

Industrial Modbus I/O Modules

- Modbus I/O Modules Introduction & Features
- Digital Input / Output Modules
- Analog Input / Output Modules



Modbus I/O Modules The Best Choice For Your SCADA Applications

-Introduction



SUNIX ioSCADA SM series is a series of industrial Modbus I/O. It supports standard Modbus (RTU & ASCII) protocol. Type of SUNIX ioSCADA modules include Digital Input, Digital Output, Analog Input, Analog Output and Counter/Frequency Input meet with most industrial automation applications. SUNIX ioSCADA series are different to traditional I/O modules used in laboratory, SUNIX ioSCADA offers great performance in Electric Power Plant, Steel Manufacturer and Petrochemical Plant, which are harsh environment and require high immunity against noise, more efficient, real-time response, long MTBF (Mean Time Between Failure), high reliability and excellent measure precision. SUNIX ioSCADA are ideal for DCS, PLC and SCADA system applications.SUNIX ioSCADA within convenience DIP Switch for setting RS-485 ID address and Serial parameters , no need to configure by any utility software. The modules are also embedded with RS-485 terminator. The RS-485 network support 4,000 feet without network repeater.

The compact design enables DIN Rail installation. The slide-in cover design that helps user to keep track of the I/O structure. SUNIX ioSCADA SM series not only for Data Acquisition but also include special control function such as I-to-O, ON/OFF Latch, Max./Min. Lock, ON/OFF Delay Timer, TCP Control and Ramp Control in order to coordinate with SCADA system.

The ioSCADA modules work as independent controller while offering the data collection and control functions. Hence making them perfect choice for SCADA & DCS applications at the industrial grade environments.



-Applications

Features

- Support Dual Watchdog Hardware & Communication
- Support Standard Modbus RTU & Modbus ASCII Protocol
- High Noise Immunity with meeting Class A , IEC61000-4-4 EFT Level 3 and IEC61000-4-2 ESD Level 3
- Provide easy Windows® Configuration Utility
- Built-in 3-way Isolation Protection
- RS-485 Terminal Resister
- Convenience DIP Switch for setting RS-485 ID addresses and parameters
- Nonvolatile Reprogrammable Memory
- User friendly LED display for immediate signal status
- Reset to default factory settings via DIP switch
- Accurate and reliable data acquisition
- Remote Inputs and Output modules
- Analog, Digital and Counter channels

SUNIX Tech Forum

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Bridging I/O Signals Over RS-485

The ioSCADA series makes possible to control remote digital and analog devices over RS-485 interface. All ioSCADA product line I/O modules provide a RS-485 interface with the possibility to set the protocol type (Modbus ASCII or RTU). RS-485 is the most popular wiring standard for many industries. The device address (from 1 to 63) and the baud rate (115200 bps). The whole series is protected against isolation and voltage; a built in watch dog circuit ensures continuity of operation even in case of strong electrical noise.

Configuration Independence

Each input signal can be independently configured with the option of various modes for both Digital and Analog signals. It helps to obtain accurate data acquisition that suits to desired application.

Windows Based Management Utility

The utility developed to monitor and configure ioSCADA's I/O signals remotely. It automatically detects the installed ioSCADA units within the network. You can select the unit to manage the input and output devices.



Watchdog for Communication Safety

The ioSCADA devices are equipped with a built-in watchdog timer that monitors the Modbus communication status. If communication between the remote I/O device and host PC or PLC is interrupted for a defined period of time, the communication watchdog will activate safe status to reset all output channels to user-defined settings. The watchdog ensures the safety of field devices operations when communication is a problem.

ioSCADA modules are also come with hardware watchdog to protect the system from collapse in case of hardware failure.

SCADA Software Compatibility

ioSCADA series is based on standard Modbus protocol, which makes ioSCADA compatible with most SCADA software, such as LabView, Wonderware, Citect, and Intellution.

