Isolated Modbus Control Mode: Using an RS-485 2-wire Modbus communications link, Stratus II can control motor speed, acceleration, deceleration and direction.

Modbus RTU Protocol
Baud Rate: Settable (default is 9600)
Word Length: 8
Parity: None
Stop Bits: 1
MODBUS ID: 1-63

Setup for Modbus Control: Use switch SW2 to select a unique ID number between 1 and 63 on your Modbus network. To set an ID number, turn #7 OFF and turn ON any number of switches 1-6 on SW2 and add up their associated "Value" see chart below. Example: turning ON "2, 4 and 6" would set the ID number by 2+8+32=42.

Table 2: SW2 Switch Settings								
Switch#	1	2	3	4	5	6	7	8
Value	1	2	4	8	16	32	OFF	PHASE

Connecting to a Modbus Network: Use an RS-485 2-wire twisted pair cable, connected to the Modbus network (refer to wiring diagram for proper pin out).

Register Definitions:

40001 – Run Control: Enter the desired control method. Only one control method may be selected at a time. Drive will use the 1st control bit set.

Table 3: Run control Description	
Bit	Description
0	1 = Run 0 = Stop
1	0 = Forward 1 = Reverse (three phase only)
2	1 = Non-Isolated Potentiometer1 Control "A"
3	1 = Non-Isolated Potentiometer2 Control "B"
4	1 = Non-Isolated Temperature Control "A/B"
5	1 = Non-Isolated Fixed Speed Switch Control "SW2"
6	1 = Non-Isolated 3 Speed Digital Control "A/B"
7	1 = Isolated Voltage Control "0-5/0-10"
8	1 = Isolated Current Control "4-20"
9	1 = Isolated Potentiometer Control "POT"
10	1 = Isolated Temperature Control "POT"

40002 – Target Frequency: Set the desired output frequency when in Modbus mode. In all other modes it is read only and displays target output frequency.

40003 – Target Speed: Set the desired output % when in Modbus mode. In all other modes it is read only and displays target output percentage.

40004 – Output Frequency: Displays the current output of the drive in Hertz.

40005 – Output Speed: Displays the current output of the drive in %.

40006 – Control value: Displays a representation of the analog control in % full or Temp °C.

40007 – Alarms: Displays all active alarms.

Table 4: Alarms Description	
Bit	Description
0	1 = Power Module Temperature Fault (100°C)
1	1 = Soft Current Limit Fault (40016 set point)
2	1 = 10A Hard Current Limit Fault
3	1 = Control Signal Fault (See Table 5)

40008 – Bus Voltage: Displays the DC bus voltage in Volts. (1V res)

40009 – Bus Current: Displays the DC bus current in Amps. (0.1A res)

40010 – Temperature: Displays the temperature of the inverter module in °C. (1°C res). 100°C shutdown.

40011 – Revision: Displays the firmware revision.

40012 – Modbus ID: Displays the Modbus ID.

40013 – Configuration: Used to configure specific control preferences.

Table 5: Configuration Description	
Bit	Description
0	1 = Three Phase 0 = Single Phase (Read Only)
1	Not used
2	1 = Idle on Temp Failure 0 = Max on Failure
3	1 = Idle on Open Therm 0 = Max on Open
4	1 = Idle on V/I/POT Failure 0 = Max on Failure
5	1 = Alarm on Temp Low 0 = Alarm on Temp High
6	1 = Alarm on V/I/POT High 0 = Alarm on Low
7	1 = Contact Closure Enabled 0 = CC disabled
8	1 = CC polarity is NC 0 = Normally open
9	1 = Motor frequency 50Hz 0 = 60Hz

40014 – Ramp Up Rate: Enter the desired increase in output frequency rate. (1Hz/sec res)

40015 – Ramp Down Rate: Enter the desired decrease in output frequency rate. (1Hz/sec res)

40016 – Current Limit: Enter the desired output current fault level (0-100) (.1A res). Any current beyond this setting will cause Stratus II to lock-up and set an alarm. Power must be cycled to clear the alarm.

40017 – Startup Run: Enter the configuration to be loaded into Register 40001(Run Control) at startup.

