 13849-1: Performance Level (PL) "C" for PV input to Alarm function
	EN 14597 TR approved
Additional Functions	Digital and analog retransmission functions.
	CT Input – Monitor partial load failure, load short and open circuit; Dual input functions including switchover, redundant sensor, average, min, max, zirconia.
	6 freely configurable alarms with manual, automatic, non-latching and event types plus alarm delay function and blocking.
	Alarms may be inhibited in standby.
	5 Recipes with 40 freely selectable parameters switchable from the front panel or digital input.
	Scrolling parameter help and user messages displayed on event.
Backup and Configuration Tools	Free iTools software for backup and configuration.
	USB Backup cable available for convenient desktop configuration and back up; powers the instrument with or without a sleeve.
	iTools also connects using Modbus/TCP and serial Modbus RTU.
"OEM Security"	Helps protect instrument configurations from unauthorized viewing, cloning or backwards engineering.

Function Blocks	Function	Standard	Standard Toolkit Blocks	Enhanced Toolkit Blocks
Instrument	Interface to Instrument wide settings	1	-	-
Loop	Enhanced Eurotherm PID Loop	1	-	-
Programmer	Ramp/Dwell Programmer	1	-	-
BCD	BCD Conversion	1	-	-
Alarm	General purpose analog alarm monitoring	6	-	-
Recipe	General purpose recipe function	1	-	-
Comms*	General purpose recipe function	2	-	-
AI	Interface to serial and Ethernet communications	2	-	-
IP Monitor	Interface to main analog input	2	-	-
IO*	Interface to Inputs and Outputs	6	-	-
Option DIO*	Digital I/O options	8	-	-
Remote Input	Interface to remote (communications) input	1	-	-
OR	Eight input logical "OR" operation	8	-	-
CT*	Current transformer	1	-	-
Zirconia*	Zirconia Probe input	1	-	-
Wires*	User wiring	50	200	200
Math2	Two input math functions	-	4	8
Lgc2	Two input logical operations	-	4	8
Lgc8	Eight input logical operations	-	2	4
Timer	Timer based functions	-	1	2
SwitchOver	Input switchover	-	1	1
Mux8	Eight Input multiplexer	-	3	4
Total	Totalizer	-	1	1
Counter	Counter block (32–bit)	-	1	2
UsrVal	User values (freely assignable)	-	4	12
Lin16	16 point linearization	-	2	2

*Dependent on instrument/options ordered

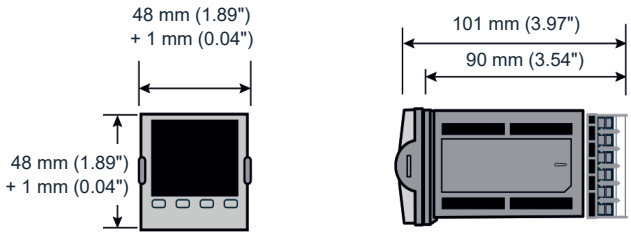
Environmental Specifications, Standards Approvals and Certifications

Operating Temperature	0 to 55°C (32 to 131°F)	
Storage Temperature	-20 to +70°C (-4 to 158°F)	
Operating/Storage Humidity	5% to 90% RH non-condensing	
Atmosphere	Non-corrosive, non-explosive	
Altitude	<2000 meters (6562 feet)	
Installation	Indoor Use Only	
Vibration and Shock	EN 61131-2 (5 to 11.9Hz @ 7mm peak to peak displacement, 11.9-150Hz @ 2g, 0.5 octave min.) EN 60068-2-6 Test FC, Vibration. EN 60068-2-27 Test Ea and guidance, Shock.	
Front of Panel Sealing Protection	Bezel (Washdown): EN 60529 IP66, UL50E Type 4X (indoor use) (equivalent to NEMA 4X)	
Rear of Panel Protection	EN 60529 IP10	
Electromagnetic Compatibility (EMC)	Emissions	HV Power Supply units to EN 61326-1 Class B – Light industrial LV Power Supply units to EN 61326-1 Class A – Heavy industrial
	Immunity	EN 61326-1 Industrial
Approvals and Certification	Europe	CE, REACH, EN 14597 TR Type Approval
	USA, Canada	UL, cUL.
	China	China RoHS, CCC: Exempt (Product not listed in catalog of products subject to China Compulsory Certification)
	General	When subject to the necessary field calibration, GS-Xx series controllers supplied by Spirax Sarco are suitable for use in Nadcap applications in all furnace classes, as defined in AMS2750F clause 3.3.1.
		Meets accuracy requirements of CQI-9
		Spirax Sarco environmental and sustainability lifecycle standards
		EN ISO 13849-1 Performance Level "C"
Electrical Safety		EN 61010-1 (installation category II, pollution degree 2)

Dimensions/panel cut-out/weights

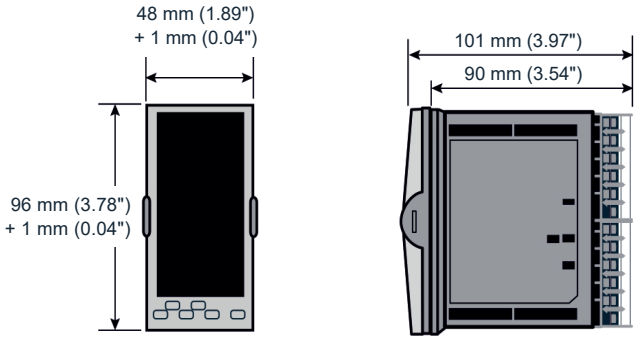
GS-X1

Cut Out Dimension	45 mm (-0.0 +0.6) x 45 mm (-0.0 +0.6)
	1.77" (-0.0 +0.02) x 1.77" (-0.0 +0.02)
Product Weight	250 g
	8.81 oz



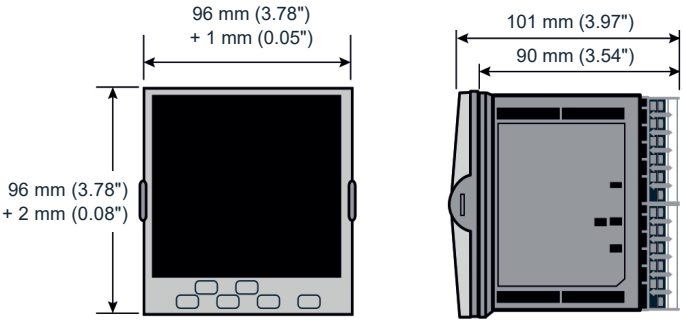
GS-X2

Cut Out Dimension	92 mm (-0.0 +0.8) x 45 mm (-0.0 +0.6)
	3.62" (-0.0 +0.03) x 1.77" (-0.0 +0.02)
Product Weight	350 g
	12.34 oz



GS-X3

Cut Out Dimension	92 mm (-0.0 +0.8) x 92 mm (-0.0 +0.8)
	3.62" (-0.0 +0.03) x 3.62" (-0.0 +0.03)
Product Weight	420 g
	14.81 oz



