

CUSTOMER SPECIFICATION

Part No. :- 500-0037-00
Model No. :- RIV 120M-4 RoHS China

RIV General Concept:

The RIV is an electronic version of old style thermocouple systems additionally featuring electronic spark re-ignition with single knob ON operation, anti-restart after mains fail, able to connect to modern (LED lamp) switch ON indicators, and very fast response to gas flame failure and other fault conditions. Prior to start the unit completes an internal self-test to ensure all safety features are functional.

The RIV is a re-igniter able to control an external gas valve. It is designed to make a safe gas control system by detecting the loss of flame sense and then shutting off the gas flow after the *No Flame Lockout Period*. As a system it consists of the RIV unit, an external power supply transformer and the customer supplied gas valve. A standard 10 way 0.2 inch spaced connector connects the gas switches, earth and gas valve while the transformer connection is a separate 4 way type. A low voltage interface allows the connection of an 8 way connector to drive indicator LED's. Spark connections are as per standard Tytronics ignition products.

The external transformer is used to avoid problems that are caused by swapping of L1 and L2 with respect to neutral /earth and hence maintains flame current sensitivity in situations where this has occurred. Changing the transformer allows ready changing of the input supply voltage from 120 (L1 to Neutral) to 230 Volts (for L1 to neutral or L1 to L2 for 2 phase systems). The RIV unit itself remains unchanged. An external gas valve is controlled by a separately connected power supply and is switched ON using the on-board relay.

Functional Requirements:

- The module operates 4 burner cook tops in conjunction with a common gas valve.
- Connected to the re-igniter safety system is a single electrode at each burner providing a means of detecting the flame and generating a spark through the gas medium to ignite the gas.
- A typical gas cock individually controls each burner. Opening the gas cocks, switches 120Vac at the same time through a micro switch to the associated channel on the module.
- The gas valve is opened after detecting a channel switch ON transition and subsequent successful completion of the internal self test, the duration of which is the Self Test Period.
- 4 independent high voltage output coils generate sufficient voltage and energy to generate a spark from the electrode across the spark gap to the earthed burner. A spark is guaranteed, provided the spark gap is within the specifications and provided the electrode and cable loading resulting from the cook top or range design meet the maximum loading specifications.
- Sparks are generated at all the burners when a gas cock is opened and power is switched by the micro switch to any re-igniter channel provided no flame is detected at the associated burner. Sparking will continue at the nominal rate until either flame is detected or the No Flame Lockout Time is exceeded.
- If no flame is detected for the period of the No Flame Lockout Time, (time detailed within technical specification) the gas valve drive is removed, stopping gas flow and sparking. (No Flame Lockout Time commences when power is switched to the gas valve).
- Flame detection utilises the flame rectification principle, primarily due to its ability to tolerate leakage currents to earth significantly larger than the flame current itself. The circuit passes a current through the electrode, flame and burner to electrical earth. The power to provide the current flow is derived from the mains line voltage through an isolating transformer. Correct operation of flame sense circuits requires the mains supply to the re-igniter to have at least a resistive connection to earth and the burners also to be earthed.
- The module detects flame under all flame conditions provided the electrode is positioned such that detected flame current exceeds the minimum specified flame current.
- The response time of the circuitry to detection and loss of flame is dependent primarily on the magnitude of the flame, and meets the requirements as detailed within the technical specification.
- The controller provides up to LED drive outputs to indicate the channel status and fault diagnostics.

CUSTOMER SPECIFICATION

Part No. :- 500-0037-00
Model No. :- RIV 120M-4 RoHS China

- Any unused channels must have inputs disconnected and the associated High Voltage Outputs connected to ground.
- In case of flame failure on any channel, the module commences a re-ignition attempt. If the flame is not re-established within the No Flame Lockout Time, the unit goes to lockout. The re-ignition attempt is performed if flame is lost at any burner, while any of the gas cocks are is turned on.
- The controller includes a micro-controller safeguard circuit to comply with the requirements of EN298-1994.

Lockout Modes:

A lockout is a result of failure modes, both operational faults and failures detected by safeguards, which ensure reliable and failsafe operation. In case of a lockout, the program stops the output signal to the relay drive circuit and consequently the relay de-energises and the gas valve closes. The system remains in lockout until all channels have been switched off for a period greater than the lockout recovery time.

The unit initially checks the safeguard circuits on a call for ignition prior to powering the gas valve on.

If the safeguard circuits are determined to be faulty the unit locks out with the active channel LEDs flashing at the *Safeguard Failure Lockout Rate*.

Mains interruptions can result in the unit powering up with a Channel Switch still set to ON if the the interruption occurred while the gas valve was on (unit is in operation). This is detected and considered a failure condition as this could result in an undesired automatic restart. In this case the unit will also lockout with the active channel LEDs flashing at the *Safeguard Failure Lockout Rate*.

The LEDs will also flash at the *Safeguard Failure Lockout Flash Rate* if the unit is switched On prior to the elapse of the *Power On Lockout Time*. This condition is detected to ensure that undesired automatic restarts can be correctly identified.

An ignition failure also generates a lockout fault resulting in the active channel's LED flashing at the *No Flame Lockout Flash Rate*. All of the active channel status LEDs will flash in unison to indicate a lockout type fault.

Electrical Connections:

Refer to the connection diagram (Fig. 6 & Fig. 7). Note that the system can be configured to operate the gas valve with a different line voltage than the line supply to the transformer (contact factory for details).

