

MODELS CSTC, CSINI, CSINV - MODULAR CONTROLLER SERIES ANALOG INPUT MODULES



- DEDICATED HIGH DENSITY INPUT MODULES FOR THE MODULAR CONTROLLER SERIES
- MODELS AVAILABLE TO ACCEPT ± 10 V, 0/4-20 mA, AND THERMOCOUPLE INPUTS
- ± 10 V AND 0/4-20 mA INPUT VERSIONS FULLY SCALABLE
- THERMOCOUPLE INPUT VERSION PROVIDES INDEPENDENT TC SELECTION FOR EACH INPUT
- UNUSED INPUTS CAN BE DISABLED TO INCREASE OVERALL READING RATE
- IDEAL FOR DATA-ACQUISITION APPLICATIONS
- AUTO ADDRESSING MINIMIZES CONFIGURATION TIME
- CAN BE USED IN CONJUNCTION WITH ANY CS SERIES MODULES



GENERAL DESCRIPTION

The Model CSTC, CSINI, and CSINV are 16-bit, 8-channel input modules designed for use with the Modular Controller Series. These modules provide a means of high-density signal measurement for data-acquisition applications. The CSTC module accepts a wide range of thermocouple types, while the CSINI and CSINV accept 0/4-20 mA and ± 10 V process signals, respectively.

The modules connect and communicate via a backplane connection to the CSMSTR Modular Controller Series Master. The CSMSTR, equipped with serial ports as well as an Ethernet port, allows the system to share data with PCs, PLCs, and SCADA systems. The Master supports any combination of up to 16 CS series modules, allowing a total of 128 signals to be monitored via a single Master.

Internal power management circuits allow the modules to be replaced while power is applied, which reduces downtime. All configuration information is stored locally within the module, as well as in the Master, so replacement modules do not need to be configured.

The Modular Controller Series' high density packaging and DIN rail mounting saves time and panel space. The backplane connection provides power and communication to the module and snaps easily onto standard top hat (T) profile DIN rail.

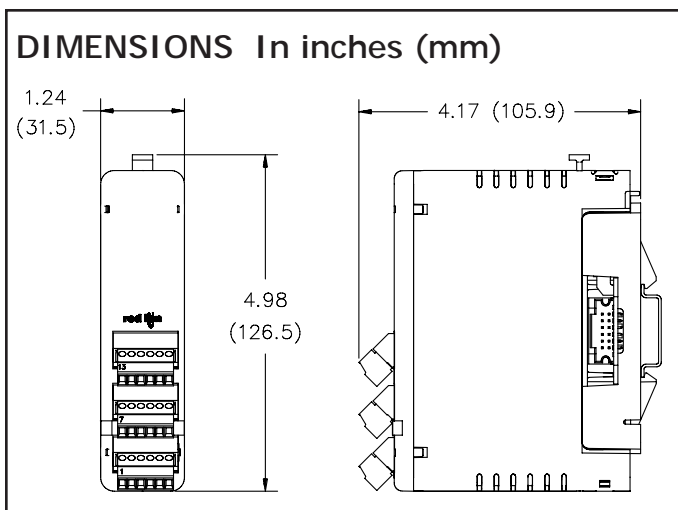
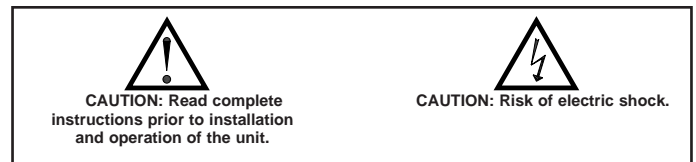
CONFIGURATION

The Modular Controller Series is configured with Windows® compatible Crimson™ software. The software is an easy to use, graphical interface which provides a means of configuration and commissioning of new systems, as well as routine module re-calibration.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use the module to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the module. An independent and redundant temperature limit indicator with alarm outputs is strongly recommended.



GENERAL SPECIFICATIONS

1. **POWER:** Derived from system backplane. (75 mA load on power input of MASTER). Module may be hot-swapped (replaced while powered up).
2. **LEDs:**
 - STS - Status LED shows module condition.
 - ALM - Alarm LED is lit during any internal alarm condition.
3. **MEMORY:** Non-volatile memory retains all programmable parameters. MASTER also stores the parameters in order to reprogram modules that are replaced.
4. **ISOLATION LEVEL:** 500 Vrms @ 50/60 Hz for 1 minute between the Signal Inputs and the CS Master Power Supply Input.
5. **COMMUNICATIONS:** Provided by the CS Master
6. **ENVIRONMENTAL CONDITIONS:**
 - Operating Temperature Range: 0 to +50°C
 - Storage Temperature Range: -40 to +85°C
 - Operating and Storage Humidity: 85% max relative humidity, non-condensing, from 0 to +50°C
 - Altitude: Up to 2000 meters

GENERAL SPECIFICATIONS (CONT'D)

7. CERTIFICATIONS AND COMPLIANCES:

SAFETY

IEC 1010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.