Specifications - Inputs and Outputs

I/O and communication types

I/O and Comms	GS-X1	GS-X2/GS-X3
Analog Inputs	1 universal input 20Hz	1 or 2 (option) universal input 20Hz
	1 auxiliary input 4-20mA, 0-10V 4Hz (option)	
Optional I/O Modules:	Up to 2, freely selectable:	Up to 3, freely selectable:
	Form A Relay Output	Form A Relay Output
	Logic I/O	Logic I/O
	DC Analog Output	DC Analog Output
	TRIAC Output	TRIAC Output
Form C Relay Output	1	1
Contact Closure Logic Input	1 (option)	2
Logic I/O (Open Collector)	-	4 or 8 (option)
Current Transformer	1 (option)	1
Transmitter Power Supply	1 (option-18V)	1 (24V)
(On GS-X1 you cannot select both Transmitter Power Supply and Communications, only one or the other)		
Communications	1 of the following options:	2 of the following options:
	EIA-485	EIA-485
	EIA-422	Modbus (or EI Bisynch) and Modbus TCP
	EIA-232	Modbus TCP Slave + EtherNet/IP Server, or Modbus TCP Slave + BACnet Slave
	Modbus RTU slave (EI Bisynch available with serial comms)	Modbus TCP Master and Slave
	Modbus TCP slave	
	Modbus TCP Slave + EtherNet/IP Server, or Modbus TCP Slave + BACnet Slave	
	Modbus TCP Master and Slave	

I/O Specifications

Universal Process Inputs	
Input Types	Thermocouples, Pt100/Pt1000 RTD, 4-20mA, 0-20mA, 10V, 2V, 0.8V, 80mV, 40mV, zirconia (oxygen probe), pyrometers. For other input types, contact your Spirax Sarco supplier for advice.
	Accuracy ±0.1% of reading. When subject to the necessary field calibration, GS-X series controllers supplied by Spirax Sarco are suitable for use in Nadcap applications in all furnace classes as defined in AMS2750F clause 3.3.1. For further information contact Spirax Sarco
Sample Time	Process Inputs 50ms (20Hz)
	Thermocouple 62.5ms (16Hz)
	RTD 100ms (10Hz)
	Automatic cycle time selection
Mains Rejection (48-62Hz)	Series mode rejection >80dB.
	Common mode rejection >150dB
Sensor Break	AC sensor break. Break detected within 3 seconds worst case.
Input Filtering	OFF to 60 seconds filter time constant.
User Calibration	User 2 point input adjust (offset/gradient), transmitter output scaling.
Thermocouple	K, J, N, R, S, B, L, T as standard, plus 2 downloadable custom curves
	Linearization accuracy: refer to IM-Pxxx-xx
	Cold Junction (CJ) calibration accuracy: ±1.0ºC at 25ºC (±1.8ºF at 77ºF) ambient
	CJ ambient rejection ratio: better than 40:1 from 25ºC ambient
	External CJ selectable as 0, 45, 50ºC or measurable for GS-X3/GS-X2

Specifications - Inputs and Outputs

I/O and communication types

Input Ranges	40mV	80mV	0.8V	2V	10V	RTD (Pt100/Pt1000)	mA
Range Min	-40mV	-80mV	-800mV	-2V	-10V	0Ω (-200°C; -328°F)	-32mA
Range Max	+40mV	+80mV	+800mV	+2V	+10V	400Ω /4000Ω (850°C; 1562°F)	+32mA
Thermal Stability from 25°C (77°F) Ambient	±0.4µV/°C ±13ppm/°C	±0.4µV/°C ±13ppm/°C	±0.4µV/°C ±13ppm/°C	±0.4µV/°C ±13ppm/°C	±0.8µV/°C ±70ppm/°C	±0.01°C/°C ±25ppm/°C	±0.16µA/°C ±113ppm/°C
Resolution	1.0µV unfiltered	1.6µV	16µV	41µV	250µV	0.05 °C (0.09 °F)	0.6µA
Electrical Noise (peak to peak with 1.6s input filter)	0.8µV	3.2µV	32µV	82µV	250µV	0.05 °C (0.09 °F)	1.3µA
Linearity Accuracy (best fit straight line)	0.003%	0.003%	0.003%	0.003%	0.007%	0.033%	0.003%
Calibration Accuracy @25°C (77°F) ambient	±4.6µV ±0.053%	±7.5µV ±0.052%	±75µV ±0.052%	±420µV ±0.044%	±1.5mV ±0.063%	±0.31°C (0.56°F) ±0.023%	±3µA ±1.052%
Input Resistance	100MΩ	100MΩ	100MΩ	100MΩ	57kΩ	-	2.49Ω (1% Shunt)
Bulb Current	-	-	-	-	-	190µA/ 180µA	-

Remote Setpoint Auxiliary Analog Input (GS-X1 Only)

Range	0 to 10V and 4 to 20mA. Max ranges -1V to 11V and 3.36mA to 20.96mA
Accuracy	<±0.25% of reading ± 1LSD, 14 Bits
Sample Rate	4Hz (250ms)
Functions	Remote setpoint input
	Auxiliary analog input
Thermal Stability	100ppm (typical) < 150ppm (worst case)
Mains Rejection	Common Mode 48-62Hz > 120dB, Series Mode > 90dB
Input Impedance	Voltage 223kΩ. Current 2.49Ω

Current Transformer Input

Input Range	0-50mA RMS, 48-62Hz
	10Ω burden resistor fitted inside module
Measurement Scaling	10, 25, 50 or 100 Amps
Calibration Accuracy	<1% of reading (typical) <4% of reading (worst case)
Input Functions	Partial load failure. SSR open or short circuit.
	Other functions including power usage totalization available using soft wiring.

Contact Closure Logic Inputs

Thresholds	Open > 400Ω, Closed < 100Ω		
Input functions	- Auto/Manual select	- Program run functions	- BCD bit
	- SP2 select	- Recipe select	- Autotune enable
	- Integral hold	- Keylock	- Standby
	- Control inhibit	- PID select	
	- PV select plus other functions available using soft wiring.		

Specifications - Inputs and Outputs

Logic I/O Modules

Output Rating	ON 12Vdc 44mA max. Minimum control cycle time 50ms (auto)		
Output Functions	Time proportioned heat, time proportioned cool. SSR drive alarm and event outputs, interlock outputs, other functions available using soft wiring.		
Contact Closure (input)	Open 500Ω, Closed 150Ω		
Input Functions	- Auto/Manual select	- Program run functions	- BCD bit
	- SP2 select	- Keylock	- Autotune enable
	- Integral hold	- Recipe select	- Standby
	- Control inhibit	- PID select	
	- PV select plus other functions available using soft wiring.		

Logic I/O Open Collector Type (GS-X3/GS-X2 only)

External DC Power Supply	15V to 35Vdc		
Output Limit	Maximum current sinking 40mA		
Output Functions	Alarm and event outputs, interlock outputs, other functions available using soft wiring. Cannot be used as a control output.		
Voltage Sensing Input	OFF < 1V, ON > 4V. Max 35V, Min -1V		
Contact Closure Input	OFF > 28KΩ, ON < 100Ω		
Input Functions	- Auto/Manual select	- Program run functions	- BCD bit
	- SP2 select	- Keylock	- Autotune enable
	- Integral hold	- Recipe select	- Standby
	- Control inhibit	- PID select	
	- PV select plus other functions available using soft wiring.		