• Panel / DIN Rail mounting options - a full-length design and a horizontal type



• Writable, Flip & Slide-out back panel.



Communication Interface

- Serial Interface : RS-485 (Data+, Data-, COM)
- Protocol : Modbus-RTU/ASCII
- Baud Rate : 1200, 2400, 4800, 9600, 19.2k, 38.4k, 57.6k, or 115.2k bps (Default 115.2k bps)
- Parity : none,
- Data Bits: 8
- Stop Bits : 1
- Module Addressing : 1 to 63, selectable. (Default address 1)
- Network Distance : 4000 feet without network repeater





Protection

- Hardware and Communication Watchdog Timer
- Network Isolation Voltage : 3000 Vrms
- Over Voltage Protection : 70 Vdc/Vp-p

Supported Modbus Commands

- Read Coil (Output) Status
- Read Input Status
- Read Input Registers (MAX 48 WORDS/MSG RTU, 24 WORDS/MSG ASCII)
- Read Holding Registers (MAX 48 WORDS/MSG RTU, 24 WORDS/MSG ASCII)
- Force Single Coil (Output)
- Preset Single Register (Output)
- Force Multiple Coils (Output)
- Preset Multiple Registers (MAX 48 WORDS/MSG RTU, 24 WORDS/MSG ASCII)
- Report Slave ID
- Command Exception support
- Broadcast Command support
- Loop back Command



−3-Way Isolation Protection

Provide RS-485 Isolation : 3000 Vrms



Field Side to Logic Side Isolation

Provide Field Side to Logic Side isolation: 3000 Vrms





Chanel-to-channel Isolation RTD LED 200uA module Sense 0+ ø Sense 0-ERPROM COM0 Embedded ADC Controller Photo-Isolation Sense 7+ Data+ Data-RS-485 Sense 7-6 —® RS-485 VCC Interfac COM7 5V • + V 200uA Power +Vs-GND-38 Regnlator • - V

Environment

- Operating temperature : -30 to 75 °C
- Storage temperature : -45 to 85 °C
- Relative humidity : 5 to 90%, non-condensing

Electromagnetic Compatibility

CE Compliant

- Electrical Fast Transient Immunity (EFT) IEC61000-4-4 Level 3 (power, signal lines)
- Electrostatic Discharge (ESD) Immunity IEC61000-4-2 Level 3 (8KV/4KV air/direct discharge)
- Surge Immunity IEC61000-4-5 (0.5KV)

	EFT Level		
	Level	IO Signal	
	1	0.25 kv	
	2	0.5 kv	
Class A 🕨	3	1 kv	
Class B 🕨	4	2 kv	

The different between ioSCADA and Traditional I/O





SUNIX ioSCADA Signal Data Processing Types



DI: Debounce, Invert, On latch, Off latch, ON delay, Off delay, Pulse, One Shot, Counter (300 Hz)

DO: Fail safe, Debounce, Pulse output, ON delay, Off delay, One Shot, TPC





AI: Smoothing, Maximum, Minimum, High / Low alarm, Over/Under range, Over / Under flow, Break

AO: Fail safe, Ramp Control (10H), Output Clamp



Intelligent i2o Control Logic



O The Total Solutions for Industrial Networking & Communication



□ ioSCADA Common specification:

Communication Interface		
Protocol	Modbus-RTU/ASCII protocol, RS-485 (3-Wire)	
Baud Rate	1200,2400, 4800, 9600, 19.2k, 38.4k, 57.6k, or 115.2k baud.	
Module Addressing	1 to 63, selectable. Default address 1	
Network Distance	4000 feet without network repeater	
MAX Nodes	Nodes Supports up to 63 modules without the use of a network repeater	
FRAME	Data Bits 8 Parity none, Stop Bits 1	
Watchdog	Communication Failure	
Network Isolation Voltage	3000 Vrms	
Over Voltage Protection	70 Vdc/Vp-p	
Suppo	rted Modbus Commands	
Function Code	Description	
1	Read Coil (Output) Status (0x)	
2	Read Input Status (1x)	
4	Read Input Registers (3x)	
3	Read Holding Registers (4x)	
5	Force Single Coil (Output) (0x)	
6	Preset Single Register (4x)	
8	Loopback Command	
15	Force Multiple Coils (Outputs) (0x)	
16	Preset Multiple Registers (4x)	
17	Report Slave ID	
	Command Exception support	
	Broadcast Command support	
	Isolation Voltage	
RS-485 Isolation	3000 Vrms	
Field Side to Logic Side isolation voltage	3000/ 5000 Vrms (Analog/Digital)	
Channel-to-channel Isolation	YES	
	Environment	
Operating temperature	-30 to 75 °C (-20 to 60 °C for SM_CNT_102)	
Storage temperature	-45 to 85 °C	
Relative humidity	5 to 90%, noncondensing	
Electromagnetic Compatibility		
Electrical Fast Transient Immunity (EFT)	IEC61000-4-4 Level 3(power, signal lines)	
Electrostatic Discharge (ESD) Immunity	IEC61000-4-2 Level 3/2 (8KV/4KV air/direct discharge)	
Surge Immunity	IEC61000-4-5 (0.5KV COMM.).	

□Digital Input / Output Modules

Model		SM_DI_116P
Product		
Description		16 Channels 24VDC Digital Input Module
Channels		16 sourcing input
Input Resistance		4.7K ohms, typical
Input Signal Voltage Rang	e	0 to 35 V DC, maximum
Input Current		5.1 mA, typical at 24V DC.
Digital logic levels :	OFF state	< 4 VDC
	ON state	>10 VDC Input
Input Response Time		1 ms max
Maximum reverse voltage		35 VDC
Maximum Input current		10 mA
Fast Mode count feature		300 Hz
Isolation (Field Side to Logic Side)		5K Vrms
Common ground		1 for 16 Channels
Watch Dog		Hardware
Power Requirements		10 to 30 Vdc
Wiring		I/O Cable 16 to 24
	Digita	al Input Function Block
On Delay timer		0 to 65535 s , 1s resolution
Off Delay timer		0 to 65535 s , 1s resolution
Input Debounce		0 to 65535 ms, 5ms resolution
Input Invert		YES
Pulse Generator		Duration- 0 to 65535 s , 1s resolution
Pulse Counter		300Hz
ON/OFF Latch		YES
Simulation		YES
Input Toggle		YES
Timer Accuracy		1%



_Relay Output Modules

Model	SM_DO_116
Product	
Description	16 Channels Power Relay Output Module
Output Channels	16
Relay Type	Form A, Normal Open
Contact Rating	5A @250VAC 5A @30VDC
Max. output current per channel	2A
Max. output current (entire module)	8A
Common Ground	1 for 16 Channels
Minimum OFF resistance	1000 Meg Ohm @500 Vdc
Minimum On resistance	30m Ohm @6 Vdc 1A
Output Response Time	10ms , MAX, measured from receipt of force coil command to gate transition of the output MOSFET.
Min. Life	1A 1*10^5 ops.
Line Voltage	Max 30Vdc, Max 250Vac
Life Mechanical	2*10 ^ 7 ops
Watch Dog	Hardware & Communication
Power Requirements	10 to 30 Vdc
Digital	Output Function Block
Output Sequence ON timer	0 to 65535 s , 1s resolution
Output Sequence Off timer	0 to 65535 s ,1s resolution
Output Invert	YES
Pulse Output	0 to 65535 s ,1 s resolution
TPC Output	0 to 100 (%),
Duty cycle	1 to 3000 (0.1 to 300s)
Atuo/Man bumpless	YES
Fail Safe (Comm. Watch Dog)	0 to 65535 s
Power on output	YES
I to O	No
Timer Accuracy	1%

