

Highlights

The SIM-100 Harmony Simulation Block is one part of a fully stimulated control simulator available for the Symphony Enterprise Management and Control System. The SIM-100 block along with Simulation LAN and API software, a Harmony bridge controller, and a Conductor human system interface (HSI) combine to create the Harmony stimulated simulation system. This simulation system is a high fidelity training simulator designed for operator and maintenance training, control logic and operator validation, and control logic development and checkout.

The simulator uses the same control logic (i.e., function block configuration) and HSI displays that are implemented in the actual plant control scheme. The use of the actual control logic and HSI displays insures that skills learned on the simulators are fully transferable to the real control system operation.

The SIM-100 block is a gateway between the Simulation LAN and the Harmony bridge controller. It communicates with the controller over Harmony Communications Network (Hnet). It communicates with the simulation management computer over the Simulation LAN (i.e., Ethernet™).

The SIM-100 block can simulate field I/O interfaced through both Harmony I/O blocks and Harmony rack I/O modules. It supports both simulated I/O and real I/O. Real I/O is supported so that hard wired panel I/O can be used during simulations. The SIM-100 block can support I/O configurations containing:

- 64 simulated local rack I/O modules.
- 64 simulated remote rack I/O modules.
- 64 simulated I/O blocks with up to 24 I/O channels each.
- 3,584 I/O points managed in up to 10 I/O groups.

The SIM-100 block is configured by the simulation software over the Simulation LAN when a simulation is started. The block receives information prior to starting a simulation session which tells it the number and types of I/O devices to simulate. The information also includes the simulated I/O device operating status (operating or failed) and the quality (good or bad) of each I/O point. The block sends commands to the controller to request that the state of all controller logic be sent to the SIM-100 block for transfer to the simulation management computer.

The SIM-100 block is both a node on the Simulation LAN and an Hnet device. Figure 1 shows the architecture using simulated I/O.

Property	Characteristic/Value ¹							
Dimensions	Type		Height		Width		Depth	
			mm	in.	mm	in.	mm	in.
	Module		266	10.5	76	3.0	162	6.4
	Base		267	10.5	138	5.4	169	6.7

NOTE:

1. All specification values are maximums unless stated otherwise.
2. Supports one Simulation LAN connection. The RJ-45 port and AUI port are mutually exclusive. An RJ-45 port connection cannot be made if there is already an AUI port connection and vice versa. The SIM-100 module will automatically switch the internal Ethernet circuitry to the AUI port or RJ-45 port depending on where it senses activity.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

Design

Category	Standard	Description
Safety	ANSI/ISA S82.01-1994	Safety standards for process control equipment
	CSA C22.2 No. 142	
	CSA C22.2 No. 1010.1	
	IEC 61010-1	
Environmental	IEC 60068-2-1,2,14	Operating temperature
	IEC 60068-2-3,30	Operating relative humidity
	MIL-STD-810E 502.3 & 501.3	Storage/transportation temperature
	ISA S71.04 (level 1 liquids, solids, gases)	Air quality
	IEC 60068-2-6	Operating vibration (sinusoidal)
	MIL-STD-810E 514.4	Storage/transportation vibration Category 1, basic transportation
Vibration	MIL-STD-810E 514.4	Transportation
	IEC 60068-2-27	Shock
	IEC 61298-3	Endurance
EMI, RFI, and electrical surge	IEC 61000-4-2 (level 3)	ESD
	IEC 61000-4-3 (level 3)	EMI susceptibility
	IEC 61000-4-4 (level 3)	Electrical fast transient
	IEC 61000-4-5 (level 3)	Electrical surges
	IEC 61000-4-6 (level 3)	Conducted immunity
	IEC 61000-4-8 (level 3)	Magnetic fields
	CISPR-11	Radiated emissions
Flammable atmospheres	CSA C22.2 No. 213 ISA S12.12	Nonincendive equipment
	FM Class 3611	Division 2 equipment
Flammability of product components	IEEE 383	Intercabinet cables
	UL rating VW-1	Intracabinet cables
	UL 94 V-0, V-1, or V-2	Flammability of plastic materials
CE mark directives	73/23/EEC	Low voltage directive
	89/336/EEC 92/31/EEC	EMC directive
	90/683/EEC 93/68/EEC 93/465/EEC	CE marking directives

Category	Standard	Description
Certifications	CSA (pending)	Certified for use as process control equipment in an ordinary (nonhazardous) location
	Factory Mutual (FM) (pending)	Approved as nonincendive equipment for use in Class I; Division 2; Groups A, B, C, D; hazardous locations.

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Environmental

Environment	Operating	Storage and Transportation
Air Quality	Noncorrosive	Noncorrosive
Altitude	Sea level to 3,048 m (10,000 ft)	Sea level to 12,000 m (40,000 ft)
Relative humidity (noncondensing)	20% to 95% up to 55°C (131°F) 20% to 45% at 55° to 70°C (131° to 158°F)	20% to 95% up to 55°C (131°F) 20% to 45% at 55° to 70°C (131° to 158°F)
Temperature	0° to 70°C (32° to 158°F) (internal enclosure)	-40° to +85°C (-40° to 185°F)
Vibration	10 to 60 Hz, 1.37 mm (0.054 in.) pp 60 to 150 Hz, 1.0 G sine	0.74 G _{RMS} longitudinal; 0.20 G _{RMS} transverse 1.04 G _{RMS} vertical; 10 to 500 Hz random
Shock	—	15 G, 11 msec

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Nomenclature

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
P	-	H	B	-	S	I	M	1	0	0	0	C	1	0	0	Base, simulation
P	-	H	B	-	S	I	M	1	0	0	1	0	0	0	0	Module, simulation
P	-	H	A	-	M	S	C	S	I	M	B	N	C	0	0	BNC thin coaxial 10Base2 transceiver, plugs into base
P	-	H	A	-	M	C	L	1	1	1	0	0	0	0	0	Harmony stackable mounting column for SIM-100 block
P	-	M	K	-	H	R	M	P	W	R	6	0	0	0	X	Harmony stackable mounting column power cable

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