JUN 9 2003

City of Massillon, Ohio
Regional Wastewater Treatment
Upgrade 2000
Project No. E9031

Section 01340 Panel Shop Drawings

Drawing Number	Description
DTSI-02040-001	Electrical Legends and Symbols
DTSI-02040-002	Drawing Index
DTSI-02040-003	Drawing Index
DTSI-02040-005	Ethernet and ControlNet Architecture Drawing
DTSI-02040-010	Laboratory Enclosure PLC Slots 1 & 2 Schematic
DTSI-02040-012	Laboratory Enclosure PLC Slots 5 & 6 Schematic
DTSI-02040-013	Laboratory Enclosure PLC Slot 7 Schematic
DTSI-02040-015	Laboratory Enclosure Schematic Diagrams
DTSI-02040-016	Laboratory Enclosure Panel Layout
DTSI-02040-020	T-A1 Node 1 Screen and Grit Panel Layout, BOM & Wiring Schematic
DTSI-02040-021	T-A1 Node 1 Screen and Grit I/O Wiring Diagram Slots 0 & 1
DTSI-02040-022	T-A1 Node 1 Screen and Grit I/O Wiring Diagram Slots 2 & 3
DTSI-02040-023	T-A1 Node 1 Screen and Grit I/O Wiring Diagram Slots 4 & 5
DTSI-02040-025	T-A2 Node 2 Preaeration, Scum, Prim Clarif Coll Panel Layout, BOM, etc.
DTSI-02040-026	T-A2 Node 2 Preaeration, Scum, Prim Clarif Coll I/O Wiring Dia Slots 0 & 1
DTSI-02040-027	T-A2 Node 2 Preaeration, Scum, Prim Clarif Coll I/O Wiring Dia Slots 2 & 3
DTSI-02040-028	T-A2 Node 2 Preaeration, Scum, Prim Clarif Coll I/O Wiring Dia Slots 4 & 5
DTSI-02040-030	T-B,C Node 3 Screw Pumps & Aeration Mixers Panel Layout, BOM, etc.
DTSI-02040-031	T-B,C Node 3 Screw Pumps & Aeration Mixers I/O Wiring Dia Slots 0 & 1
DTSI-02040-035	T-D1A Node 4 Solids Handling Unit 1 Panel Layout, BOM, etc.
DTSI-02040-036	T-D1A Node 4 Solids Handling Unit 1 I/O Wiring Diagram Slots 0 & 1
DTSI-02040-037	T-D1A Node 4 Solids Handling Unit 1 I/O Wiring Diagram Slots 2 & 3
DTSI-02040-038	T-D1A Node 4 Solids Handling Unit 1 I/O Wiring Diagram Slots 4 & 5

Prepared by:
Dublin Technical Systems
6199 Shamrock Ct.
Dublin, OH 43016

City of Massillon, Ohio
Regional Wastewater Treatment
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Section 01340 Panel Shop Drawings

Drawing Number	Description
DTSI-02040-040	T-D1B Node 5 Solids Handling Unit 2 Panel Layout, BOM, etc.
DTSI-02040-041	T-D1B Node 5 Solids Handling Unit 2 I/O Wiring Diagram Slots 0 & 1
DTSI-02040-042	T-D1B Node 5 Solids Handling Unit 2 I/O Wiring Diagram Slots 2 & 3
DTSI-02040-043	T-D1B Node 5 Solids Handling Unit 2 I/O Wiring Diagram Slots 4 & 5
DTSI-02040-044	T-D1B Node 5 Solids Handling Unit 2 I/O Wiring Diagram Slot 6
DTSI-02040-045	T-D2A Node 6 Digester Area Panel Layout, BOM, & Wiring Schematic
DTSI-02040-046	T-D2A Node 6 Digester Area I/O Wiring Diagram Slots 0 & 1
DTSI-02040-047	T-D2A Node 6 Digester Area I/O Wiring Diagram Slots 2 & 3
DTSI-02040-048	T-D2A Node 6 Digester Area I/O Wiring Diagram Slots 4 & 5
DTSI-02040-049	T-D2A Node 6 Digester Area I/O Wiring Diagram Slots 6 & 7
DTSI-02040-050	T-E1, E2 Node 7 Blower Bldg Panel Layout, BOM & Wiring Schematic
DTSI-02040-051	T-E1, E2 Node 7 Blower Bldg I/O Wiring Diagram Slots 0 & 1
DTSI-02040-052	T-E1, E2 Node 7 Blower Bldg I/O Wiring Diagram Slots 2 & 3
DTSI-02040-053	T-E1, E2 Node 7 Blower Bldg I/O Wiring Diagram Slot 4
DTSI-02040-055	T-F1, F2 Node 8 Retention Tanks Panel Layout, BOM & Wiring Sch.
DTSI-02040-056	T-F1, F2 Node 8 Retention Tanks I/O Wiring Diagram Slots 0 & 1
DTSI-02040-057	T-F1, F2 Node 8 Retention Tanks I/O Wiring Diagram Slot 2
DTSI-02040-060	T-A Node 9 Admin. Bldg. Panel Layout, BOM & Wiring Schematic
DTSI-02040-061	T-A Node 9 Admin. Bldg. I/O Wiring Diagram Slots 0 & 1
DTSI-02040-062	T-A Node 9 Admin. Bldg. I/O Wiring Diagram Slot 2

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Section 01340 Panel Shop Drawings

Drawing Number	Description
DTSI-02040-065	T-D2B Node 10 RAS & SEC Clarif Panel Layout, BOM, etc.
DTSI-02040-066	T-D2B Node 10 RAS & SEC Clarif I/O Wiring Diagram Slots 0 & 1
DTSI-02040-067	T-D2B Node 10 RAS & SEC Clarif I/O Wiring Diagram Slots 2 & 3
DTSI-02040-068	T-D2B Node 10 RAS & SEC Clarif I/O Wiring Diagram Slots 4 & 5
DTSI-02040-070	T-D1 Node 11 Tertiary Filter & UV Panel Layout, BOM, etc.
DTSI-02040-071	T-D1 Node 11 Tertiary Filter & UV I/O Wiring Diagram Slots 0 & 1
DTSI-02040-072	T-D1 Node 11 Tertiary Filter & UV I/O Wiring Diagram Slots 2 & 3
DTSI-02040-073	T-D1 Node 11 Tertiary Filter & UV I/O Wiring Diagram Slots 4 & 5
DTSI-02040-200	Retention Bypass Flow Meter M1
DTSI-02040-201	Secondary Clarifier Valve #1
DTSI-02040-202	Secondary Clarifier Valve #2
DTSI-02040-203	Secondary Clarifier Valve #3
DTSI-02040-204	Secondary Clarifier Valve #4
DTSI-02040-205	Secondary Clarifier Valve #5
DTSI-02040-206	Aeration Tank #1 RAS Flow
DTSI-02040-207	Aeration Tank #2 RAS Flow
DTSI-02040-208	Aeration Tank #3 RAS Flow
DTSI-02040-209	WAS to Sludge Blending Flow, M10
DTSI-02040-210	Raw Sludge to Sludge Blending Flow, M11
DTSI-02040-211	Digester Recirculation Flow, M13
DTSI-02040-212	Digester Feed Flow, M12

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Section 01340 Panel Shop Drawings

Drawing Number	Description
DTSI-02040-213	GBT Feed Flow, M14
DTSI-02040-214	BFP Feed Flow, M15
DTSI-02040-215	GBT #1 Discharge Flow, M16
DTSI-02040-216	GBT #2 Discharge Flow, M17
DTSI-02040-220	Retention Basin Effluent, M19 Parshall Flume Level
DTSI-02040-221	Plant Effluent Flow, M20
DTSI-02040-222	Secondary Bypass Flow, M21
DTSI-02040-225	Sidestream / Recycle Flow, M22
DTSI-02040-226	Digester Waste Gas Flow, M23
DTSI-02040-227	Digester Utility Gas Flow, M24
DTSI-02040-230	RAS Pump #1 VFD Speed Control
DTSI-02040-231	RAS Pump #2 VFD Speed Control
DTSI-02040-232	RAS Pump #3 VFD Speed Control
DTSI-02040-233	RAS Pump #4 VFD Speed Control
DTSI-02040-235	Influent Trunk Sewer Level and Flow
DTSI-02040-250	Flow Retention Basin Effluent Flow Level, L2
DTSI-02040-251	Storm Flow Retention Tank Water Level, L3
DTSI-02040-252	Thickened Sludge Wet Well Level, L4
DTSI-02040-253	Sludge Blending Tank #1 Level
DTSI-02040-254	Sludge Blending Tank #2 Level
DTSI-02040-255	Side stream Tank Level, L9
DTSI-02040-256	High River Stage Level, L10