□ Digital Input / Output Modules

Model		SM_DIO_116P
Product		
Description		16 Channels 24VDC Digital Input / Output module
Input Channels		8 sourcing input
Output Channels		8 sourcing outputs
Input Resistance		4.7K ohms, typical
Input Signal Voltage Rang	e	0 to 35 V DC, maximum
Input Current		5.1 mA, typical at 24V DC.
Digital logic levels :	OFF state	< 4 VDC
	ON state	>10 VDC Input
Input Response Time		1 ms max
Maximum reverse voltage		35 VDC
Maximum Input current		10 mA
Fast Mode count feature		300 Hz
Isolation (Field Side to Logic Side)		5K Vrms
Input Common ground		1 for 8 Channels
Output On Resistance		0.28 ohms maximum
Continuous output curren	t	500 mA max
Supply voltage Range		10 to 35V DC, maximum
Output Response Time :	Force Coil	Output updates within 10 ms (max) of receipt of a command
Output protection		Fuse (4A)
Output Common Ground		1 for 8 Channels
Maximum lamp load		5W @24Vdc
Maximum inductive load		0.2 H (3 Amp load at 24 VDC)
Max. OFF state leakage current		100 nA
Typical ON voltage (@ 1 Amp)		1V
Output Protection against inductive loads		YES
Output Principle of Operation		Non-latching
Watch Dog		Hardware & Communication
Power Requirements		10 to 30 Vdc
Wiring		I/O Cable 16 to 24 AWG

More... (see the next page)



Digital Input Function Block		
On Delay timer	0 to 65535 s , 1s resolution	
Off Delay timer	0 to 65535 s , 1s resolution	
Input Debounce	0 to 65535 ms, 5ms resolution	
Input Invert	YES	
Pulse Generator	Duration- 0 to 65535 s , 1s resolution	
Pulse Counter	300Hz	
ON/OFF Latch	YES	
Simulation	YES	
Input Toggle	YES	
Timer Accuracy	1%	
Digital Output Function Block		
Output Sequence ON timer 0 to 65535 s , 1s resolution		
Output Sequence Off timer	0 to 65535 s ,1s resolution	
Output Invert	YES	
Pulse Output	0 to 65535 s ,1 s resolution	
TPC Output	0 to 100 (%),	
Duty cycle	1 to 3000 (0.1 to 300s)	
Atuo/Man bumpless	YES	
Fail Safe (Comm. Watch Dog)	0 to 65535 s	
Power on output	YES	
I to O	YES	
Timer Accuracy	1%	

_ Relay Output Modules

Model	SM DO 108	
Product		
Description	8 Channels Relay Output Module	
Output Channels	8	
Relay Type	Form A, Normal Open	
Contact Rating	5A @250VAC 5A @30VDC	
Max. output current per channel	2A	
Minimum OFF resistance	1000 Meg Ohm @500 Vdc	
Minimum On resistance	30m Ohm @6 Vdc 1A	
Output Response Time	10ms, MAX, measured from receipt of force coil command to gate transition of the output MOSFET.	
Min. Life	1A 1*10 ^ 5 ops.	
Line Voltage	Max 30Vdc, Max 250Vac	
Life Mechanical	2*10 ^ 7 ops	
Watch Dog	Hardware & Communication	
Power Requirements	10 to 30 Vdc	
Wiring	I/O Cable 16 to 24 AWG	
Digita	l Output Function Block	
Output Sequence ON timer	0 to 65535 s , 1s resolution	
Output Sequence Off timer	0 to 65535 s ,1s resolution	
Output Invert	YES	
Pulse Output	0 to 65535 s ,1 s resolution	
TPC Output	0 to 100 (%),	
Duty cycle	1 to 3000 (0.1 to 300s)	
Atuo/Man bumpless	YES	
Fail Safe (Comm. Watch Dog)	0 to 65535 s	
Power on output	YES	
	No	
T. A.		
limer Accuracy	1 %	