ELECTROMAGNETIC COMPATIBILITY

Emissions and Immunity to EN 61326: Electrical Equipment for Measurement, Control and Laboratory use.

Immunity to Industrial Locations:

Electrostatic discharge	EN 61000-4-2	Criterion A 4 kV contact discharge 8 kV air discharge
Electromagnetic RF fields	EN 61000-4-3	Criterion B ² 10 V/m
Fast transients (burst)	EN 61000-4-4	Criterion A 2 kV power ³ 2 kV signal
Surge	EN 61000-4-5	Criterion A 1 kV L-L, 2 kV L&N-E power ³
RF conducted interference	EN 61000-4-6	Criterion B ² 3 V/rms

Emissions:

Emissions	EN 55011	Class A
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Notes:

1. *Criterion A: Normal operation within specified limits.*
2. *Criterion B: Temporary loss of performance from which the unit self-recovers.*
Self-recoverable loss of performance during EMI disturbance:
Process signals may deviate during EMI disturbance.
For operation without loss of performance:
I/O cables routed in metal conduit connected to earth ground.
OR
Install 1 ferrite core turn (RLC #FCOR0000 or equivalent), to I/O cables at unit.
3. *Power supplied from backplane via Master Module.*
8. **CONSTRUCTION:** Case body is burgundy high impact plastic. Installation Category I, Pollution Degree 2.
9. **CONNECTIONS:** Removable wire clamp screw terminal blocks.
10. **MOUNTING:** Snaps on to standard DIN style top hat (T) profile mounting rails according to EN50022 -35 x 7.5 and -35 x 15.
11. **WEIGHT:** 6 oz (170.1 g)

CSTC8 SPECIFICATIONS

12. INPUTS:

Channels: 8 single-ended

Effective Resolution: Full 16-bit

Sample Time: 50 msec - 400 msec, depending on number of enabled inputs.

ENABLED INPUTS	SCAN TIME (READING RATE)
1	50 msec (20 Hz)
2	100 msec (10 Hz)
3	150 msec (6.7 Hz)
4	200 msec (5 Hz)
5	250 msec (4 Hz)
6	300 msec (3.3 Hz)
7	350 msec (2.9 Hz)
8	400 msec (2.5 Hz)

Common Mode Rejection: >110 dB, 50/60 Hz

Normal Mode Rejection: >90 dB, 50/60 Hz

Temperature Coefficient: 0.01%/°C

Step Response Time: One scan time (to within 99% of final value)

Types: T, E, J, K, R, S, B, N, C

Slope & Offset: Provides sensor error correction

Input Impedance: 20 MΩ

Lead Resistance Effect: 0.25 μV/Ω

Cold Junction Compensation: Less than ±1°C typical (±1.5°C max) over 0 to 50 °C ambient temperature

Resolution: 0.1°

TYPE	MEASUREMENT RANGE	WIRE COLOR	
		ANSI	BS 1843
T	-200 to +400°C -328 to +752°F	(+) Blue (-) Red	(+) White (-) Blue
E	-200 to +730°C -328 to +1346°F	(+) Violet (-) Red	(+) Brown (-) Blue
J	-200 to +760°C -328 to +1400°F	(+) White (-) Red	(+) Yellow (-) Blue
K	-200 to +1250°C -328 to +2282°F	(+) Yellow (-) Red	(+) Brown (-) Blue
R	0 to +1768°C +32 to +3214°F	No Standard	(+) White (-) Blue
S	0 to +1768°C +32 to +3214°F	No Standard	(+) White (-) Blue
B	+149 to +1820°C +300 to +3308°F	No Standard	No Standard
N	-200 to +1300°C -328 to +2372°F	(+) Orange (-) Red	(+) Orange (-) Blue
C W5/W6	0 to +2315°C +32 to +4199°F	No Standard	No Standard

13. **TEMPERATURE INDICATION ACCURACY:** ± (0.3% of span, +1°C). Includes NIST conformity, cold junction effect, A/D conversion errors, temperature coefficient and linearization conformity at 23°C after 20 minute warm up.
14. **PROBE BREAK RESPONSE:** Upscale drive, Input Fault Alarm bit set high, ALM LED illuminates.

CSINI8 SPECIFICATIONS

15. INPUTS:

Channels: 8 single-ended

Ranges: 0-20 mA or 4-20 mA

Effective Resolution: Full 16-bit

Programmable Scaling: ±30,000

Sample Time: 50 msec - 400 msec, depending on number of enabled inputs.