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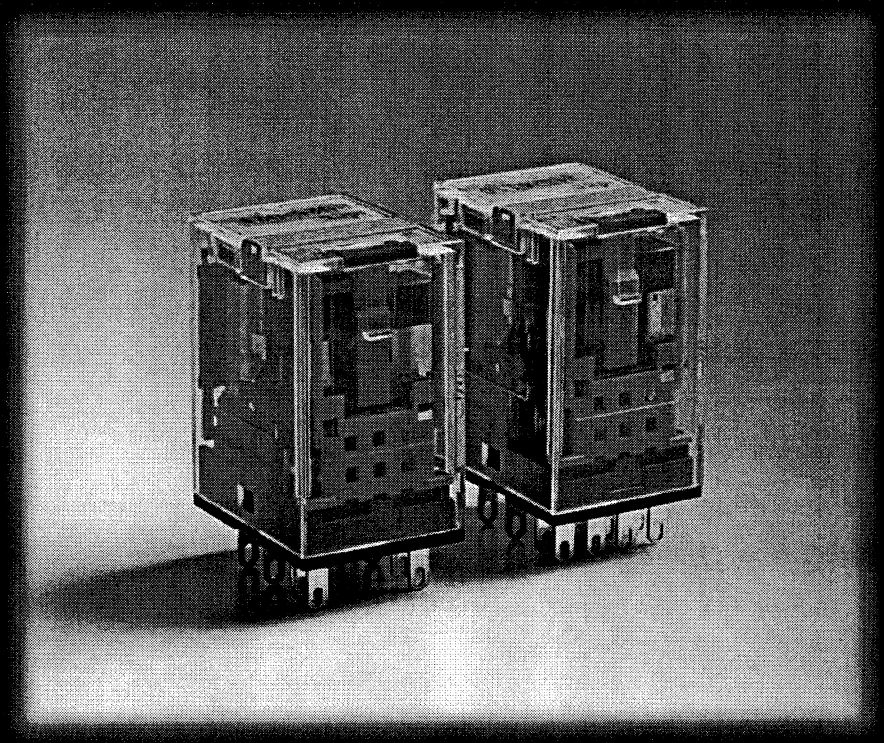
Section 01340 Panel Shop Drawings

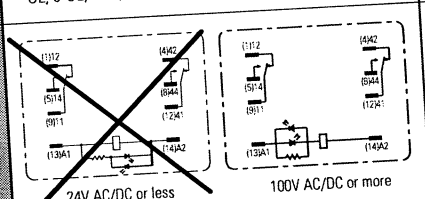
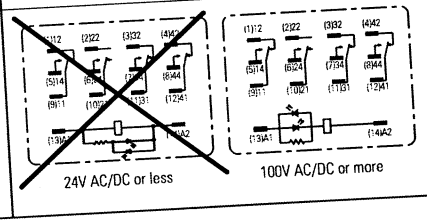
Drawing Number	Description
DTSI-02040-257	Bar Screens #1 & #2 Level Switches
DTSI-02040-258	Bar Screens Level Relay Panel Layout
DTSI-02040-259	RAS Wet Well Level Relay Panel Layout
DTSI-02040-262	Primary Digester Level
DTSI-02040-263	Secondary Digester Level, L6B
DTSI-02040-265	NPW Wet Well Level, L13
DTSI-02040-266	High River Level Switches
DTSI-02040-267	High River Level Panel Layout
DTSI-02040-268	Secondary Digester Level Alarm Panel Layout

RU Relays

There's no comparison

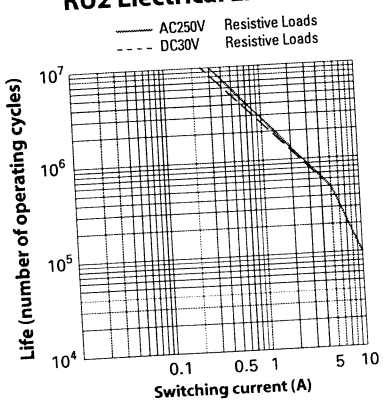


idec

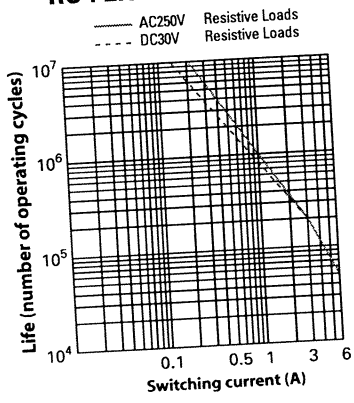
MODEL NO.	RU2	RU4
CONTACT CONFIGURATION	DPDT	4PDT
CONTACT MATERIAL	AgSnOIn (silver tin oxide indium)	AuAg/Ag (gold-silver alloy on silver)
CONTACT RATED LOAD (resistive)	10A/250V AC, ~~10A/30V DC~~	6A/250V AC, ~~6A/30V DC~~
COIL VOLTAGE	~~Z~~4, 110-120, ~~220-240V~~ AC ~~12, 24, 110V DC~~	~~24~~, 110-120, ~~220-240V AC~~ ~~12, 24, 110V DC~~
COIL POWER CONSUMPTION (approx.)	1.1-1.4VA (AC); ~~0.8-1.0W (DC)~~	1.1-1.4VA (AC); ~~0.8-1.0W (DC)~~
COIL MAXIMUM VOLTAGE (of the rated voltage)	AC: 110%, ~~DC: 110%~~	AC: 110%, ~~DC: 110%~~
COIL PICKUP VOLTAGE (of the rated voltage)	AC: 80% maximum, ~~DC: 66% maximum~~	AC: 80% maximum; ~~DC: 66% maximum~~
COIL DROPOUT VOLTAGE (of the rated voltage)	AC: 30% minimum; ~~DC: 10% minimum~~	AC: 30% minimum; ~~DC: 10% minimum~~
CONTACT RESISTANCE (initial value)	50 mΩ maximum	50 mΩ maximum
MINIMUM APPLICABLE LOAD	24VDC, 5mA (reference value)	5VDC, 5mA (reference value)
OPERATE TIME (at rated voltage)	20 msec maximum	20 msec maximum
RELEASE TIME (at rated voltage)	20 msec maximum	20 msec maximum
LIFE MECHANICAL	AC: 20,000,000 operations minimum ~~DC: 30,000,000 operations minimum~~	AC: 20,000,000 operations minimum ~~DC: 30,000,000 operations minimum~~
LIFE ELECTRICAL	See electrical life curve	See electrical life curve
DIELECTRIC STRENGTH Between contact and coil	2,500VAC, 1 minute	2,500VAC, 1 minute
DIELECTRIC STRENGTH Between poles	2,500VAC, 1 minute	2,000VAC, 1 minute
DIELECTRIC STRENGTH Between contacts of the same pole	1,000VAC, 1 minute	1,000VAC, 1 minute
SHOCK RESISTANCE	Operating extremes: 150 m/s^2 (15G) Damage limits: 1,000 m/s^2 (100G)	Operating extremes: 150 m/s^2 (15G) Damage limits: 1,000 m/s^2 (100G)
VIBRATION RESISTANCE	Operating extremes: 10 to 55Hz, Amplitude 1.0 mm p-p Damage limits: 10 to 55Hz, Amplitude 1.0 mm p-p	Operating extremes: 10 to 55Hz, Amplitude 1.0 mm p-p Damage limits: 10 to 55Hz, Amplitude 1.0 mm p-p
DEGREE OF PROTECTION	IP40	IP40
OPERATING TEMPERATURE	-55 to +70°C (no freezing)	-55 to +70°C (no freezing)
APPLICABLE SOCKET (DIN RAIL MOUNT)	SM2S-05	SY4S-05
DIMENSIONS (H x W x D mm)	35.0 x 21.0 x 27.5	35.0 x 21.0 x 27.5
WEIGHT (approx.)	35g	35g
APPROVALS	UL, c-UL, TÜV, CE	UL, c-UL, TÜV, CE
INTERNAL CONNECTION (bottom view)		

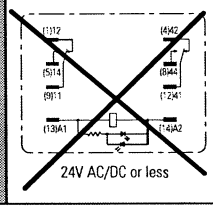
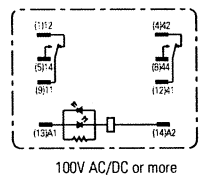
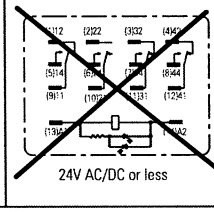
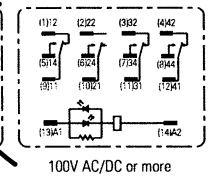
Before operating the manual latching lever, make sure to turn off the power.
Do not use the latching lever as a manual disconnect switch.
Make sure that the manual latching lever is never left at a pulled out position.
Failure to observe this may affect the operation and contact life.