TRIAC Module

Rating	Min 40mA, 30V RMS, Max 0.75A @ 264V AC resistive.
Output Functions	Time proportioned heat, time proportioned cool. SSR drive alarm and event outputs, interlock outputs, other functions available using soft wiring.
Surge Rating	Max current surge 30A (<10ms) Max continuous operating voltage 540V peak, 385V RMS. Max surge voltage 800V peak, 565V RMS (< 10ms).

Isolated DC Analog Output Module

	Current Output	**Voltage Output**
Range	0-20mA	0-10V
Load Resistance	<550Ω	<450Ω
Calibration Accuracy	±(0.5% of reading + 100µA offset)	±(0.5% of reading + 50mV offset)
Output Functions	- SCR/Power control drive	
	- Proportional valve	
	- Retransmission to chart recorder or other instrumentation	
	- Other functions using soft wiring	
Digital Input (DI), where configured	The DC output module can be configured as contact closure input see "I/O List (io)" in Installation Manual (IM-P794-03). In this case:	
	- Retransmission to chart recorder or other instrumentation	
	- Other functions using soft wiring	

Specifications - Power, communications and operator interface

Power and transmitter power supply

Power Supply, AC Supply Measurement and Transmitter Power Supply	
Controller Supply Voltage	100-230Vac +/- 15%, 48 to 62Hz or 24Vac +10%/-15%, 48 to 62Hz or 24Vdc +20%/-15%, max 5% ripple voltage.
Power Supply Rating	GS-X1 Controller 6W GS-X2/GS-X3 Controller 9W
Power Measurement	Only available in 100-230Vac powered instruments. Measures direct from power supply (no additional connections). Uncalibrated. Electrical noise 0.5V filtered, used by the PID function for power feedforward.
Transmitter Power Supply (GS-X2/GS-X3 only)	24Vdc. 2 to 28mA load. Isolated from system (300V AC double insulation)
Transmitter Power Supply (GS-X1 Option)	18Vdc. +/- 15% 30mA maximum. Load Regulation < 1 V over 25mA. Isolated from system (300V AC double insulation)
Over voltage category	CAT II

Communications

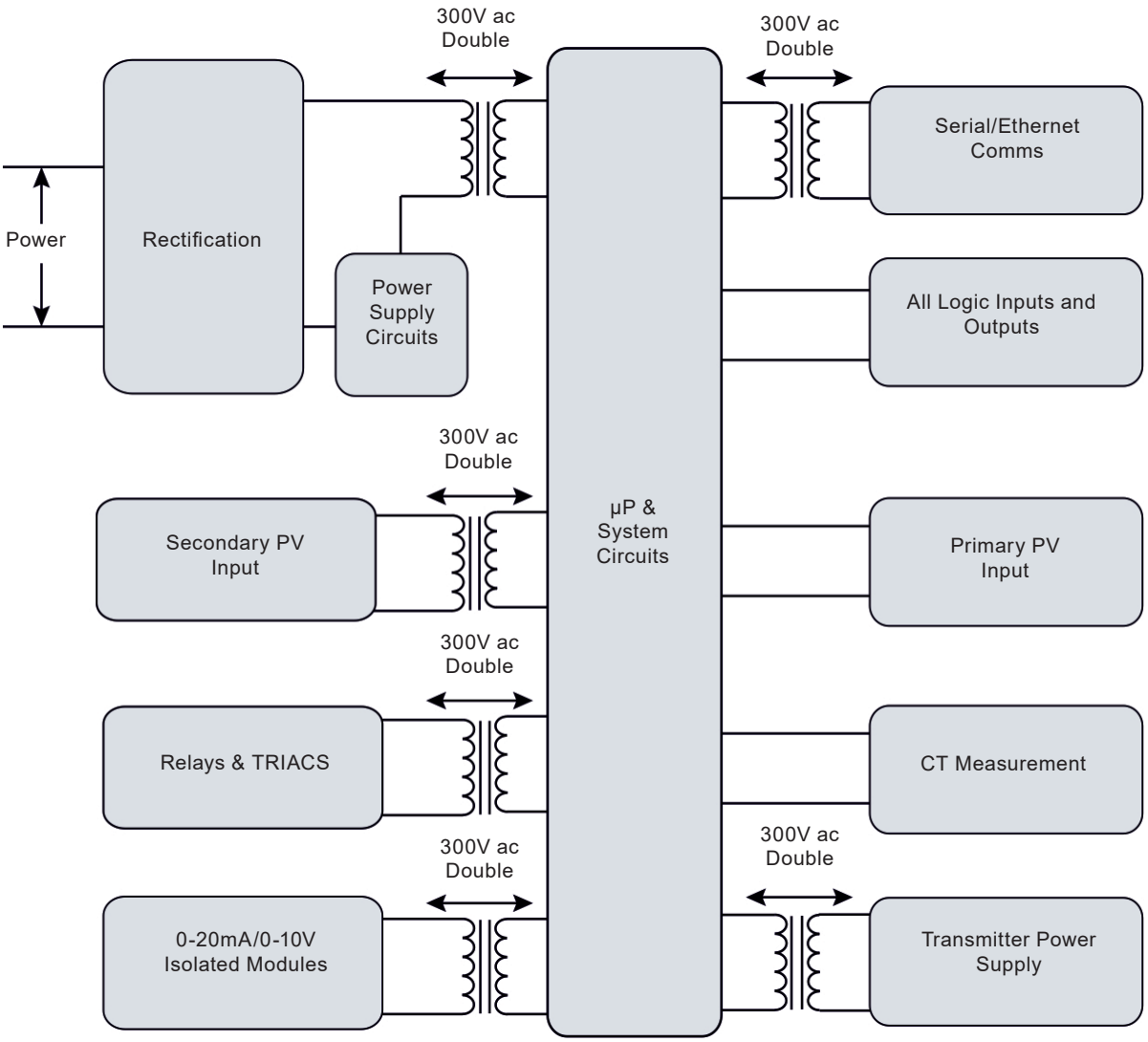
Ethernet	Shielded grounded RJ45 connection supporting 10/100BASE-T auto-sensing
	vModbus/TCP, BACnet and EtherNet/IP Protocols
	Fixed IP address or DHCP
	Bonjour Auto-Discovery
Serial	EIA-485 Half duplex
	EIA-422/EIA-232 Full duplex
	Baud Rates 4800 (EI-Bisynch only), 9600, 19200
	Modbus RTU 8 data bits, odd/even/no parity selectable
	EI-Bisynch 7 data bits even parity fixed

Operator Interface - Display and Operation

Type	High visibility LCD with backlight. Flat "washdown" membrane bezel with superior panel sealing, or sculpted bezel with fully tactile keys.
Keyboard	100,000 operations typical
Main PV	GS-X1 4 digits, 3 decimal places
	GS-X2 4.5 digits, 4 decimal places
	GS-X3 5 digits, 4 decimal places; green/red bicolor (red in alarm)
Second Line (GS-X3/GS-X2 only)	5 character 16 segment text or numeric
Third Line	16 segment scrolling text or numeric display
Text Character sets	Roman, Simplified Cyrillic
Additional Display Functions	Program status indicator (ramp up, ramp down or dwell)
	Output indicators
	Alarm indication
	Units
	Bar graph (GS-X3, GS-X2 Controllers only)
	Communications activity indicator
HMI Functions	Configurable display contents
	Configurable scroll lists for operator/supervisor
	Configurable scrolling event messages
	Passcode level protection with lockout period
	2 Programmable function keys (GS-X3, GS-X2 Controllers only)