Table 6: Startup Run Control Description	
Bit	Description
0	1 = Run 0 = Stop
1	0 = Forward 1 = Reverse (three phase only)
2	1 = Non-Isolated Potentiometer1 Control "A"
3	1 = Non-Isolated Potentiometer2 Control "B"
4	1 = Non-Isolated Temperature Control "A/B"
5	1 = Non-Isolated Fixed Speed Switch Control "SW2"
6	1 = Non-Isolated 3 Speed Digital Control "A/B"
7	1 = Isolated Voltage Control "0-5/0-10"
8	1 = Isolated Current Control "4-20"
9	1 = Isolated Potentiometer Control "POT"
10	1 = Isolated Temperature Control "POT"

*Drive will use the 1st control bit set.

40018 – Startup Frequency: Enter the desired frequency output at startup. Modbus control only.

40019 – Max Frequency Output: Enter the desired maximum frequency output when in analog control modes.

40020 – Idle Frequency Output: Enter the desired Idle frequency output when in analog control modes.

40021 – Contact Closure Frequency: Enter the desired output frequency when CC is activated. Non-Isolated digital control.

40022 – Max Control %: Used in 0-5V, 0-10V, 4-20mA, and Pot control. It sets the analog control percentage point of where the Max Frequency output occurs.

40023 – Idle Control: The Idle control register is used in 0-5V, 0-10V, 4-20mA, and Pot control. It sets the Idle frequency control percentage. Refer to 40013.

40024 – Alarm Control: The alarm control register is used in 0-5V, 0-10V, 4-20mA, and Pot control. It sets the alarm control percentage. 0=Disabled. Refer to 40013.

40025 – Max Temperature: The max temperature register is used in Thermistor control. It sets the Temperature threshold for max frequency output. Refer to 40019 for setting Max Freq output value.

40026 – Idle Temperature: Used in thermistor control mode to set the temperature threshold for idle frequency. Refer to register 40020 for setting Idle Freq value.

40027 – Alarm Temperature: Used in thermistor control mode to set the temperature threshold for an alarm.

40028 – Baud Rate: Sets the Modbus communication Baud rate. Range from 2,400 – 500,000 (100 Baud Res). *Recovery: Setting SW2 for ID 0 will set Baud to 9600.

40029 – PWM Frequency: Sets the sine wave modulation frequency. Range from 2,000 – 20,000 Hz. Default = 16,000Hz

40030 – EEPROM Save: Setting this register to a 1 saves the control variables into EEPROM. EEPROM Save is also used to set variables to default.

Table 7: Stratus II Modbus Memory Map			
Reg#	Description	Valid Entry	Default
40001	Run Control	See Table 3	129
40002	Target Frequency (Hz)	0 – 400	0
40003	Target Speed (%)	0 – 100	0
40004	Actual Output Frequency (Hz)	Read Only	-
40005	Actual Output Speed (%)	Read Only	-
40006	Control Value (°C or %)	Read Only	-
40007	Alarms Status	See Table 4	-
40008	Bus Voltage (VDC)	Read Only	-
40009	Bus Current (0.1A)	Read Only	-
40010	Module Temperature (°C)	Read Only	-
40011	Revision	Read Only	-
40012	Modbus ID	Read Only	-
40013	Configuration	See Table 5	129
40014	Ramp Up Rate (Hz/sec)	1 – 20	6
40015	Ramp Down Rate (Hz/sec)	1 – 20	12
40016	Soft Current Limit (0.1A res)	0 – 100	100
40017	Startup Run Control	See Table 6	129
40018	Startup Frequency (Hz)	0 – 400	0
40019	Max Frequency (Hz)	0 – 400	60
40020	Idle Frequency (Hz)	0 – 400	0
40021	CC Frequency (Hz)	0 – 400	0
40022	Max Control (%)	0 – 100	100
40023	Idle Control (%)	0 – 100	0
40024	Alarm Control (%)	0 – 100	0
40025	Max Temperature (°C)	-20 – 100	60
40026	Idle Temperature (°C)	-20 – 100	0
40027	Alarm Temperature (°C)	-20 – 100	100
40028	Baud Rate (100 Baud res)	0 – 5000	96
40029	PWM Carrier Frequency (Hz)	2000-20000	16000
40030	EEPROM Save / Recover	1 = SAVE	0

CONNECTIONS

WARNING: Dangerous voltages are present when connected to the power line and for some time after power is removed. Power must be removed for 30 seconds before making any connections or adjustments to avoid electrical shock or damage.