ENABLED INPUTS	SCAN TIME (READING RATE)
1	50 msec (20 Hz)
2	100 msec (10 Hz)
3	150 msec (6.7 Hz)
4	200 msec (5 Hz)
5	250 msec (4 Hz)
6	300 msec (3.3 Hz)
7	350 msec (2.9 Hz)
8	400 msec (2.5 Hz)

Common Mode Rejection: >110 dB, 50/60 Hz

Normal Mode Rejection: >90 dB, 50/60 Hz

Step Response Time: One scan time (to within 99% of final value)

Input Impedance: 10 Ω

Max. Continuous Overload: 100 mA

16. **ACCURACY:** ±0.1% of span
17. **INPUT FAULT RESPONSE:** Upscale Drive, Input Fault Alarm bit set high, ALM LED illuminates below -3 mA, and above 23 mA for 0-20 mA range; below +3 mA and above 23 mA for 4-20 mA signals.

LEDS

STS – STATUS LED

The Status LED is a dual color LED that provides information regarding the state of the module. This includes indication of the various stages of the start-up routine (power-up), as well as any errors that may occur.

Startup Routine

Rapidly Flashing Red	Module is currently running the boot loader and/or being flash upgraded by Crimson. This occurs for four seconds during a power up.
Steady Red	Module switching to configuration.
Green	Module performing normally.

FIRMWARE UPGRADE

The module's firmware is stored in flash memory so that software/hardware conflicts are avoided, and so that software features may be added in the future.

During a download, Crimson compares its own library of firmware files with those stored in the Master module. If they do not match, Crimson will download the necessary files. The Master then checks to make sure that the I/O modules contain the same firmware. If they contain a different revision, the Master will automatically copy those files into the module's flash memory. During this process, the module LEDs will flash rapidly, starting with the top row, and progressing through the remaining rows until the process is complete.

Error States

Solid Red	Module not controlling, and not communicating.
Green/Pulsing Red	Module is controlling properly, but has lost communication with the Master.

ALM – ALARM LED

The Alarm LED indicates the presence of an input fault condition. When one or more Input Fault Alarm bits is high, the LED turns on. The alarms may be disabled for unused inputs.

CONFIGURATION

Programming is done via Crimson, a Windows® compatible configuration interface. Please see the Crimson manual for more information.

ORDERING INFORMATION

TYPE	MODEL NO.	DESCRIPTION	PART NUMBER
Master Module	CSMSTR	Controller Series Master, Comms, Ethernet	CSMSTRSE
Input Modules	CSTC	8 Channel Thermocouple Module	CSTC8000
	CSINI	8 Channel 0(4)-20 mA Input Module	CSINI800
	CSINV	8 Channel ± 10 V Input Module	CSINV800
PID Control Modules	CSPID1	Single Loop Module, Relay Outputs	CSPID1R0
		Single Loop Module, Relay Outputs, Analog Output	CSPID1RA
		Single Loop Module, Relay Outputs, Heater Current Input	CSPID1RM
		Single Loop Module, Solid State Outputs	CSPID1S0
		Single Loop Module, Solid State Outputs, Analog Output	CSPID1SA
		Single Loop Module, Solid State Outputs, Heater Current Input	CSPID1SM
	CSPID2	Dual Loop Module, Relay Outputs	CSPID2R0
		Dual Loop Module, Relay Outputs, Heater Current Input	CSPID2RM
		Dual Loop Module, Solid State Outputs	CSPID2S0
		Dual Loop Module, Solid State Outputs, Heater Current Input	CSPID2SM
		Dual Loop Module, Triac Outputs	CSPID2T0
		Dual Loop Module, Triac Outputs, Heater Current Input	CSPID2TM
Communications Cables (10 feet)	CBL	ALLEN BRADLEY SLC-503 Via DF 1	CBLAB001
		ALLEN BRADLEY PLC-5 Via CHNL 0	CBLAB002
		ALLEN BRADLEY Via DH485	CBLAB003
		GE FANUC 90S Via SNP	CBLGEF01
		GENERIC RS232 TO MALE 9-PIN	CBLGEN01
		GENERIC RS232 BARE WIRES	CBLGEN02
		GENERIC RS422/485 BARE WIRE	CBLGEN03
		MITSUBUSHI FX	CBLMIT01
		MITSUBISHI FX0 & FX0N	CBLMIT02
		MODICON (RS232)	CBLMOD01
		OMRON SYSMAC CP Series RS232	CBLOMR01
		Modular Controller to Paradigm via RS232	CBLPAR01
		Modular Controller to Paradigm via RS485	CBLPAR02
		SIEMENS S7 PPI	CBLSIE01
		SIEMENS MPI W/O ADAPTER	CBLSIE02
		SIEMENS MPI W/ ADAPTER	CBLSIE03
		Programming Cable for CS, G3, & Paradigm Series	CBLPROG0
Software		Crimson Programming Software	SFCRM *
		Crimson Programming Software, Manual, and Download Cable	SFCRK
Accessories		Rail Stops (Qty 2)	RSRSTP00
		Replacement Base	CSBASE00
		Replacement Termination Plug	CSTERM00

* Free at www.modularcontroller.com