RU2 Electrical Life Curve



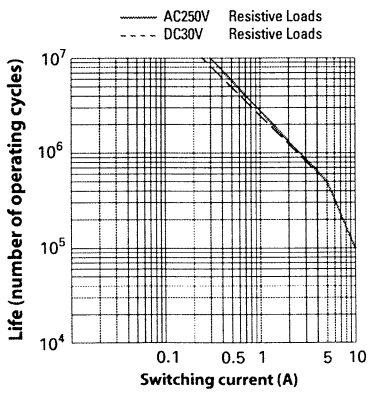
RU4 Electrical Life Curve



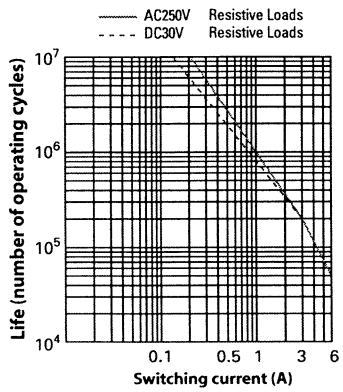
MODEL NO.		RU2	RU4
CONTACT	CONFIGURATION	DPDT	4PDT
	MATERIAL	AgSnOIn (silver tin oxide indium)	AuAg/Ag (gold-silver alloy on silver)
	RATED LOAD (resistive)	10A/250V AC, ~~10A/30V DC~~	6A/250V AC, ~~6A/30V DC~~
COIL	VOLTAGE	~~24~~, 110-120, ~~220-240V~~ AC ~~12, 24, 110V DC~~	~~24~~, 110-120, ~~220-240V AC~~ ~~12, 24, 110V DC~~
	POWER CONSUMPTION (approx.)	1.1-1.4VA (AC); ~~0.9-1.0W (DC)~~	1.1-1.4VA (AC); ~~0.9-1.0W (DC)~~
	MAXIMUM VOLTAGE (of the rated voltage)	AC: 110%, ~~DC: 110%~~	AC: 110%, ~~DC: 110%~~
	PICKUP VOLTAGE (of the rated voltage)	AC: 80% maximum, ~~DC: 80% maximum~~	AC: 80% maximum; ~~DC: 80% maximum~~
	DROPOUT VOLTAGE (of the rated voltage)	AC: 30% minimum; ~~DC: 10% minimum~~	AC: 30% minimum; ~~DC: 10% minimum~~
CONTACT RESISTANCE (initial value)		50 mΩ maximum	50 mΩ maximum
MINIMUM APPLICABLE LOAD		24VDC, 5mA (reference value)	5VDC, 5mA (reference value)
OPERATE TIME (at rated voltage)		20 msec maximum	20 msec maximum
RELEASE TIME (at rated voltage)		20 msec maximum	20 msec maximum
LIFE	MECHANICAL	AC: 20,000,000 operations minimum ~~DC: 30,000,000 operations minimum~~	AC: 20,000,000 operations minimum ~~DC: 30,000,000 operations minimum~~
	ELECTRICAL	See electrical life curve	See electrical life curve
DIELECTRIC STRENGTH	Between contact and coil	2,500VAC, 1 minute	2,500VAC, 1 minute
	Between poles	2,500VAC, 1 minute	2,000VAC, 1 minute
	Between contacts of the same pole	1,000VAC, 1 minute	1,000VAC, 1 minute
SHOCK RESISTANCE		Operating extremes: 150 m/s^2 (15G) Damage limits: 1,000 m/s^2 (100G)	Operating extremes: 150 m/s^2 (15G) Damage limits: 1,000 m/s^2 (100G)
VIBRATION RESISTANCE		Operating extremes: 10 to 55Hz, Amplitude 1.0 mm p-p Damage limits: 10 to 55Hz, Amplitude 1.0 mm p-p	Operating extremes: 10 to 55Hz, Amplitude 1.0 mm p-p Damage limits: 10 to 55Hz, Amplitude 1.0 mm p-p
DEGREE OF PROTECTION		IP40	IP40
OPERATING TEMPERATURE		-55 to +70°C (no freezing)	-55 to +70°C (no freezing)
APPLICABLE SOCKET	(DIN RAIL MOUNT)	SM2S-05	SY4S-05
DIMENSIONS (H x W x D mm)		35.0 x 21.0 x 27.5	35.0 x 21.0 x 27.5
WEIGHT (approx.)		35g	35g
APPROVALS		UL, c-UL, TÜV, CE	UL, c-UL, TÜV, CE
INTERNAL CONNECTION (bottom view)		 24V AC/DC or less  100V AC/DC or more	 24V AC/DC or less  100V AC/DC or more

Before operating the manual latching lever, make sure to turn off the power.
Do not use the latching lever as a manual disconnect switch.
Make sure that the manual latching lever is never left at a pulled out position.
Failure to observe this may affect the operation and contact life.

RU2 Electrical Life Curve



RU4 Electrical Life Curve

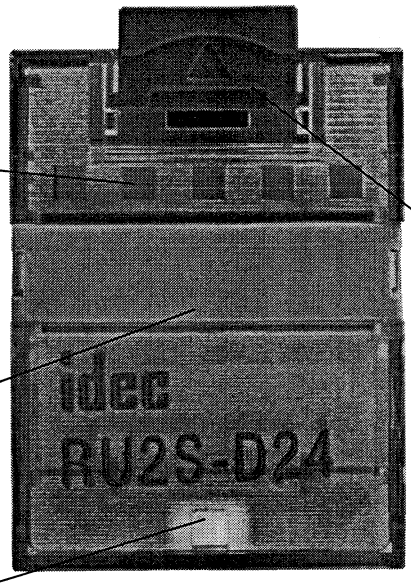


All Standard Features

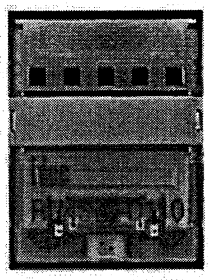
Mechanical flag indicator with five easy-to-see windows for greatest visibilty

Snap-on marking plate for relay identification — easy to write on or replace

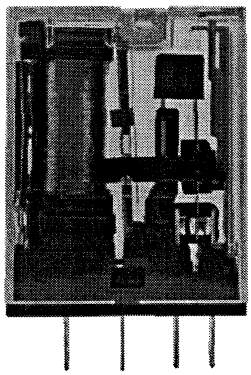
Super bright **non-polarized green LED** for visual verification of voltage applied



Color coded **manual latching levers** for circuit verification — green for DC coil, orange for AC coil



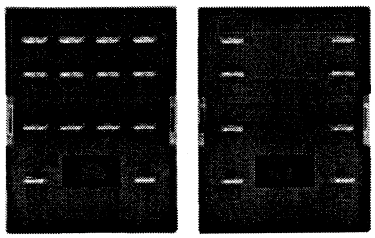
Pictured without manual latching lever



No internal wires
No solder points
No lead

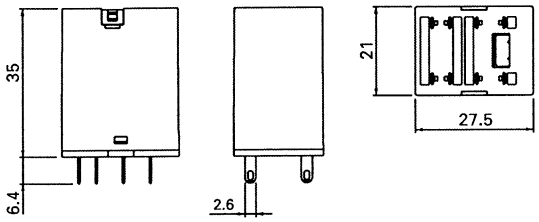
New and improved robotic manufacturing process for precise and reliable construction

Bottom view

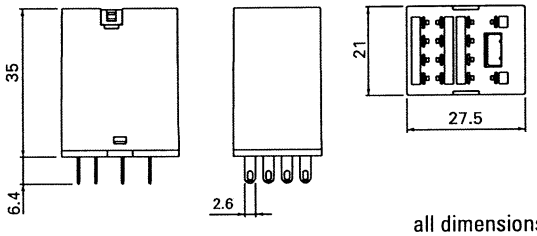


4 pole (RU4) 2 pole (RU2)