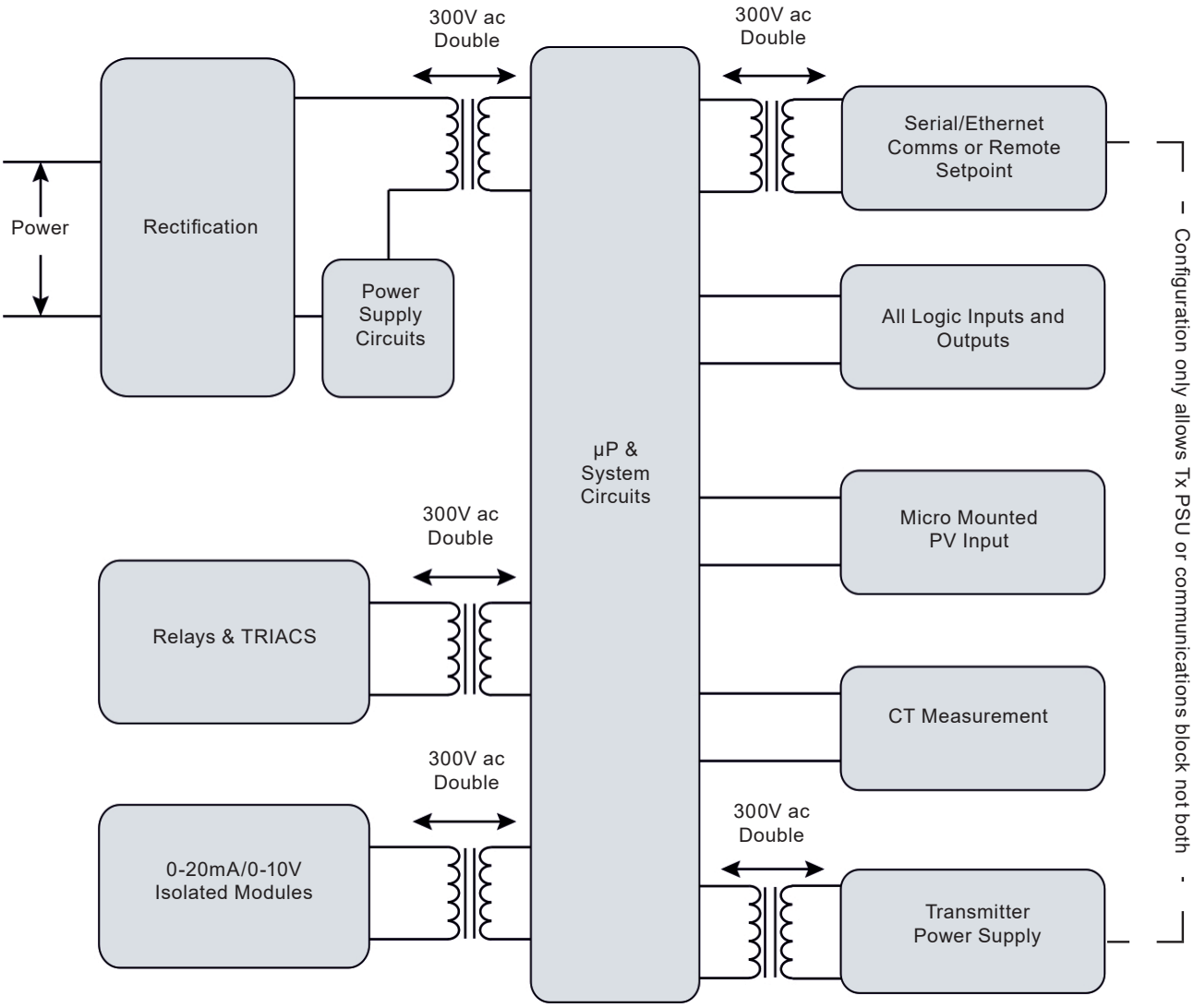
Specifications

GS-X2/GS-X3 isolation



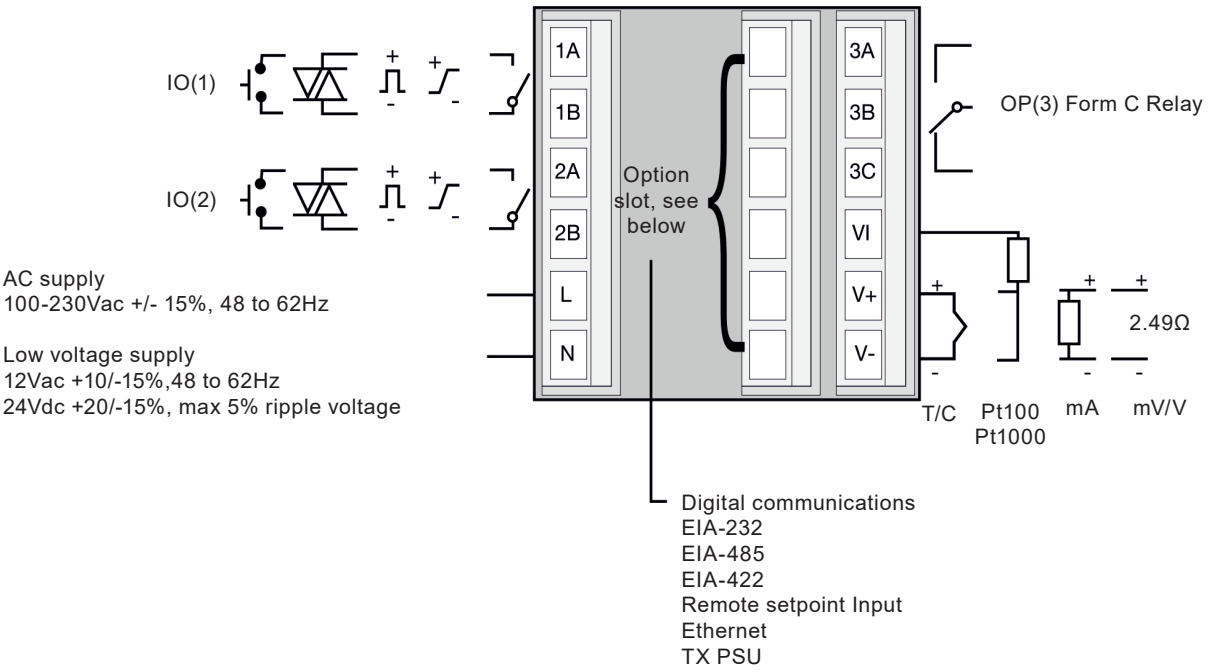
Specifications (continued)