MOTOR COMPATIBILITY

For maximum motor life without using a line filter, the use of an inverter duty motor is recommended.

Mounting: Stratus II is supplied with six 0.16"D mounting holes suitable for #6 screws. Use at least 4 screws to mount Stratus II.

Power Connections: It is recommended that an adequately sized circuit breaker be connected between the power service and Stratus II to permit fail-safe removal of power before making adjustments or connections. Using .250" Female spade type terminals, connect L1 power (white) to location N, connect L2 power (black) to location L, connect Earth ground (green) to location G. Refer to wiring diagram for connections.

Motor Connections: For motor connections, use .250" Female spade type terminals. For single-phase motors, connect motor to positions marked W/T3 and V/T2. For three-phase motors connect to locations W/T3, V/T2 and U/T1. If a three-phase motor runs backwards, disconnect power and switch any 2 of the three wires. Any number of motors may be controlled in parallel from one unit as long as the total current does not exceed the current rating.
To help reduce electrical noise emissions, use shielded cable or place motor wires in a grounded metal conduit.

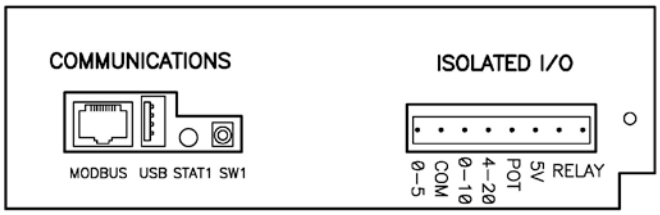
Using Single-Phase or Three-Phase Motors

Stratus II can control single- or three-phase motors from a single-phase power source. Refer to wiring diagram for motor connections.
To control a 1PH motor set SW2, #8 to the OFF position.
To control a 3PH motor set SW2, #8 to the ON position.
Power must be cycled before this setting will take effect.

SW2 Switch Settings for Fixed Speed, ModBus and Motor Phase

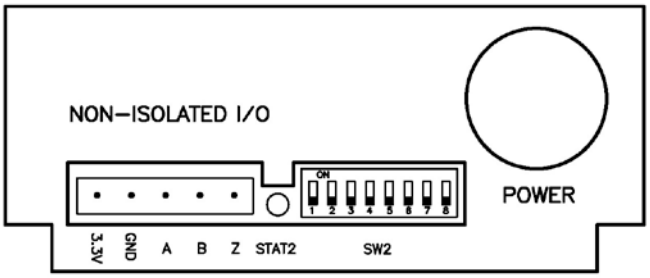
1	2	3	4	5	6	7	8
Fixed Speed Setting or ModBus (Value 1 to 63)						ON = Fixed Speed	ON = 3Phase
1	2	4	8	16	32	OFF = ModBus ID	OFF = 1Phase

Communications & Isolated Control I/O Connections



MODBUS – RJ-45 Jack for Modbus interface
USB – For future USB interface
STAT1 – Isolated control status LED
SW1 – Future Feature
0-5 – Connection for 0-5 VDC control input
COM – Common connection for all input signals
0-10 – Connection for 0-10 VDC control input
4-20 – Connection for 4-20 mA control input
POT – Connection for a potentiometer or thermistor control input.
5 V – Connection to power a remote transducer or potentiometer, 5VDC @ 50mA
RELAY – Connection for a relay alarm output.

Non-Isolated Control & Power I/O Connections



3.3V – Regulated 3.3VDC output
GND – Non-isolated reference level
A – Non-isolated programmable pin
B – Non-isolated programmable pin
Z – STOP on contact closure to "GND"
STAT2 – Non-Isolated control status
SW2 – Switches to select single- or three-phase output power, fixed speed mode settings or Modbus address
POWER – 115/230 VAC Power Source Input