RU2 Dimensions



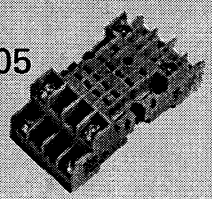
RU4 Dimensions



all dimensions in mm

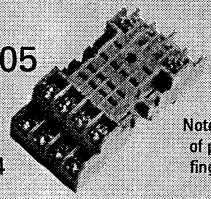
Applicable Sockets

Part No.
SM2S-05



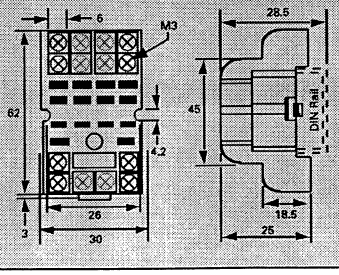
for RU2 relay

Part No.
SY4S-05



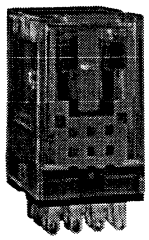
for RU4 relay

Note: Add "C" at end of part number for fingersafe version (SM2S-05C) (SY4S-05C)



There's no comparison!

The RU Relay has all the features you need with all the quality you expect from IDEC. See how other relays measure up.



	Non-polarized LED	Solder-free construction	No internal wires	Mechanical flag indicator	Manual latching lever	Snap-on marking plate
IDEC RU	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**	**Standard**
AB 700-HC	Optional	No	No	No	No	No
Aromat HC	Optional	No	No	No	No	No
Finder 55	Optional	No	No	Yes	Yes	No
Omron MY	Optional	No	No	No	No	No
P&B/TYCO KHAU	Optional	No	No	No	No	No
P&B/TYCO PT	Optional	Yes	Yes	Yes	Yes	Yes
Releco/Turck C9	Optional	No	No	Yes	Yes	Yes
Square D 8501-RS	Optional	No	No	No	No	No

ORDERING INFORMATION

RU **S** –

Part No. — Options — Coil Voltage Code

2 = DPDT
4 = 4PDT

(Blank) = Standard (Latching lever & Indicator light
~~C = No Latching Lever~~
~~D = Standard + Diode (24V DC only)~~

~~D12 = 12V DC~~
~~D24 = 24V DC~~
~~D110 = 110V DC~~
~~A24 = 24V AC~~
A110 = 110-120V AC
~~A220 = 220-240V AC~~

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Catalog No. EP937-1 06/02 20K

IDEC CORPORATION
1175 Elko Drive
Sunnyvale, CA 94089-2209, USA
Tel (408) 747-0550
Toll Free (800) 262-IDEC
Fax (408) 744-9055
Fax (800) 635-6246
E-mail: opencontact@idec.com
www.idec.com

IDEC CANADA LIMITED
Unit 22-151 Brunel Road
Mississauga, Ontario, L4Z 1X3, Canada
Tel (905) 890-8561
Toll Free (888) 317-4332
Fax (905) 890-8562

IDEC AUSTRALIA PTY. LTD.
2/3 Macro Court
Rowville, Victoria 3178, Australia
Toll Free 1-800-68-4332
Fax +61-3-9763-3255
E-mail: sales@au.idec.com

IDEC IZUMI CORPORATION
7-31, Nishi-Miyahara
1-Chome, Yodogawa-ku
Osaka 532-8550, Japan
Tel +81-6-6398-2571
Fax +81-6-6392-9731
www.izumi.com

IDEC EUROPEAN HEADQUARTERS
Unit 2 Beechwood
Chineham Business Park
Basingstoke
Hampshire RG24 8WA, United Kingdom
Tel +44-1256-321000
Fax +44-1256-327755
E-mail: idec@uk.idec.com

IDEC ELEKTROTECHNIK GmbH
Wendenstraße 331
D-20537 Hamburg, Germany
Tel +49-40-251191
Fax +49-40-2543361
E-mail: service@idec.de

IDEC IZUMI (H.K.) CO., LTD.
Room No.1409, Tower 1 Silvercord
30 Canton Road, Tsimshatsui
Kowloon, Hong Kong
Tel +852-2-376-2823
Fax +852-2-376-0790

IDEC IZUMI ASIA PTE. LTD.
No. 31, Tannery Lane #05-01
Dragon Land Building,
Singapore 347788
Tel +65-6746-1155
Fax +65-6844-5995

IDEC TAIWAN CORPORATION
8F-1, No.79, Hsin Tai Wu Road, Sec. 1
Hsi-Chih, Taipei County, Taiwan, (ROC)
Tel +886-2-2698-3929
Fax +886-2-2698-3931
E-mail: idectpe@idectwn.hinet.net

MOORE INDUSTRIES

ECA-DIN

Current and Voltage Alarms

February 2001

Data Sheet 9.01

Affordable Alarm Trip

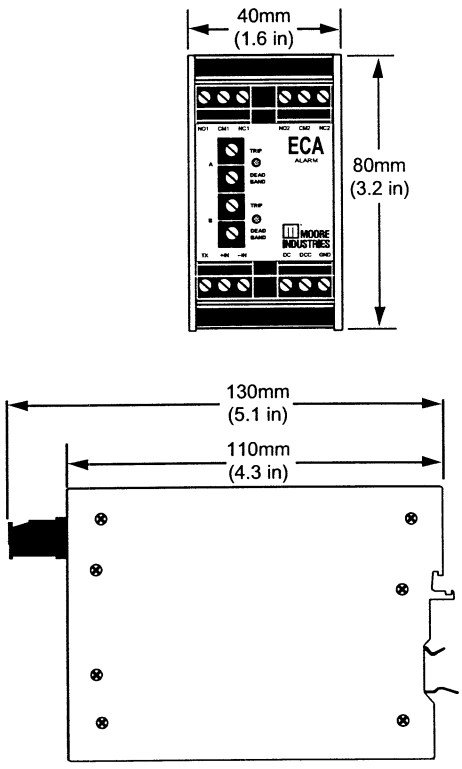
The ECA DIN-style Alarm features a solid metal housing that stands up to the continual rigors of process control and factory automation applications.

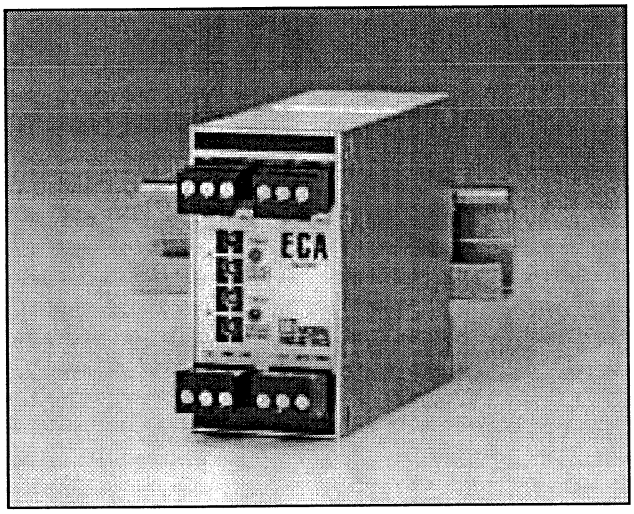
Rugged and reliable, the 4-wire (line-powered) ECA is the low-cost solution when alarm trip outputs are needed to indicate high or low process conditions.

Available models accept current and voltage input from field transmitters, transducers, and other process instruments. When the input falls outside of a pre-set limit (user configurable), the ECA provides contact closure outputs ideal for indicating a high and/or low condition via a bell, buzzer, light or other annunciating device.

Configurable Dual Alarms—The ECA is offered in a wide variety of dual alarm models. Choose any combination of high or low, failsafe or non-failsafe alarms, and the ECA will be factory-set for you. Internal jumpers allow for changes after it arrives at your plant.