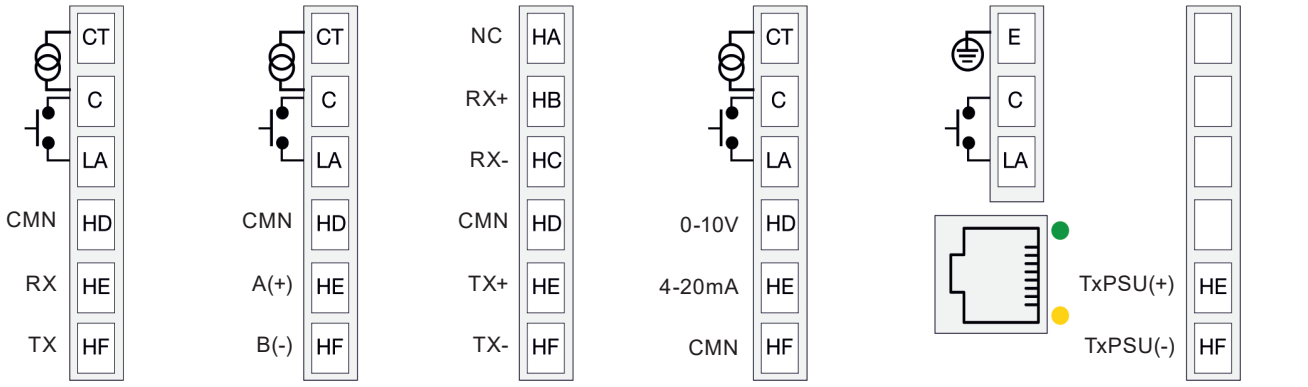
GS-X1 isolation



Specifications (continued)

Rear terminals GS-X1



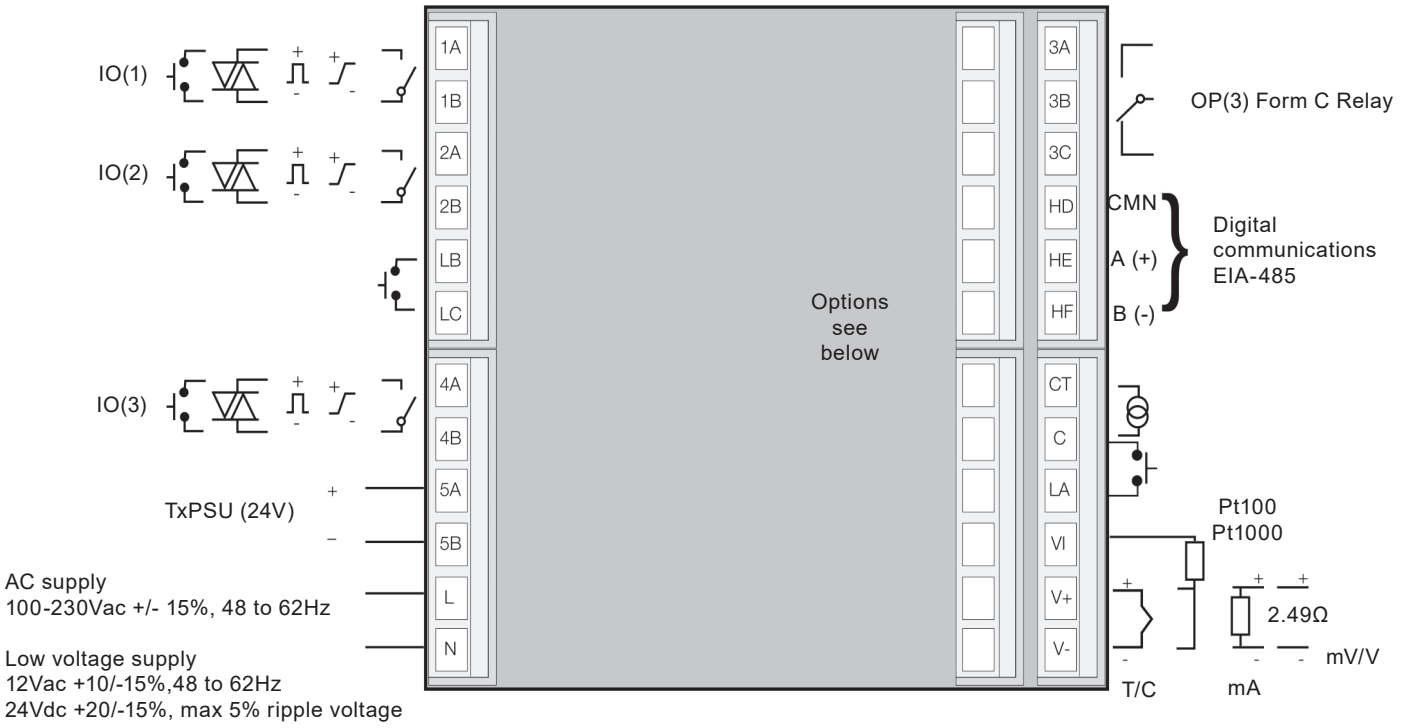


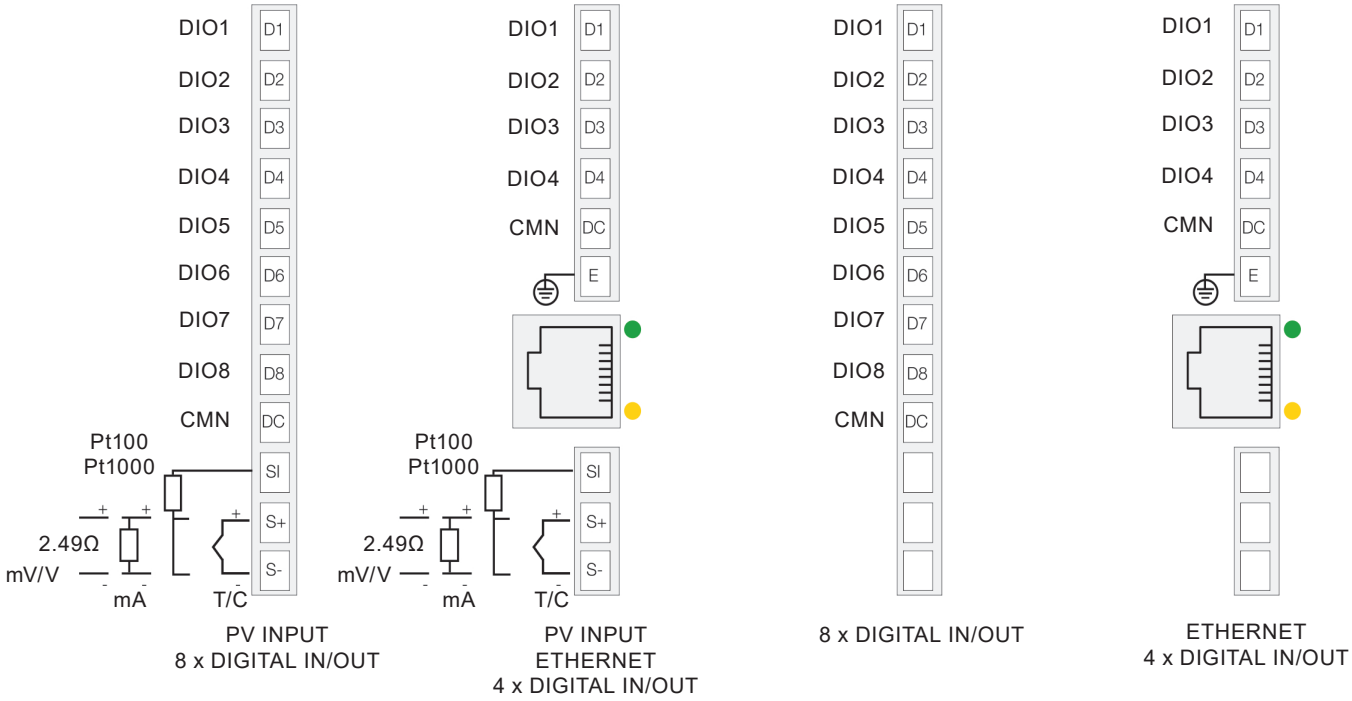
Key to Symbols Used in Wiring Diagrams

+ −	**Logic Output (SSR drive)**		Relay Output		Contact Input
+ −	**0-10V/0-20mA Analog Output**		TRIAC Output		Current Transformer Input

