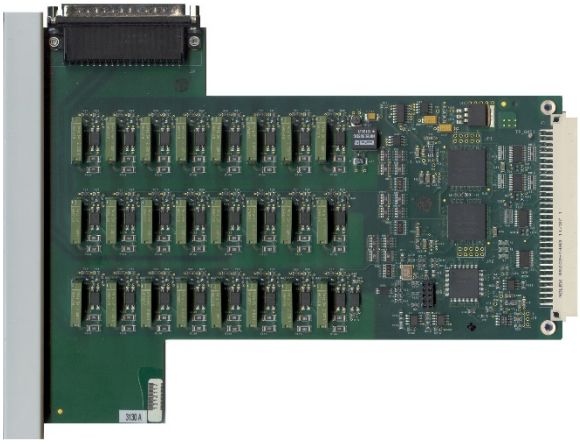
12 Channel SIL-3 Relay Output Card

3130/3131/3133

PRODUCT HIGHLIGHTS

- **Safety/ Critical Control Applications**
- **Configurable Redundancy**

  Single, Dual, Triple
- **Source or Sink up to 2 Amps per channel**
- **Redundant PLDs with voted Outputs**
- **Advanced Diagnostics**



3130 12-Channel Relay Output

PRODUCT OVERVIEW

Compliant to the following standards: IEC61508:2010, IEC61511:2003, IEC61131-2, IEC61131-6, NFPA72, EN-54, NFPA85, ABS

Applications: The 12 Channel Relay Output Card is well suited for use in safety and critical control applications, power industry, process control and rotating machinery.

Benefits: Configurable redundancy reduces costs as the redundant outputs are configured to the availability, integrity and system cost requirements. The flexible architectures allow redundant outputs to be on the same card or different cards. These cards may be placed in the same chassis or in different chassis.

Redundant PLDs (Programmable Logic Devices) with voted outputs. Extensive output voting increases safety integrity and could reduce cost. For example, RTP's dual redundant 2oo2D output configuration has the same safety integrity as the traditional triple redundant outputs. This is due to a number of reasons. The outputs are voted in the Chassis Processor before the command is transmitted to the output module. Then, the command is sent to the output module twice and compared by 2 PLDs. Finally, each channel has two relays in series that must be driven by each respective PLD in order for the output to be energized. Therefore, each output is the result of several votes and results in the same integrity as the triplicated output of a traditional TMR system.

Advanced Diagnostics. Diagnostics are performed extensively on all backplane communications to ensure the validity of commands, slot addressing, card ID and data. The data path is checked for a stuck at zero or stuck at one condition by performing an exclusive-or operation on 2 subsequent data transfers, the first being normal and second inverted. If a backplane error is detected, an error bit is set and the outputs are not transferred. Two safety status registers display the actual states of the two relays that control each channel's output. The programmable watchdog timer disables the outputs if processor communications is lost.

RTP is the Best Technology for Your Investment,
Here's why:
The 3000 TAS is a multi-processor architecture that delivers exceptional Performance and Comprehensive Diagnostics. The results speak for themselves: A reaction time of 12 msec, true 1 msec SOE (Analog and Digital), an MBTF of greater than 50000 years an MTTFS of greater than 60000 years, and a PFDavg of $5x10^{-5}$. ***Compare these numbers to any other system.***
Built-in proof test diagnostics means it will never be necessary to shut down at the proof test interval. Unlimited online downloads of logic and configuration changes do not require a periodic shut down like other systems. ***Compare this functionality to any other system.***
NetSuite Software: One-time price includes unlimited use of Logic Development, Alarm Manager, Data Archive and Historian and HMI without hardware or software keys. ***Compare this functionality and price to all other systems.***
Finally, a Safety Instrumented System (SIS) should always take the process it protects to a safe state when it is required to do so, and it should never interfere with the operation of the process at the time. ***The 3000 TAS does this better than any other system.***

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Architecture:
The 3130 Relay Output Card is rated at 24 VDC, the 3131 for 120 VAC and the 3133 for 240 VAC. Each Relay Output Card is SIL-3 rated in singleton and redundant configurations.