Figure 1. *ECA-DIN dimensions.*



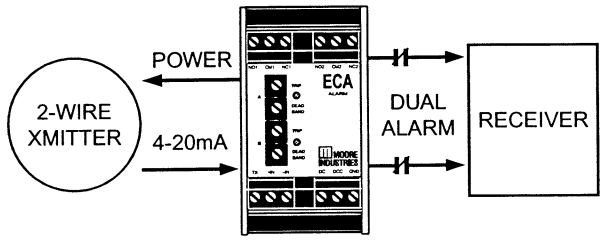


Compact durable aluminum housing *snaps quickly and securely onto standard G-type and Top Hat rails.*

Features

- **Independently configurable dual alarms.** Individually field-configure the ECA's dual alarms to low/low, high/high, low/high, or high/low output, and failsafe or non-failsafe trip operation.
- **Wide range of input options.** Available models accept common ac and dc input types.
- **RFI/EMI Protection.** The ECA provides an effective barrier against the unpredictable, harmful effects of radio frequency and electromagnetic interference.
- **Fully-adjustable trip point.** A potentiometer on the front panel will allow quick selection of trip point values from 0-110% of input span.
- **LED provides alarm indication.** The ECA's LED clearly indicates when the alarm trip changes from normal mode to alarm mode.

Figure 2. *The ECA comes equipped with two alarm outputs, and will power a transmitter using the –TX option.*



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ECA-DIN

Current and Voltage Alarms

Specifications

Performance

Repeatability: Trip point repeats within ±0.1% of full scale
Stability: Trip point within ±0.2% of span per year
Burden: 4-20mA is 1V, max; ~~0-5A is 0.01V, max~~
Power Consumption: 1.5W, typical; ~~2.5W, typical with –TX option; 3.5W max, with –TX option~~
Deadband: 1-20% of span standard (see -AD options for other deadband ranges)
Alarm Response: 50 msec for a step change of 10-90% beyond trip point(s)

Performance (Continued)

Line Voltage Effect: 0.005% per 10% line change
Isolation: 1500Vrms between input, output and power
Maximum Input Overrange: 200% of full scale for DC Current input; ~~150% of full scale for DC Voltage and AC Current inputs~~

Ambient Conditions

Operating Range: -20°C to +70°C (-4°F to +158°F)
Relative Humidity: 0-95%, non-condensing
Ambient Effect: ±0.007% of span/°C, typical; ±0.015% of span/°C, max

Ambient Conditions (Continued)

RFI/EMI Protection: Trip point not to be affected by more than 0.1% of span at 10V/m, 20-1000MHz

Adjustments

Trip Points: Multiturn front panel potentiometers adjust trip point from 0-110% of input span
Deadband: Multiturn front panel potentiometers adjust from 1-20% or 1-100% of full scale, depending on the option selected

Indicators

Front panel LED(s) is ON when relay is energized

Weight

454 grams (1lb.)

Ordering Information

Unit	Input	Output	Power	Options	Housing
ECA 4-Wire Current and Voltage Alarm	**4-20mA** into 50Ω ~~**1-5V** into 1MΩ~~ ~~**0-5AAC** into 0.002Ω~~	Alarm Configuration (High or Low and Failsafe or Non-Failsafe are configurable via internal jumpers): **DH1L1** Dual, High/Low, Failsafe ~~**DH2L2** Dual, High/Low, Non-Failsafe~~ ~~**DH1H1** Dual, High/High, Failsafe~~ ~~**DH2H2** Dual, High/High, Non-Failsafe~~ ~~**DL1L1** Dual, Low/Low, Failsafe~~ ~~**DL2L2** Dual, Low/Low, Non-Failsafe~~ ~~**DL1H1** Dual, Low/High, Failsafe~~ ~~**DL2H2** Dual, High/High, Non-Failsafe~~ (SPDT relays rated 5A @ 250Vac non-inductive or 30Vdc) **NOTE:** Failsafe is energized in the normal condition and de-energized either upon alarm or power loss to the unit. Combinations of Failsafe and Non-Failsafe for dual alarms are also possible by following the same method of designation.	~~**24DC**, ±10%~~ **117AC**, 50/60Hz, ±10% ~~**230AC**, 50/60Hz, ±10%~~ (117AC and 230AC are jumper selectable) 1.5 Watts, typical; ~~2.5 Watts, typical with –TX option; 3.5 Watts, max with –TX option~~	**–AD** Adjustable deadband 1-20% of full scale ~~**–AD100** Adjustable deadband 1-100% of full scale~~ ~~**–EM** Externally mounted input transformer for current input (available with 0-5AAC input type only)~~ ~~**–TX** 24V transmitter excitation for powering a 2 wire transmitter (DC input types only)~~	**DIN** Aluminum, DIN-style housing mounts on both 32mm G-type (EN50035) and 35mm Top Hat (EN50022) rail

When ordering, specify: Unit / Input / Output / Power / Options [Housing]
Model number example: ECA / 4-20MA / DH1L1 / 117AC / –AD100 [DIN]

MOORE INDUSTRIES — *The Interface Solution Experts* • **www.miinet.com**

United States • info@miinet.com
Tel: (818) 894-7111 • FAX: (818) 891-2816

Belgium • info@mooreind.be
Tel: 03/448.10.18 • FAX: 03/440.17.97

China • sales@mooreind.com.cn
Tel: 86-21-68406724 • FAX: 86-21-50623585

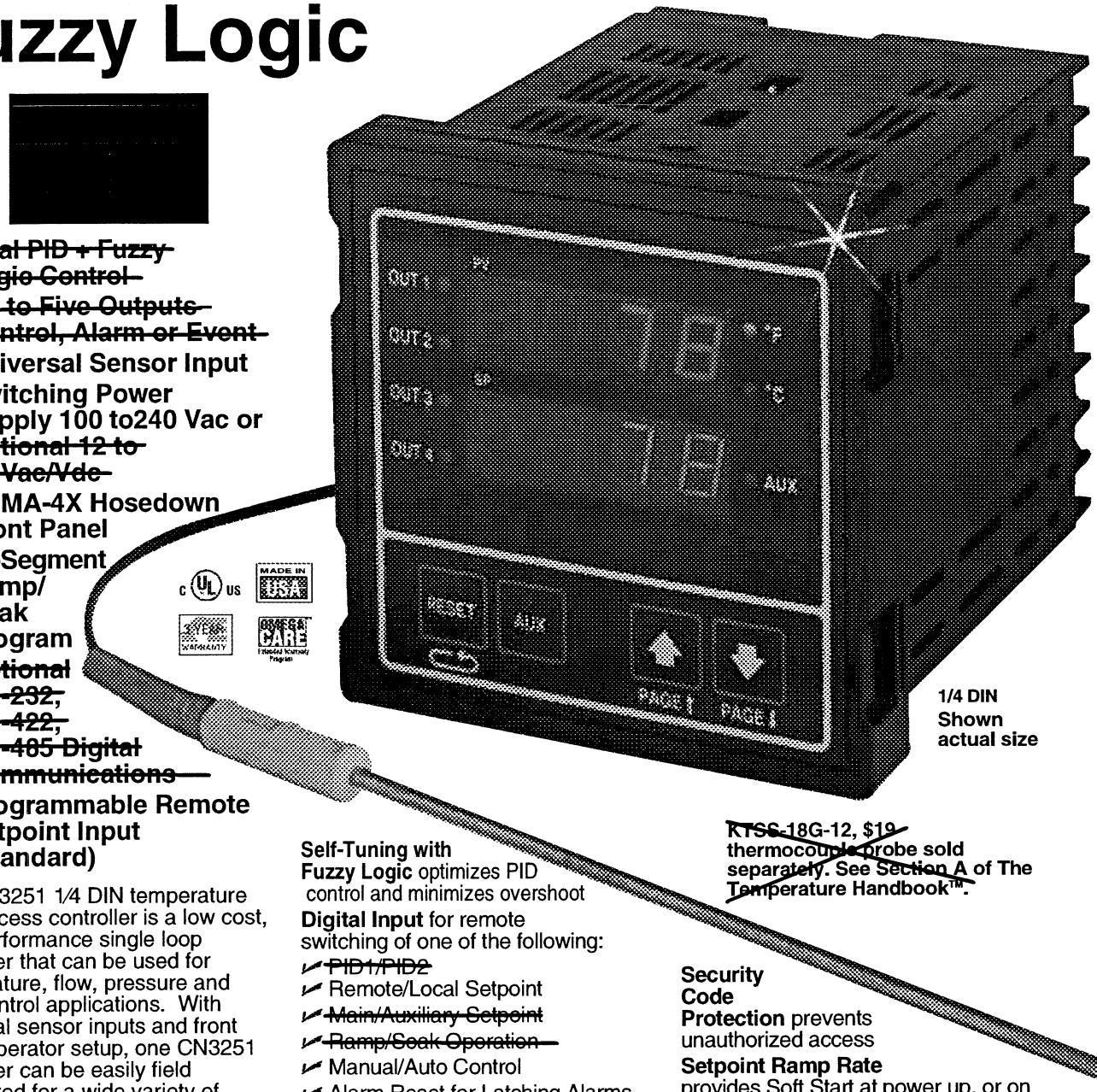
Australia • sales@mooreind.com.au
Tel: (02) 8536-7200 • FAX: (02) 9525-7296

The Netherlands • sales@mooreind.nl
Tel: (0)344-617971 • FAX: (0)344-615920

United Kingdom • sales@mooreind.com
Tel: 01293 514488 • FAX: 01293 536852

Specifications subject to change without notice. Printed in U.S.A.