Specifications (continued)

Rear terminals GS-X2, GS-X3





Key to Symbols Used in Wiring Diagrams

+ –	**Logic Output (SSR drive)**		Relay Output		Contact Input
+ –	**0-10V/0-20mA Analog Output**		TRIAC Output		Current Transformer Input

Order Codes GS-X1

GS-X1	1/16 DIN Controller (Includes one Universal PV Input and one Form C Relay)			GS-X1
1	Type	CC	= Controller Only	CC
		CP	= 1 x 8 Segment Basic Programmer	
		P1	= 1 x 24 Segment Advanced Programmer	
		P10	= 10 x 24 Segment Advanced Programmer	
		P20	= 20 x 8 Segment Advanced Programmer	
2	Supply Voltage	VH	= 100 - 230Vac +/-15% (48 to 62Hz)	VH
		VL	= 24Vac +10%, -15% (48 to 62 Hz); 24Vdc +20, -15%; 5% Ripple	
3	I/O 1	XX	= Not Fitted	R2
		L2	= Logic	
		R1	= Relay Output (Without Snubber)	
		R2	= Relay (Supplied With External Snubber)	
		D1	= DC Output	
		T1	= TRIAC (Without Snubber)	
		T2	= TRIAC (Supplied With External Snubber)	
4	I/O 2	XX	= Not Fitted	D1
		L2	= Logic	
		R1	= Relay Output (Without Snubber)	
		R2	= Relay (Supplied With External Snubber)	
		D1	= DC Output	
		T1	= TRIAC (Without Snubber)	
		T2	= TRIAC (Supplied With External Snubber)	
5	Future	X	= Not Fitted	X
6	Output 3	XX	= Form C (Default)	XX
7	Serial Communications Protocol [7]	XX	= Modbus Slave (Default) Or None	XX
		EI	= EI-Bisynch Comms	
		SM	= Modbus Master and Slave	
8	Ethernet, Communications & Remote SP [8]	XX	= None (Default)	TX
		C1	= CT Input, Contact Closure Digital Input, and EIA-232	
		C2	= CT Input, Contact Closure Digital Input, and EIA-485 (3 Wire)	
		C3	= EIA-422 Only (5 Wire)	
		CR	= CT Input, Contact Closure Digital Input, RSP Input	
		CE	= Contact Closure Digital Input, Ethernet	
		TX	= Transmitter PSU	
9	Ethernet (TCP) Communications Protocol [9]	XX	= Modbus TCP Slave (Default) Or None	XX
		ES	= EtherNet/IP Server and Modbus TCP Slave	
		BS	= BACnet Slave and Modbus TCP Slave	
		TM	= Modbus TCP Master and Slave	

Order Codes continued on next page

10	Tool Kit Blocks	XX	= None (Default 50 Wires)	XX
		TK	= Standard (Includes 200 Wires)	
		ETK	= Enhanced (Includes 200 Wires)	
11	OEM Security	XXX	= None (Default)	XXX
		OEM	= OEM Security	
12	Bezel	WD	= Washdown	WD
13	Labels	XXXXX	= None (Default)	XXXXX
		Fnnnn	= Custom Label	
14	Specials [14]	XXXXXX	= None (Default)	XXXXXX
15	Gain scheduling Sets	XX	= Two Gain Scheduling Sets (Default)	XX
		08	= Eight Gain Scheduling Sets	

[7] Use of a serial communications protocol requires purchase of "C1", "C2" or "C3" option in field 8, cannot be selected if TX in field 8 required.

[8] Not available if field 7 set to EI or SM

[9] Use of an ethernet communications protocol requires purchase of "CE" in field 8.

[14] Regional and Application specific codes are entered here which can be found in additional release documentation

Example

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
GS-X1	**CC**	**VH**	**R2**	**D1**	**X**	**XX**	**XX**	**TX**	**XX**	**XX**	**XXX**	**WD**	**XXXXX**	**XXXXXX**	**XX**

Quick start codes GS-X1

				Example
16	Application	X	= None	X
		1	= Heat Only	
		2	= Heat/Cool	
		V	= VPU	
17	Input 1 Sensor Type	X	= Not Required	X
		M	= Linear 0 to 80mVdc	
		V	= Linear 0 to 10Vdc	
		2	= Linear 0 to 20mA	
		4	= Linear 4 to 20mA	
		B	= Type B Thermocouple	
		C	= Type C Thermocouple	
		J	= Type J Thermocouple	
		K	= Type K Thermocouple	
		L	= Type L Thermocouple	
		N	= Type N Thermocouple	
		R	= Type R Thermocouple	
		S	= Type S Thermocouple	
		T	= Type T Thermocouple	
		P	= Pt100	
		W	= Pt100	
18	Input 1 Range	X	= Not Required	X
		F	= Full Range	
		1	= 0 to 100°C or 32 to 212°F or 273 to 373K	
		2	= 0 to 200°C or 32 to 392°F or 273 to 473K	
		3	= 0 to 400°C or 32 to 752°F or 273 to 673K	
		4	= 0 to 600°C or 32 to 1112°F or 273 to 873K	
		5	= 0 to 800°C or 32 to 1472°F or 273 to 1073K	
		6	= 0 to 1000°C or 32 to 1832°F or 273 to 1273K	
		7	= 0 to 1200°C or 32 to 2192°F or 273 to 1473K	
		8	= 0 to 1300°C or 32 to 2552°F or 273 to 1573K	
		9	= 0 to 1600°C or 32 to 2912°F or 273 to 1873K	
		A	= 0 to 1800°C or 32 to 3272°F or 273 to 2073K	
19	Future	X	= Future	X
20	Future	XX	= Future	X

Quick start codes continued on next page

21	CT Input Range	X	= Not Used	X
		1	= 10A	
		2	= 25A	
		5	= 50A	
		6	= 100A	
		7	= 1000A	
22	Digital Input A Function [22]	X	= Not Used	X
		W	= Alarm Acknowledge	
		M	= Auto/Manual	
		R	= Programmer Run/Hold	
		L	= Keylock	
		K	= Loop Track	
		P	= Local Setpoint Select	
		T	= Programmer Reset	
		U	= Remote Setpoint Select	
		V	= Recipe Select	
23	Future	X	= Future	X
24	Future	X	= Future	X
25	Units	X	= Use Default (Degrees Celsius)	X
		C	= Degrees Celsius	
		F	= Degrees Fahrenheit	
		K	= Kelvin	
26	Future	XX	= Future	XX
27	Warranty	XX	= Standard Warranty	XX
			= Future - WL005 Extended warranty	
28	Certificate of Conformity	XX	= None Required	XX
		CERT1	= Supplied With Certificate of Conformity	
		CERT2	= Supplied With Certificate of Conformity	

[22] Requires purchase of Communications Option (Field 8) with "Digital Input".