$_{\Box}$ Current / Voltage Analog Input Modules

Model		SM_AI_108i
Product		
Description		8 Channels Current / Voltage Input Module
Input Channel		8 differential
Input Range		$\pm 20 m \text{A}, 4 \text{ to } 20 m \text{A}, \pm 10 \text{V}, \pm 5 \text{V}, 1 \text{ to } 5 \text{V}$
Resolution		16 bit (1 part in 32,000.)
Input accuracy		(@25° C) $\pm 0.05\%$ of input range.
Ambient Temperature Effe	ct	Better than $\pm 0.005\%$ of input span per °C, or $\pm 1.0 \text{uV/°C},$ whichever is greater
Noise Filter		50/ 60Hz Auto
Noise Rejection :	Normal mode	60dB @ 60Hz, typical.
	Common mode	88dB @ 60Hz, typical.
Input Filter Bandwidth		-3dB at 1.5Hz, typical.
Input Conversion Rate		140 ms (per channel)
Current Input Resistance		250 ohm
Voltage Input Impedance		380K ohm
Over voltage protection (v	oltage inputs only)	60 V AC
Over current protection (co	urrent inputs only)	300 mA
Watch Dog		Hardware
Power Requirements		10 to 30 Vdc
Wiring		I/O Cable 16 to 24 AWG
	Analog	g Input Function Block
Offset adjust		-128 to 127
Input Smoothing		1 to 255
Latch Max. Value		YES
Latch Min. Value		YES
High/Low Alarm		YES
Over/Under Range Alarm		YES
Over/Under Flow Alarm		YES
Break Alarm:		YES

\Box Universal Analog Input Module

Г		
Model		SM_UI_108i
Product		
Description		8 Channels Universal Analog Input Module
Input Channel		8 differential
Input Range		$\pm 20mA,~4$ to 20mA, $~\pm 10V,~\pm 5V,~1$ to 5V , $\pm 100mV,$ +/-500mV, Thermocouple types (J, K, T, R, S, E, B, N)
Input accuracy		(@25° C) \pm 0.05% of input range. (a/v/mA)
Resolution		Thermocouple input: 0.1°C (0.18°F) ,others 16 bit (1 part in 32,000.)
Ambient Temperature Effect		Better than $\pm 0.005\%$ of input span per °C, or ± 1.0 uV/°C, whichever is greater
Noise Filter	1	50/ 60Hz Auto
Noise Rejection :	Normal mode	60dB (A/V/mV)@ 60Hz, typical
	Common mode	88dB (A/V/mV)@ 60Hz, typical
Input Filter Bandwidth		-3dB at 1.5Hz, typical
Input Conversion Rate		140ms (per channel)
Current Input Resistance		250 ohm
mV and Voltage Input Imp	pedance	100K ohm
Overvoltage protection (ve	oltage inputs only)	60 V AC
Overcurrent protection (cu	urrent inputs only)	300 mA
External cold-junction con	npensation	YES
Thermocouple Break Deter	ction	YES
TC Input impedance		20 M ohm
TC Input bias current (break)		200 uA typical
TC Overvoltage protection		±15 V
Reference-junction accuracy		0.15 °C @0~70 °C, 0.5 °C @-20~0 °C
Watch Dog		Hardware
Power Requirements		10 to 30 Vdc
Wiring		I/O Cable 16 to 24 AWG

More... (see the next page)



	Analog Input Function Block		
Offset adjust	-128 to 127		
Input Smoothing	1 to 255		
Latch Max. Value	YES		
Latch Min. Value	YES		
High/Low Alarm	yh/Low Alarm YES		
Over/Under Range Alarm	YES		
Over/Under Flow Alarm	ler Flow Alarm YES		
Break Alarm	YES		
Input Range & Accuracy			
тс	°C Range (°F Range)	Accuracy	
l	-210 to 1200 °C (-346 to 1712 °F)	±0.1°C	
К	-200 to 1372 °C (-328 to 2502 °F)	±0.1°C	
Т	-260 to 400 °C (-436 to 752°F)	±0.1°C	
R	R -50 to 1768 °C (-58 to 3214°F) ±0.3°C		
S	S -50 to 1768°C (-58 to 3214°F) ±0.5°C		
E	-200 to 1000°C (-328 to 1832°F) ±0.1°C		
В	260 to 1820°C (500 to 3308°F) ±0.5°C		
Ν	230 to 1300°C (-382 to 2372°F) ±0.1°C		