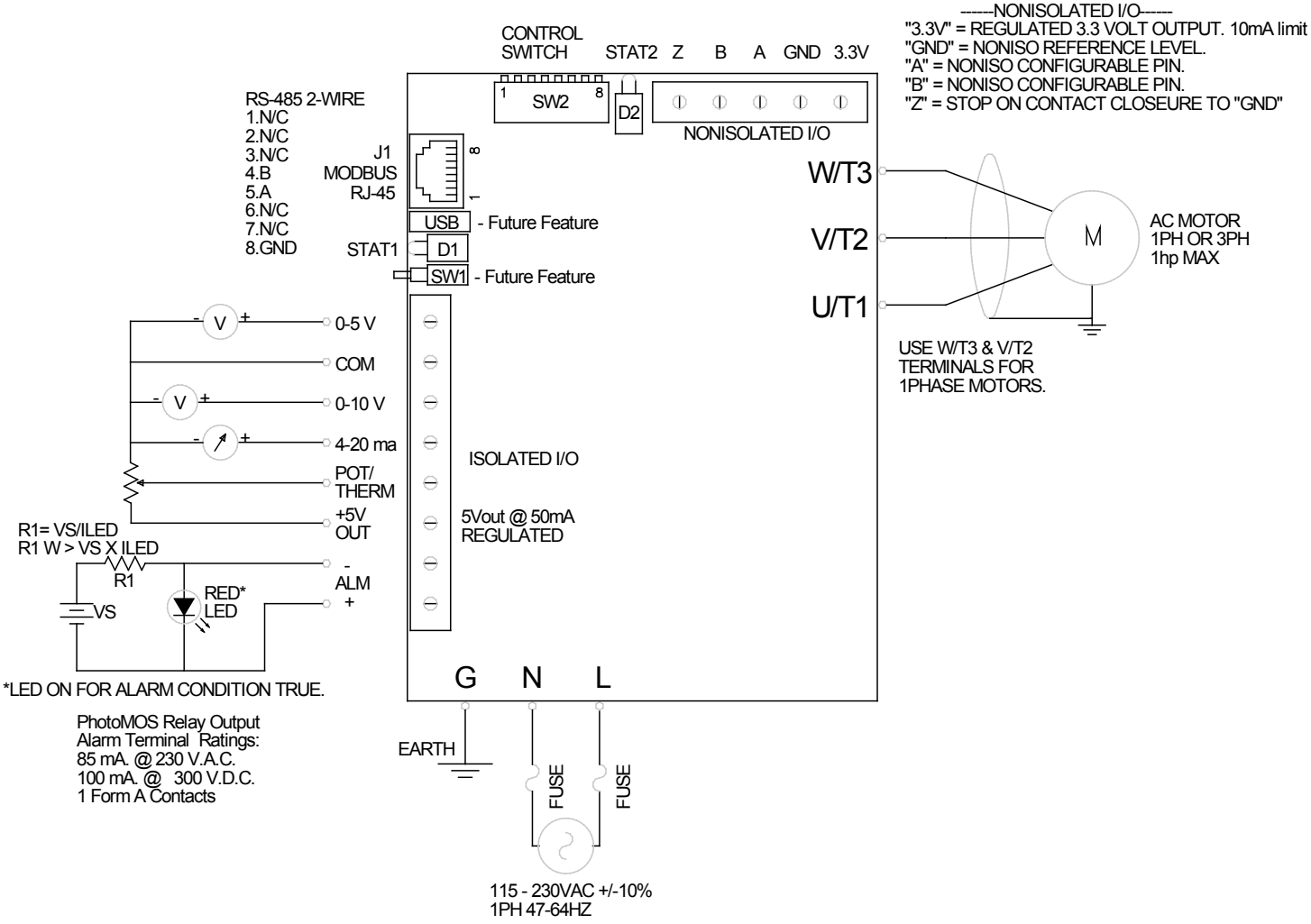
STAT1 LED Isolated Status

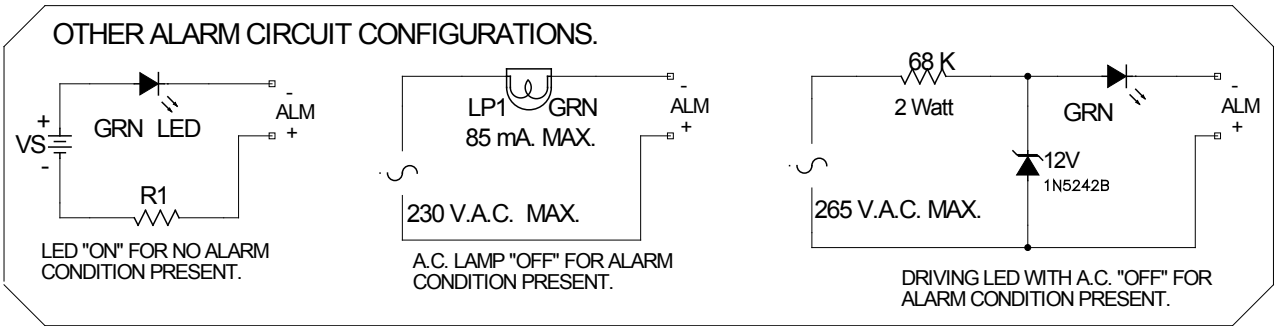
LED	Description
GREEN	No Fault
RED	Isolated Control Fault