Example (cont)

16	17	18	19	20	21	22	23	24	25	26	27	28
X	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**XX**	**XX**	**XX**

Order Codes GS-X2, GS-X3

				Example
GS-X2 1/8 DIN Controller **GS-X3** 1/4 DIN Controller		I/O supplied as standard includes one Universal PV Input, EIA-485 Modbus RTU Slave Communications, 1 Form C Relay, 2x Contact Closure Digital Inputs, 1 Current Transformer Input, and 24Vdc Transmitter Power Supply.		**GS-X2**
1	Type	CC	= Controller Only	CC
		CP	= 1 x 8 Segment Basic Programmer	
		P1	= 1 x 24 Segment Advanced Programmer	
		P10	= 10 x 24 Segment Advanced Programmer	
		P20	= 20 x 8 Segment Advanced Programmer	
2	Supply Voltage	VH	= 100 - 230Vac +/-15% (48 to 62Hz)	VH
		VL	= 24Vac +10%, -15% (48 to 62 Hz); 24Vdc +20, -15%; 5% Ripple	
3	I/O 1	XX	= Not Fitted	R2
		L2	= Logic	
		R1	= Relay Output (Without Snubber)	
		R2	= Relay (Supplied With External Snubber)	
		D1	= DC Output	
		T1	= TRIAC (Without Snubber)	
		T2	= TRIAC (Supplied With External Snubber)	
4	I/O 2	XX	= Not Fitted	D1
		L2	= Logic	
		R1	= Relay Output (Without Snubber)	
		R2	= Relay (Supplied With External Snubber)	
		D1	= DC Output	
		T1	= TRIAC (Without Snubber)	
		T2	= TRIAC (Supplied With External Snubber)	
5	I/O 4	XX	= Not Fitted	D1
		L2	= Logic	
		R1	= Relay Output (Without Snubber)	
		R2	= Relay (Supplied With External Snubber)	
		D1	= DC Output	
		T1	= TRIAC (Without Snubber)	
		T2	= TRIAC (Supplied With External Snubber)	
6	Output 3	XX	= Form C (Default)	XX
7	Serial Communications Protocol [7]	XX	= Modbus Slave (Default) Or None	XX
		EI	= EI-Bisynch Comms	
		SM	= Modbus Master and Slave	

Order Codes continued on next page

Order Codes GS-X2, GS-X3 (continued)

				Example
8	Ethernet, Communications & Remote SP [8]	XX	= None (Default)	D8
		I8	= Second PV Input; 8 Digital Input/Outputs	
		D8	= 8 Digital Input/Outputs Only	
		E4	= Ethernet (Modbus TCP Slave) 4 x Digital I/O Only	
		IE	= Second PV Input;Ethernet (Modbus TCP Slave) + 4 x Digital I/O	
9	Ethernet (TCP) Communications Protocol [9]	XX	= Modbus TCP Slave (Default) Or None	XX
		ES	= EtherNet/IP Server and Modbus TCP Slave	
		BS	= BACnet Slave and Modbus TCP Slave	
		TM	= Modbus TCP Master and Slave	
10	Tool Kit Blocks	XX	= None (Default 50 Wires)	XX
		TK	= Standard (Includes 200 Wires)	
		ETK	= Enhanced (Includes 200 Wires)	
11	OEM Security	XXX	= None (Default)	XXX
		OEM	= OEM Security	
12	Bezel	WD	= Washdown	WD
13	Labels	XXXXX	= None (Default)	XXXXX
		Fnnnn	= Custom Label	
14	Specials [14]	XXXXXX	= None (Default)	XXXXXX
15	Gain scheduling Sets	XX	= Two Gain Scheduling Sets (Default)	XX
		08	= Eight Gain Scheduling Sets	

[7] EIA-485 serial communications is provided as standard for GS-X2 and GS-X3. No additional option purchase is required to use serial communications protocols.

[8] Digital I/O on Ethernet, 2nd Input & Option I/O cannot be used for PID control output.

[9] Use of Ethernet communications protocols requires purchase of Ethernet Communications (field 8) options "E4" or "IE".

[14] Regional and Application specific codes are entered here which can be found in additional release documentation

Example

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
GS-X2	**CC**	**VH**	**R2**	**D1**	**D1**	**XX**	**XX**	**D8**	**XX**	**XX**	**XXX**	**WD**	**XXXX**	**XXXXXX**	**XX**

Quick start codes GS-X2, GS-X3

				Example
16	Application	X	= None (Exit Quick Code)	X
		1	= Heat Only (Default) 1,2,V,C,D all add (note 5)	
		2	= Heat/Cool	
		V	= VPU	
		C	= Carbon Potential Controller (Requires PV2 and Zirconia)	
		D	= Dew Point Controller (Requires PV2 and Zirconia)	
17	Input 1 Sensor Type	X	= Not Required	X
		M	= Linear 0 to 80mVdc	
		V	= Linear 0 to 10Vdc	
		2	= Linear 0 to 20mA	
		4	= Linear 4 to 20mA	
		B	= Type B Thermocouple	
		C	= Type C Thermocouple	
		J	= Type J Thermocouple	
		K	= Type K Thermocouple	
		L	= Type L Thermocouple	
		N	= Type N Thermocouple	
		R	= Type R Thermocouple	
		S	= Type S Thermocouple	
		T	= Type T Thermocouple	
		P	= Pt100	
		W	= Pt100	
18	Input 1 Range	X	= Not Required	X
		F	= Full Sensor range	
		1	= 0 to 100°C or 32 to 212°F or 273 to 373K	
		2	= 0 to 200°C or 32 to 392°F or 273 to 473K	
		3	= 0 to 400°C or 32 to 752°F or 273 to 673K	
		4	= 0 to 600°C or 32 to 1112°F or 273 to 873K	
		5	= 0 to 800°C or 32 to 1472°F or 273 to 1073K	
		6	= 0 to 1000°C or 32 to 1832°F or 273 to 1273K	
		7	= 0 to 1200°C or 32 to 2192°F or 273 to 1473K	
		8	= 0 to 1300°C or 32 to 2552°F or 273 to 1573K	
		9	= 0 to 1600°C or 32 to 2912°F or 273 to 1873K	
		A	= 0 to 1800°C or 32 to 3272°F or 273 to 2073K	

Quick start codes continued on next page

Quick start codes GS-X2, GS-X3 (continued)

				Example
19	Input 2 Sensor Type [19]	X	= Not Required	X
		M	= Linear 0 to 80mVdc	
		V	= Linear 0 to 10Vdc	
		2	= Linear 0 to 20mA	
		4	= Linear 4 to 20mA	
		B	= Type B Thermocouple	
		C	= Type C Thermocouple	
		J	= Type J Thermocouple	
		K	= Type K Thermocouple	
		L	= Type L Thermocouple	
		N	= Type N Thermocouple	
		R	= Type R Thermocouple	
		S	= Type S Thermocouple	
		T	= Type T Thermocouple	
		P	= Pt100	
		W	= Pt100	
		Z	= Zirconia (HiZ)	
20	Input 2 Range [7] [20]	X	= Not Required	X
		F	= Full Sensor range	
		1	= 0 to 100°C or 32 to 212°F or 273 to 373K	
		2	= 0 to 200°C or 32 to 392°F or 273 to 473K	
		3	= 0 to 400°C or 32 to 752°F or 273 to 673K	
		4	= 0 to 600°C or 32 to 1112°F or 273 to 873K	
		5	= 0 to 800°C or 32 to 1472°F or 273 to 1073K	
		6	= 0 to 1000°C or 32 to 1832°F or 273 to 1273K	
		7	= 0 to 1200°C or 32 to 2192°F or 273 to 1473K	
		8	= 0 to 1300°C or 32 to 2552°F or 273 to 1573K	
		9	= 0 to 1600°C or 32 to 2912°F or 273 to 1873K	
		A	= 0 to 1800°C or 32 to 3272°F or 273 to 2073K	
21	CT Input Range	X	= Not Used	X
		1	= 10A	
		2	= 25A	
		5	= 50A	
		6	= 100A	
		7	= 1000A	