RTD Analog Input Module

Model		SM_RTD_108i		
Product				
Description		8 Channels RTD	Analog Input Module	
Input Channel		8 differential		
Input Type		PT100,PT1000,0	Cu50, Cu100,Ni120	
Ambient Temperature E	ffect	Better than ± 0 . is greater	005% of input span per °C,	or ±1.0uV/°C, whichever
Noise Filter		50/ 60Hz Auto		
Noise Rejection :	Normal mode	60dB @ 60Hz,	typical	
	Common mode	90dB @ 60Hz, -	typical	
Input Filter Bandwidth		-3dB at 1.5Hz, t	typical	
Input Conversion Rate		140 ms (per cha	annel)	
RID Break Detection		YES	1 11 .	
Excitation Current		200 uA DC typical, all types		
Lead-Wire Compensation		25 obms per load (Pt) 10 obms per load (Cu) 20 obms per load (Ni)		
Match Dor		Hardware		
Wiring			24 0/0/6	
Analog Input Function Block				
Offset adjust	-128 to 127	High/Low Alarm	YES	
Input Smoothing	1 to 255	Over/Under Range	YES	
Latch Max. Value	YES	Alarm Over/Under Flow Alarm	YES	
Latch Min. Value	YES	Break Alarm	YES	
	Inp	ut Range & Accuracy		
Input Type	Alpha	Input Range	Resolution	Accuracy
Pt 100 ohm	.00385	-200 to 850°C	0.1°C	±0.1°C
Pt 100 ohm	.003902	-200 to 850°C	0.1°C	±0.1°C
Pt 100 ohm	.003916	-200 to 850°C	0.1°C	±0.1°C
Pt 100 ohm	.00392	-200 to 850°C	0.1°C	±0.1°C
Pt 100 ohm	.003926	-200 to 850°C	0.1°C	±0.1°C
Pt 200 ohm	.00385	-200 to 850°C	0.1°C	±0.1°C
Pt 500 ohm	.00385	-200 to 850°C	0.1°C	±0.1°C
Pt 1000 ohm	.00375	-200 to 850°C	0.1°C	±0.1°C
Pt 1000 ohm	.00385	-200 to 850°C	0.1°C	±0.1°C
Ni 120 ohm	.00672	-80 to 260°C	0.1°C	±0.2°C
Cu 100 ohm	.00427	-100 to 260°C	0.1°C	±0.2°C
Cu 50 ohm	.00427	-100 to 260°C	0.1°C	±0.2°C



□Thermistor Analog Input Modules

Model		SM_TH_108i
Product		
Description		8 Channels Thermistor Analog Input Module
Input Channel		8 differential
Input Type		10К Туре II,10К Туре III
Input Range		-45 °C to 140 °C
Resolution		0.1°C (0.18°F)
Accuracy		± 0.5°C (0.18°F)
Ambient Temperature Effect		Better than $\pm 0.005\%$ of input span per °C, or $\pm 1.0 \text{uV/°C}$, whichever is greater
Noise Filter		50/ 60Hz Auto
Noise Rejection :	Normal mode	60dB @ 60Hz, typical
	Common mode	90dB @ 60Hz, typical
Input Filter Bandwidth		-3dB at 1.5Hz, typical
Input Conversion Rate		140ms (per channel)
Break Detection		YES
Excitation Current		200 uA DC typical, all types
Lead-Wire		2-wire
Watch Dog		Hardware
Power Requirements		10 to 30 Vdc
Wiring		I/O Cable 16 to 24 AWG
	Analo	g Input Function Block
Offset adjust		-128 to 127
Input Smoothing		1 to 255
Latch Max. Value		YES
Latch Min. Value		YES
High/Low Alarm		YES
Over/Under Range Alarm		YES
Over/Under Flow Alarm		YES
Break Alarm		YES