Ramp/Soak Temperature/ Process Controller with Fuzzy Logic



1/4 DIN
Shown actual size

- ~~Dual PID + Fuzzy Logic Control~~
- ~~Up to Five Outputs Control, Alarm or Event~~
- **Universal Sensor Input**
- **Switching Power Supply 100 to240 Vac or ~~Optional 12 to 24 Vac/Vdc~~**
- **NEMA-4X Hosedown Front Panel**
- **16-Segment Ramp/ Soak Program**
- **~~Optional RS-232, RS-422, RS-485 Digital Communications~~**
- **Programmable Remote Setpoint Input (Standard)**

~~KTSS-18G-12, $19 thermocouple probe sold separately. See Section A of The Temperature Handbook™.~~

The CN3251 1/4 DIN temperature and process controller is a low cost, high performance single loop controller that can be used for temperature, flow, pressure and level control applications. With universal sensor inputs and front panel operator setup, one CN3251 controller can be easily field configured for a wide variety of applications, and simply reconfigured as application needs change. This makes it an exceptional choice for applications requiring multiple control needs, manufacturing facilities, testing facilities and testing applications.

FEATURES

Five (5) Possible Outputs for Single Output or Heat/Cool Control, plus up to three Alarm or Event Outputs

Universal Sensor Input accepts thermocouple, RTD or analog signals, 24 Vdc output for loop power

Self-Tuning with Fuzzy Logic optimizes PID control and minimizes overshoot

Digital Input for remote switching of one of the following:

- ~~PID1/PID2~~
- Remote/Local Setpoint
- ~~Main/Auxiliary Setpoint~~
- ~~Ramp/Soak Operation~~
- Manual/Auto Control
- Alarm Reset for Latching Alarms

16-Interval Ramp/Soak Program with guaranteed soak, event outputs and looping

- **Optional Programmable Analog**
- **Programmable Remote Setpoint Input (Standard on All Products)**

AUX Pushbutton and LED for front panel switching of:

- ~~PID1/PID2~~
- Remote/Local Setpoint
- ~~Main/Auxiliary Setpoint~~
- ~~Ramp/Soak Operation~~
- Manual/Auto Control

Security Code Protection prevents unauthorized access

Setpoint Ramp Rate provides Soft Start at power up, or on setpoint changes, to prevent uneven heating and overshoot.

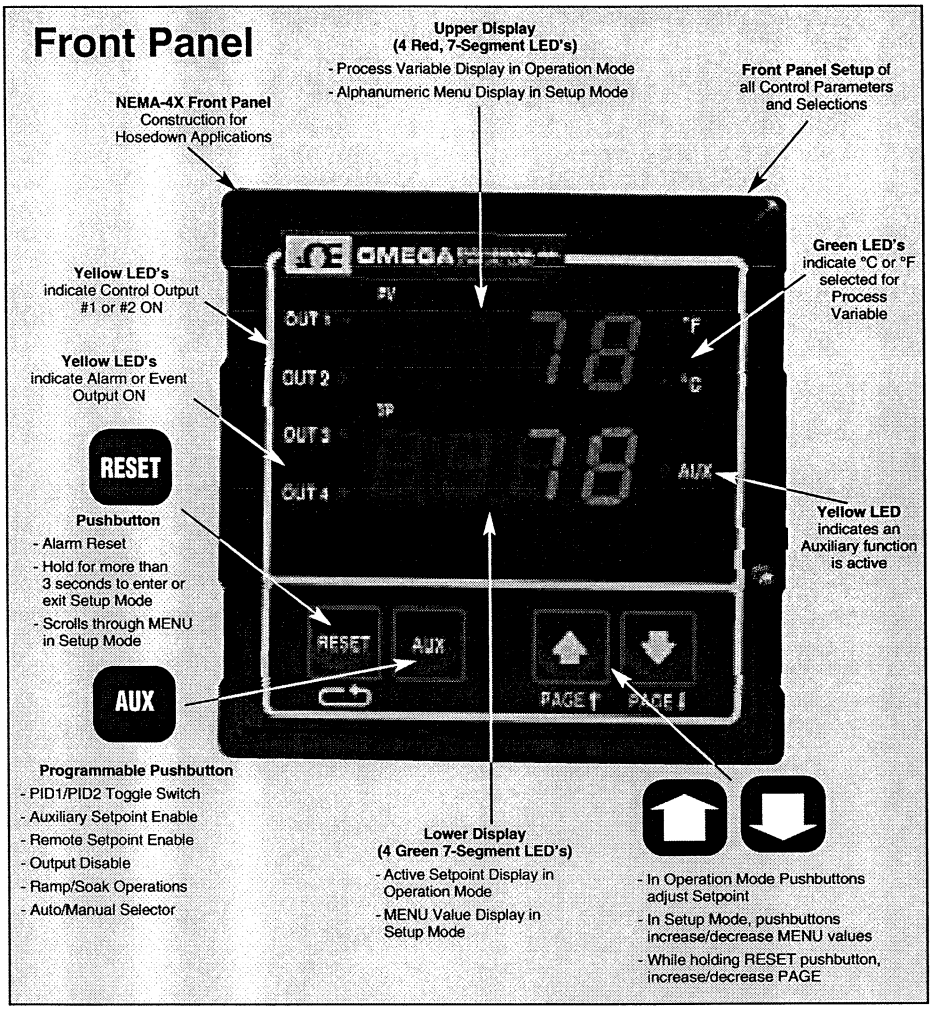
Control Loop Protection provides process protection from:

- Open Sensor
- Shorted Sensor
- Sensor Reversed
- Control Output Open or Shorted
- Power Control Device Open or Shorted
- Load Power Missing and Self-Diagnostics

Operating Ambient up to 166°C (150°F)

SPECIFICATIONS

Control Modes:
Automatic: On/Off, Proportional, PID, PI, PD, PID + Fuzzy Logic, Heat/Cool (Dual PID)
Control Adjustments:
Control Setpoint: Sensor Range
Setpoint Limits: Sensor Range
Deadband: 1 to 100°F
Proportional Band: Sensor Range
Manual Reset: –99.9 to 99.9
Automatic Reset: 0.00 to 99.99 repeats per minute
Rate: 0 to 500 seconds
Output Cycle Time: 0.1 to 60.0 seconds
Output Limit: 0.0 to 100.0%
Open Sensor/Out of Range Output Command: 0.0 to 100.0%
Display Offset: –100 to 100°F
~~**Heat/Cool Adjustments:**~~
Output Offsets: 0 to 100% of Proportional Band
Cooling Medium: Air, Water or Oil
Alarm Adjustments:
Setpoints: High and Low Settings for each Alarm Output
Alarm Types: Absolute: High, Low and High/Low, Tracking: +Deviation, –Deviation, and ±Deviation
Relay Action: Latching or Non-Latching, Energized or De-Energized
Alarm Deadband: Adjustable, 0 to 100°F
Alarm Inhibit: On Power-Up, Enabled or Disabled
Control/Alarm Outputs:
Total of five (5) Control/Alarm outputs possible
Relay: Form A contacts, 1.0 Amps at 120/230 Vac (resistive load)
Solid State Relay Drive:
24 Vdc nominal at 40 mA
Triac: 1 Amp continuous, 10 Amp in-rush, at 120 or 230 Vac
Current/Voltage: ~~4-20 mA into 0 to 800 Ω,~~ field changeable to 1-5 Vdc
~~**Output #5 (Optional):**~~
Relay: N.O. Form C contact, 5 A at 120 ~~or 2.5 Amp 230 Vac~~
Sensor Input: Field selectable Thermocouple, RTD, Current or Voltage
Input Update Rate:
2 Samples per Second
Ramp/Soak Programming:
Intervals: 16
Loops: 1 loop, 0-255 times or continuous
Event Outputs: Up to 3
Guaranteed Soak Differential:
Off, 1°F to sensor span
Time Units: Secs., Mins., Hours (1 sec. to 99.99 hours/segment)
Ramp to Setpoint:
1 to 9999°/hour on power-up
Open Sensor & Out-of-Range Condition:
Programmable control action with display indicating condition "OPEN SENS"
Remote Setpoint Input:
Input Signal: ~~4-20 mA, 250 Ω Input Impedance,~~ 1-5 Vdc, 110 KΩ Input Impedance, Voltage or Current Field Selectable via switch