Each Relay output card channel consists of two relays with normally open contacts connected in series. No single fault can result in an output being stuck in the closed position. Opto-couplers measure the condition of each relay and provide feedback to status registers, which report the position of each relay contact to the operating program for fault detection. This readback of the relays is valid when the channel output is connected to a load and a power source. The on board hardware watchdog timer will de-energize outputs to a safe state.

Field upgradeable. Enhancements to all of the I/O cards may be accomplished quickly and easily in the field. PLD (Programmable Logic Device) upgrades are done as a simple file download and re-start. Field upgrades are provided at no cost, the same as RTP software updates.

Online repair**.** Never stop the process. Replace and/or re-configure the relay output card without shutting off the power. The relay output card is hot swappable. In a redundant system, just use NetArrays to disable the card to be replaced, remove the cable and card. Install the replacement card, attach the cable and re-enable it in NetArrays. If adding a new output card, install it into the chassis, wire it, make the change in NetArrays and download the new file online. This allows existing logic and I/O to continue processing undisturbed while the new I/O card and logic is initialized.

Easy to diagnose. Diagnostics also detect the presence of the field termination cable. If the cable connection is insecure or removed, it will result in the card being placed offline and an error message being displayed in the device status window. The corresponding error bit is set in the integer error detection word.

RTP has established a widely known reputation of manufacturing robust, quality systems that meet the latest and most stringent standards. The 3130, 3131 and 3133 cards are no exception. High-performance, high-availability and high-integrity are all achieved in the extremely flexible design architecture. RTP is not your traditional system. RTP is the Technologically Advanced System.

Specifications:

3130/ 3131/ 3133 Relay Output Card **Electrical:**	
Safety level	SIL 3
Channels	12 channels
Maximum voltage 3130: 3131: 3133:	 30 VDC 125 VAC 250 VAC
Contact form:	Form A (Normally Open)
Contact arrangement:	12 sets of redundant contacts
Contact resistance	200 milliohms max.
Open Circuit (Relay off) Voltage 3130: 3131: 3133	 30 VDC 125 VAC 240 VAC
Minimum load:	10 milliamperes, additive for redundant applications.
Maximum load:	2 amperes per channel.
Leakage Current Relay off	3 milliamperes Max, additive for redundant applications.
Bounce:	3 milliseconds max.
Total relay on delay	22 millisecond max.
Total relay off delay	22 millisecond max.
Relay on to valid readback	35 milliseconds max.
Relay off to valid readback	35 milliseconds max.
Maximum relay cycle speed	1,800 Operations per Hour at full electrical load 18,000 operations per hour, Mechanical.
Relay Driver test	Duration < 1 milli-seconds.
Isolation from RTP system	500 V AC/DC

Channel to Channel Isolation 3130/ 3131: 3133:	 200 V AC/DC 320 V AC/DC
Power requirement:	
Backplane power	850 mA @ 5vdc supplied by the RTP backplane
Environmental Specification:	
Temperature Range:	Operating: -20°C to +60°C; Storage: –25°C to +85°C
Humidity Range:	10-95% Relative Humidity, non-condensing
Cooling Requirements:	Forced air cooling not required at altitudes below 10,000 feet
Termination Modules 3130:	
	3099/12-101 Single sinking configuration with diodes
	3099/12-001 Triple redundant sinking configuration with diodes
	3099/12-100 Single sourcing configuration with diodes
	3099/12-000 Triple redundant sourcing configuration with diodes
Termination Modules 3131/ 3133:	
	3099/13-101 Single sinking configuration with snubbers
	3099/13-001 Triple redundant sinking configuration with snubbers
	3099/13-100 Single sourcing configuration with snubbers
	3099/13-000 Triple redundant sourcing configuration with snubbers