Quick start codes continued on next page

Quick start codes GS-X2, GS-X3 (continued)

				Example
22	Digital Input A Function [22]	X	= Not Used	X
		W	= Alarm Acknowledge	
		M	= Auto/Manual	
		R	= Programmer Run/Hold	
		L	= Keylock	
		K	= Loop Track	
		P	= Local Setpoint Select	
		T	= Programmer Reset	
		U	= Remote Setpoint Select	
		V	= Recipe Select	
23	Digital Input B Function	X	= Not Used	X
		W	= Alarm Acknowledge	
		M	= Auto/Manual	
		R	= Programmer Run/Hold	
		L	= Keylock	
		K	= Loop Track	
		P	= Local Setpoint Select	
		T	= Programmer Reset	
		U	= Remote Setpoint Select	
		V	= Recipe Select	
24	Programmer I/O Configuration [24]	X	= Not Used/Fitted	X
		1	= D1 to D8 Programmer Event Outputs 1 to 8	
		2	= D1 to D4 = Programmer Event Outputs 1 to 4, D5 to D7 = BCD Inputs 1 to 3, D8 = Programmer Run/Hold. BCD Output to Program Number	
		3	= D1 to D4 = Programmer Event outputs 1 to 4, D5 to D8 Programmer Run, Hold, Reset, Advance Respectively	
		4	= D1 to D4 = Programmer Event inputs 1 to 4, D5 to D7 Programmer Run/Hold, Reset, Advance Respectively, D8 Not Used. BCD Output to Program Number	
		5	= D1 to D8 = BCD Inputs 1 to 8. BCD Output to Recipe Recall	
		6	= D1 to D4 = BCD Inputs 1 to 4, D5 - D8 = Not used. BCD Output to Recipe Recall	
		7	= D1 to D4 Programmer Run, Hold, Reset, Advance Respectively, D5 - D8 = Not used	
		8	= D1 to D3 Programmer Run, Hold, Reset Respectively, D4 - D8 = Not Used	
		9	= D1 to D4 = Programmer Event Outputs, D5 to D8 = Not Used	

Quick start codes continued on next page

Quick start codes GS-X2, GS-X3 (continued)

					Example
25	Units	X	=	Use Default (Degrees Celsius)	X
		C	=	Degrees Celsius	
		F	=	Degrees Fahrenheit	
		K	=	Kelvin	
26	Future	XX	=	Future	XX
27	Warranty	XX	=	Standard Warranty	XX
			=	Future - WL005 Extended warranty	
28	Certificate of Conformity	XX	=	None Required	XX
		CERT1	=	Supplied With Certificate of Conformity	
		CERT2	=	Supplied With Certificate of Conformity	

[19] Requires purchase of second input (field 8). either "I8" or "IE".
[20] Requires purchase of second input (field 8),either "I8" or "IE".
[22] Requires purchase of Communications Option (Field 8) with "Digital Input".
[24] Requires purchase of option I/O (field 8). either "I8", "D8", "E4" or "IE".

Example (cont)

16	17	18	19	20	21	22	23	24	25	26	27	28
X	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**XX**	**XX**	**XX**

Further Examples

SX80 Example - to order an equivelent of the SX80 the following Nomenclature is required

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
GS-X1	**CC**	**VH**	**R2**	**D1**	**X**	**XX**	**XX**	**TX**	**XX**	**XX**	**XXX**	**WD**	**XXXXX**	**XXXXXX**

15	**16**	17	18	19	20	21	22	23	24	25	26	27	28
XX	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**XX**	**XX**	**XX**

Resulting in order code:

GS-X1 CC/VH/R2/D1/X/XX/XX/TX/XX/XX/XXX/WD/XXXXX/XXXXXX/XX

SX90 Example - to order an equivelent of the SX90 the following Nomenclature is required

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
GS-X2	**CC**	**VH**	**R2**	**D1**	**D1**	**XX**	**XX**	**D8**	**XX**	**XX**	**XXX**	**WD**	**XXXXX**	**XXXXXX**

15	**16**	17	18	19	20	21	22	23	24	25	26	27	28
XX	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**XX**	**XX**	**XX**

Resulting in order code:

GS-X2 CC/VH/R2/D1/D1/XX/XX/D8/XX/XX/XXX/WD/XXXX/XXXXXX/XX

GS-X1 Example - as SX80 example above but with Modbus RTU (no TX PSU)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
GS-X1	**CC**	**VH**	**R2**	**D1**	**X**	**XX**	**XX**	**C2**	**XX**	**XX**	**XXX**	**WD**	**XXXXX**	**XXXXXX**

15	**16**	17	18	19	20	21	22	23	24	25	26	27	28
XX	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**XX**	**XX**	**XX**

Resulting in order code:

GS-X1 CC/VH/R2/D1/X/XX/XX/C2/XX/XX/XXX/WD/XXXXX/XXXXXX/XX

GS-X2 Example - Communications with BACnet and Modbus TCP

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
GS-X2	**CC**	**VH**	**R2**	**D1**	**D1**	**XX**	**XX**	**CE**	**BS**	**XX**	**XXX**	**WD**	**XXXXX**	**XXXXXX**

15	**16**	17	18	19	20	21	22	23	24	25	26	27	28
XX	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**XX**	**XX**	**XX**

Resulting in order code:

GS-X2 CC/VH/R2/D1/D1/XX/XX/CE/BS/XX/XXX/WD/XXXXX/XXXXXX/XX

How to order example:

GS-X1 CC/VH/R2/D1/X/XX/XX/TX/XX/XX/XXX/WD/XXXXX/XXXXXX/XX
1 off Spirax Sarco Panel Mounted programmable controller to replace SX80

Spare parts and accessories

The controllers contain no user servicable parts.
The following accessories are available.

Accessory order codes

GS-X	GS-Xx Accessories	Example
		GS-X
1	RES2R9 = 2.49 Resistor	USBCONF
	RES250 = 250 Resistor	
	RES500 = 500 Resistor	
	SNUBBER = RC Snubber	
	USBCONF = USB Backup Lead	
	CTR10A = Current Transformer 10A Primary	
	CTR25A = Current Transformer 25A Primary	
	CTR50A = Current Transformer 50A Primary	
	CTR100A = Current Transformer 100A Primary	
	ITOOLS = i Tools configuration software	

Example

	1
GS-X	USBCONF

How to order spares and accessories

Always order accessories by using the nomenclature and description given in the table above.

Example: GS-X USBCONF - 1 off USB Backup Lead - This accessory is for a GS-Xx Controller.