Range: Programmable over selected Sensor Span
Accuracy: ±0.3% of Sensor Span (initial accuracy) at 24°C (75°F) ambient temperature and rated line voltage, field calibrate to ±0.2% of Sensor Span
Digital Input: Accepts dry-contact closure
Analog Output Option:
Assignable Functions:
Process Variable, Output #1 Command, Active Setpoint, Output #2 Command
Output Signal: 4-20 mA into 0-800 Ω load, ~~1-5 Vdc into 100 KΩ or greater load~~
Selectable via DIP switch
Range: Programmable over selected sensor span for retransmission of Process Variable and Active Setpoint, fixed to 0 to 100% for transmission of output commands
Accuracy: ±0.2% of programmed span, ±1 LSD
~~**Digital Communications (optional):**~~
~~**RS-232:** Single drop, isolated~~
~~**RS-422/485:** Multi drop, isolated, field selectable by switch~~
~~**Baud Rates:**~~
~~1200, 2400, 4800, 9600, 19.2 K~~
~~**Protocols:** ASCII Line, Computer Interface~~
Instrument Power:
100 to 240 Vac, +10%, –15%;
12 to 24 Vac/Vdc, ±10%; 50 to 60 Hz

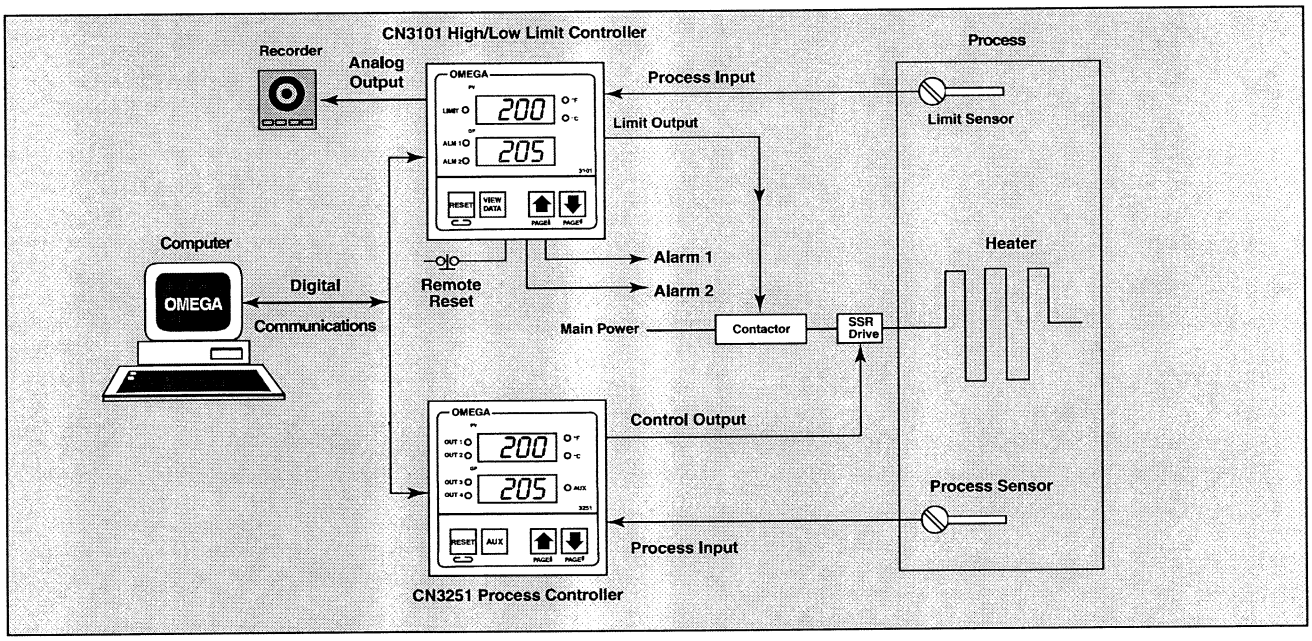
Operating Environment:
0 to 65°C (32 to 150°F) ambient temperature, relative humidity <95%, non-condensing
Dimensions:
Overall: 96H x 96W x 121 mm D (3.78 x 3.78 x 4.75")
Depth Behind Panel: 102 mm (4.00")
Front Panel Projection: 19 mm (0.75")
Panel Cutout: 92 x 92 mm (3.6 x 3.6")
Weight: 454 g. (1 lb)
Case Material:
High Impact, Black ABS Plastic
Front Panel: NEMA-4X Construction
Influence of Line Voltage Variation:
±0.1% of sensor span/10% change in nominal line voltage
Noise Rejection:
Common Mode Noise: 140 dB at 60 Hz
Series Mode Noise: ±0.1% of Sensor Span with 300 mV peak to peak, 50 or 60 Hz series mode noise
RFI: Typically less than 0.5% of sensor span at a distance of 1 meter (3.1 ft) from transmitter (4 W, 464 MHz)

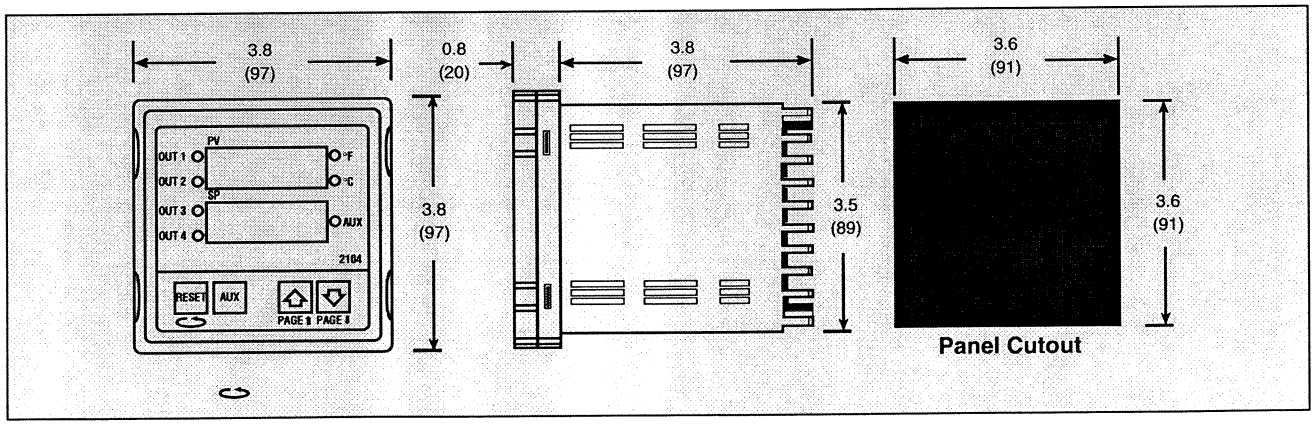
For Additional Controllers and Indicators, See Section M

Input Types and Ranges

Input Type	Range	Accuracy @ 77°F/25°C ambient (all ±% of sensor span)
J Iron Constantan	-73 to 760°C -100 to 1400°F	0.2%
K CHROMEGA® ALOMEGA®	-184 to 1316°C -300 to 2400°F	0.2%
T Copper Constantan	-212 to 399°C -350 to 750°F	0.4% for PV <-80°C 0.2% for PV >-80°C
E CHROMEGA® Constantan	-73 to 593°C -100 to 1100°F	0.2%
R Pt-13%Rh/Pt	-18 to 1760°C 0 to 3200°F	0.4%
S Pt-10%Rh/Pt	-18 to 1760°C 0 to 3200°F	0.4%
B Pt-30%Rh/ Pt-6%Rh	10 to 1816°C 50 to 3300°F	0.4% for PV >538°C
RTD Pt, 385 100 ohm	-128 to 538°C -200 to 1000°F -73.3 to 482.2°C -99.9 to 899.9°F	0.2%
4 to 20 mA	Scalable (-500 to 5000)	0.2%
~~0 to 5 Vdc~~	~~Scalable (-500 to 5000)~~	~~0.2%~~
1 to 5 Vdc	Scalable (-500 to 5000)	0.2%

Companion Limit Controller:
CN3101 Series available in section P of The Temperature Handbook™. Accepts thermocouple, RTD and process signals, see CN3101 specifications for details.