STAT2 LED Non-Isolated Status/Output Status

LED	Description
GREEN	No Faults
RED	Non-Isolated Control Fault, Module Temperature Fault, Over Current Fault

WIRING DIAGRAM





TECHNICAL DATA

Motor Compatibility: For maximum motor life without using a line filter, the use of an inverter duty motor is recommended.

Electrical Noise Emissions and filtering: Electrical noise emissions (EMI) are highly dependent on load and environment. For many applications no additional filtering is required to meet EN55011/FCC class A emissions standards. For applications requiring additional filtering CRI recommends the following filters or equivalents:

EN55011/FCC class A: 150KHz – 30mHz	EN55011/FCC class B: 10KHz-30mHz
Filter Concepts: LE series www.filterconcepts.com	Filter Concepts: LX series www.filterconcepts.com
Corcom S series, www.cor.com	Corcom Q series, www.cor.com

Controlling multiple motors: Multiple motors wired in parallel can be controlled from one Stratus II as long as maximum peak (startup) currents do not exceed 10 Amps.

Control Accuracy and Hysteresis: Control signal accuracy is as follows:

Voltage ± 0.38VDC
Current ± 0.4mA
Temperature ± 1.5C°

In alarm conditions, loss of signal and ON/OFF feature, hysteresis is added to eliminate cycling. Hysteresis is as follows:

Voltage ± 2%
Current ± 1.5%
Temperature 1-2C°

RoHS compliance: Stratus II is RoHS (6/6) compliant

Maximum Fan Current: Some motors draw higher current at less than maximum voltage. Contact motor manufacturer for details.

HiPot Testing: Stratus II is designed to withstand HiPot testing to 1500Vrms, line input to analog input, motor output to analog input.

Current Derating:

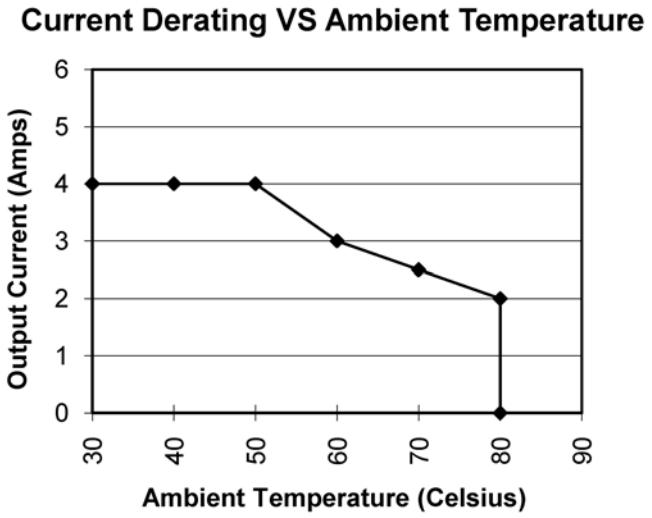


Figure 6

Specifications:

- **Input Power: 115 & 230 VAC +/-10% 47-64 Hz Single Phase, 5.7 Amps**
- **Output Power: 115 & 230 VAC +/-10% 0-400 Hz Single Phase, 4.0 Amps**
- **Maximum peak (startup) current: 10 Amps**
- **Storage Temperature: -40˚C to 125˚C**
- **Operating Temperature: -20˚C to 40˚C (full load)**
- **Thermal shutdown at 100°C**
- **Relative Humidity: 95% non-condensing**
- **Weight (with cover): 1.8 lb (816 grams)**
- **Weight (no cover): 1.2 lb (544 grams)**