Current / Voltage Analog Output Module

Model	SM_AO_102i				
Product					
Description	2 Channels Current / Voltage Analog Output Module				
Output Channel	2 differential				
Output Range	0 to 20mA,4 to 20mA, 0 to 10V				
Resolution	12 bit (1 part in 4095)				
Output accuracy	(@25° C) \pm 0.1% of output range				
Ambient Temperature Effect	Better than $\pm 0.005\%$ of input span per °C, or ± 1.0 uV/°C, whichever is greater				
Response Time	10 ms typical into 500 ohms, for measurement to reach 98% of the final				
Maximum Output Current	20.5 mA DC typical				
Current Output Compliance	10.5 V typical				
Current Output Load Resistance Range	0 to 500 ohms typical				
Maximum Output Voltage	10. 5V DC typical				
Voltage Output Current(Votage mode)	0 to 10.5 mA DC maximum				
Voltage Output Impedance	1K ohm				
Output Short Circuit Protection	Included				
Watch Dog	Hardware & Communication				
Power Requirements	10 to 30 Vdc				
Wiring	I/O Cable 16 to 24 AWG				
Analog Input Function Block					
Offset adjust	-128 to 127				
Slop Output	Slop time (0 to 65535 s)				
High/Low Clamp	YES				
Auto/Man bumpless	YES				
Fail Safe (Comm. Watch Dog)	0 to 65535 s				
Power on output	YES				

Current / Frequency Intput Module

Model		SM_CNT_102						
Product								
Description		2 Channels Current / Frquency Input Module						
Output Channel		2						
Relay Output Channels		4						
Input Ranges		0 to 10,000Hz						
Resolution		0 to 10,000Hz input range: 1Hz						
Pulse counter		1 pulse						
Minimum Input Pulse Width		50µS						
Counting Rate		10KHz maximum counting rate (50uS ON and 50uS OFF for 100 uS period or 10KHz)						
Input Impedance		4.7K ohms, typical						
Digital logic levels :	OFF state		< 4	< 4 VDC				
	ON state		>1	>10 VDC				
Output Relay Type		Form A,Normal Open						
Contact Rating		5A @250VAC 5A @30VDC						
Max. output current per channel		2A						
Max. output current (entire module)		8A						
Minimum OFF resistance		1000 Meg Ohm @500 Vdc						
Minimum On resistance		30M Ohm @6 Vdc 1A						
Output Response Time		10ms , MAX, measured from receipt of force coil command to gate transition of the output MOSFET						
Min. Life		1A 1*10 ^ 5 ops						
Line Voltage			Max 30Vdc, Max 250Vac					
Life Mechanical		2*10 ^ 7 ops						
Watch Dog		Hardware & Communication						
Power Requirements		10 to 30 Vdc						
Wiring		I/O Cable 16 to 24 AWG						
Operating Temperature			$-20 \sim 60^{\circ}C$					
Digital Input Function Block								
On Delay timer	NO	Pulse	Generator	NO	Simulation	YES		
Off Delay timer	NO	Puls	e Counter	10K HZ	Input Toggle	NO		
Input Debounce	NO	ON/OFF Latch		NO	Timer Accuracy	NO		
Input Invert	YES							
Digital Output Function Block								
Output Sequence ON time	NO	ТРС	Output	NO	Power on output	YES		
Output Sequence Off time	NO	Duty cycle		NO	Alarm Output	NO		
Output Invert	YES	Atuo/Man bumpless		0 to 65535 s	Timer Accuracy	NO		
Pulse Output	NO	Fail Safe ((Comm. Watch Dog)	YES				