~~OMEGACARE™ extended warranty program is available for models shown on this page. Ask your sales representative for full details when placing an order.~~

~~**Ordering Example:**~~
~~**CN3251-R-A-92-PV**, ramp and soak controller with a relay/dc Pulse heat output, alarm/event relay, RS-232 digital communications and recorder output,~~
~~$410 + 45 + 125 = $580.~~
~~**OGW-1 OMEGACARE™** extends standard 3-year warranty to a total of 4 years ($62),~~
~~$580 + 58 = $638.~~
~~**CN3251-FR-A-S2-PV**, ramp and soak controller with a 4 to 20 mA heat output, relay cool output, alarm/event relay, RS-232 digital communications and recorder output,~~
~~$410 + 40 + 45 + 125 = $620.~~
~~**OGW-1 OMEGACARE™** extends standard 3-year warranty to a total of 4 years ($62),~~

Single Output Options (No Additional Charge)

Output Suffix	Output #1 Type
~~-R~~	~~Relay/dc Pulse*~~
~~-T~~	~~ac SSR~~
-F	4 to 20 mA**

**field selectable*
*** field selectable for 1 to 5 Vdc*

Dual Output Options (Field Installable)

Order Suffix	Add'l. Cost	Description Output #1	Output #2
-RR	$ 40	Relay	Relay
-TT	40	ac SSR	ac SSR
-FF	40	4 to 20 mA*	4 to 20 mA*
-DD	40	dc Pulse	dc pulse
-FR	40	4 to 20 mA*	Relay
-FT	40	4 to 20 mA*	ac SSR
-DR	40	dc pulse	Relay
-DT	40	dc pulse	ac SSR

**Field selectable for 1 to 5 Vdc*

Options

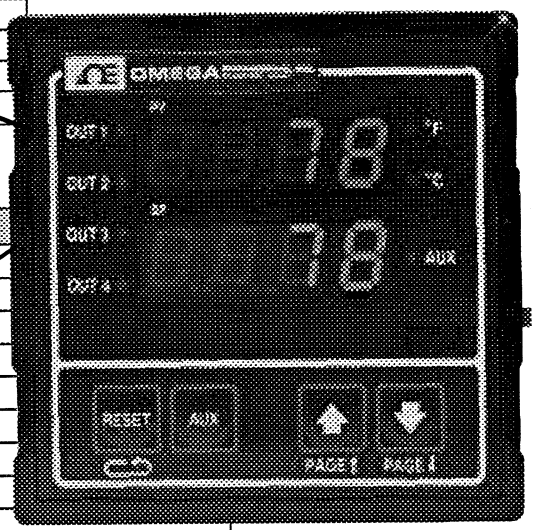
Ordering Code	Price	Description
-TPS	$80	24 Vdc Transmitter Isolated output 65 mA ††
-LV*	55	12 to 24 Vdc/Vac power
-A*	45	Dual alarm/event relays (shared common terminal)
-S2†	100	RS-232 digital communications, with one alarm/event relay
-S4†	100	RS-422/485 digital communications, with one alarm/event relay
-PV†	80	Recorder output, 4 to 20 mA/1 to 5 Vdc
-S2-PV†	125	RS-232 digital communications, one alarm/event relay and recorder output
-S4-PV†	125	RS-422/485 digital communications, one alarm/event relay and recorder output

**These options can be ordered with any model number.*
† Only one of these options can be ordered at a time.
†† Cannot be ordered with "A" option

Accessories

Model No.	Price	Description
3250X-R	$ 45	Relay/dc pulse output module
3250X-T	45	ac SSR output module
3250X-FF*	85	4 to 20 mA/4 to 20 mA output module
3250X-RR	85	Relay/Relay output module
3250X-TT	85	ac SSR/ac SSR output module
3250X-DD	85	dc Pulse/dc pulse output module
3250X-FR*	85	4 to 20 mA/Relay output module
3250X-FT*	85	4 to 20 mA/ac SSR output module
3250X-DR	85	dc Pulse/Relay output module
3250X-DT	85	dc Pulse/ac SSR output module
3250X-S2	100	RS-232 digital communications board
3250X-S4	100	RS-485/422 digital communications board
3250X-CASE-COMM**	60	Housing for CN3251's with digital communications
3250X-CASE	60	Housing for CN3251's without digital communications
3250X-SBKT	40	Side mounting bracket
CN3200-SOFT	320	Software for communications option
CNQUENCHARC	8	Noise suppression kit, 110 to 230 Vac

**Field selectable for 1 to 5 Vdc. ** Special controller case required when adding -S2 or -S4 to controllers.*



Model CN3251

For Additional Controllers and Indicators, See Sections M & P of The Temperature Handbook™.

SUBMITTAL STAMP PAGE

MASSILLON WASTEWATER TREATMENT PLANT UPGRADE 2000

CITY OF MASSILLON, OHIO

KOKOSING CONSTRUCTION COMPANY, INC

PO BOX 226 FREDERICKTOWN, OHIO 43019-0226

CTI ENVIRONMENTAL, INC

100 LINCOLN WAY EAST, SUITE 280, MASSILLON, OHIO 44646

DATE OF SUBMITTAL	6/12/03
SUBMITTAL NUMBER	00414
SPECIFICATION SECTION	13320
SPECIFICATION TITLE	Monitoring System
DRAWING REFERENCE NO.	N/A
Checked By	

This submittal has been checked per specification section 01340, section 1.3, paragraph A. Approval is for general arrangement only and does not release the supplier and/or subcontractor from responsibility for quantities, dimensions, performance or any other requirements of the contract documents.

☐ No Exception ☐ Revise And Resubmit

☐ Exceptions As Noted ☐ Rejected

Corrections or comments made on shop drawings during this review do not relieve the contractor from compliance with requirements of the drawings and specifications. This check is only for review of the general conformance with the design concept of the project and general compliance with the information given in the contract documents. Nothing herein authorizes additional cost. The contractor is responsible for the following: confirming and correlating all quantities and dimensions; selecting fabrication process and techniques of construction; coordinating his or her work with that of all other trades; and performing all work in a safe and satisfactory manner.

CTI ENVIRONMENTAL, INC.

By RWR

Date 6/25/03

CTI ENVIRONMENTAL, INC.
ENGINEERS IN WATER AND EARTH SCIENCES

LETTER OF TRANSMITTAL

100 Lincoln Wat East
Massillon, Ohio 44646

PHONE: (330) 834-9960
FAX: (330) 834-9961

Date: June 26, 2003	Account No.: E02008-2-2
Attention: Mr. Todd Schurig	
Regarding: Massillon, Ohio	
Wastewater Treatment Plant Upgrade 2000	

TO: Kokosing Construction Company, Inc.
2765 Indian River Road, SW
Massillon, Ohio 44646

WE ARE SENDING YOU:
☒ ATTACHED ☐ UNDER SEPARATE COVER VIA _____
☐ REPORT(S) ☐ DRAWINGS ☐ CONTRACTS ☒ SHOP DRAWINGS
☐ SPECIFICATIONS ☐ COPY OF LETTER ☐ CHANGE ORDER ☐ FORMS ☒ AS NOTED

COPIES	DESCRIPTION
~~5~~ 4	Monitoring System; Section 13320 (Submittal # 414)

THESE ARE TRANSMITTED:
☐ FOR YOUR APPROVAL
☐ AS REQUESTED
☐ FOR YOUR INFORMATION
☐ SIGN, DATE, RETURN
☐ SIGN, DATE, FORWARD
☐ FOR REVIEW, COMMENT
☒ FOR YOUR USE
☒ NO EXCEPTIONS
☐ EXCEPTIONS AS NOTED
☐ REVISE AND RESUBMIT
☐ REJECTED

REMARKS:

COPY TO: Massillon WWTP Manager
Massillon Construction Superintendent
CTI Field
CTI Office

SIGNED: Josh J. Bauer, RPR

IF ENCLOSURES ARE NOT AS NOTED, PLEASE NOTIFY US AT ONCE!