Transformer Connectivity:

The transformer is supplied with a 4 way output connector, to plug directly into the RIV (only), and 2 wire input connections to connect to the mains supply. Depending on the transformer selected this can 120 or 230 V at 50/60Hz.

Mains Input - Line (L)

Represents the line voltage input to the transformer which depending on requirements is either 120 or 230V, 50/60Hz

Mains Input - Neutral (N)

Represents the neutral input to the transformer

Transformer Output (high voltage):

108Vac at load (connector 1,2)

CUSTOMER SPECIFICATION

Part No. :- 500-0037-00
Model No. :- RIV 120M-4 RoHS China

Transformer Output (low voltage):
13.7 Vac at load (connector pin 3, 4)

HV Coil Output Connector:

INPUT - Spark Terminals (S2-5)

These connections have a dual function, to provide a high voltage capable of generating a spark (refer Outputs from Module) and as a means of detecting flame when operating in input mode.

OUTPUT - Spark Terminals (S2-5)

The output provides a high voltage peak at the connected electrode, sufficient to spark across an air gap to the earthed burner, provided the air gap and loading due to the electrode and cables, is lower than the specified maximum.

Control Connector:

A 10 way connector is used to make the switch connections and connect the earth and gas valve.

OUTPUT - Switch Out

This connection is used only to provide power to the external gas switches. It is sourced from the isolation transformer and provides a separate (referenced to Earth by the PCB) line to supply an isolated 120Vac signal.

INPUT - Burner Control (SW2-5)

The nominal 120Vac signal (supplied by the transformer) to any of the 4 Burner switch inputs controls the following functions:

1. Enables LEDs to be displayed and the start sequence to be commenced.
2. The flame detection is enabled which in turn controls the spark function and the 'No flame lockout' feature in which the gas valve relay drive is de-energised when no flame is detected for the No Flame Lockout period.

Input - Earth (GND)

For safety and operational reasons an earth connection **must** be provided to the unit and the burners **must be earthed**. Failure to do so could result in erratic behaviour.

INPUT - Line

Connection of the line voltage required to operate the gas valve at either 120 or 230 Vac.

OUTPUT - Gas Valve Line

This connection supplies the line voltage to the gas valve when required via a relay contact on the RIV. The gas valve contact will operate (CLOSE) whenever the unit is switched on using SW2-5 if no lockout conditions exist. This is an isolated contact and can operate a gas valve at a different voltage to the transformer's input supply.

(note gas valve must be separately connected to neutral).

CUSTOMER SPECIFICATION

Part No. :- 500-0037-00
 Model No. :- RIV 120M-4 RoHS China

Technical Specifications

Parameter	Min	Typ	Max	Units
General Parameters				
Line Voltage (recommended Tytronics transformer) Tytronics part no. 9902 301 00050 See appendix 1 for details	102	120	132	Vac
Line Voltage (recommended Tytronics transformer) Tytronics part no. 9902 301 00051 See appendix 2 for details	196	230	230	Vac
Frequency		50/60		Hz
Safe Start Check or Waiting Time (from gas valve switch ON from Standby)		2.1		sec
Transformer Operating Temperature range	0		105	deg. C
Spark parameters				
Spark Output Peak Voltage @ 40pF, nom input	10	13		kV
Spark Gap @ Max Load (40pF)	2.5		4.5	mm
Electrode & Cable Load to earth			40	pF
Spark Rate	184	187	190	Spk/min
Flame Parameters				
Flame Sense Current (-15% line Vac 60Hz) *Note1	0.2			μA dc
Flame Failure Recognition Time			2.3	sec
Flame Verification Time		1.5		Sec
No Flame Lockout Time	3.9	5	5	Sec
Power On Lockout Time		1		Sec
Leakage tolerance		20		MΩ
Gas Valve Contact Rating (solenoid load only)				
Load rating at 24Vac			1.0	A (ac)
Load rating at 240Vac			200	mA
Types of Gas	Natural, Liquefied Petroleum (LP), manufactured, mixed, or LP gas-air mixture			
Classification Code	A.M.C.L.X.N.			
Mounting Position	Any orientation			

Note 1: It is recommended that systems be designed to maintain the average minimum flame current above 0.4μA. This ensures that the module does not spark due to drafts blowing flame away from the electrodes.

CUSTOMER SPECIFICATION

Part No. :- 500-0037-00
 Model No. :- RIV 120M-4 RoHS China

Parameter	Min	Typ	Max	Units
LED Load Parameters				
Number of LEDs			4	
Safeguard Failure Lockout Flash Rate		5		Per sec
No Flame Lockout Flash Rate		1		Per sec
LED Load Current Available (rms per LED)			7	mA

Environmental Specification

Parameter	Min	Typ	Max	Units
Operating Temperature (continuous)	0		100	°C
Operating Temperature (up to 1000 hours over life of product based on Product life estimates)			105	°C
Relative Humidity (at 40°C – non condensing)			95	%
Degree of Protection	IP10			

Mating Connectors

Control Connector:

10 x Input Header 0.2”(5.08mm) pitch, to suit 0.045” square pins connector with locking ramp (eg Vensik 5080-10PY or equivalent)

Transformer Connector:

(This connector is fitted and supplied with the Tytronics recommended transformers)

4 x Input Header 0.2”(5.08mm) pitch, to suit 0.045” square pins connector with locking ramp (eg Vensik 5080-4PY or equivalent)

Gas Ignition connections:

4 x Outlet Terminal 0.11”x 0.032” (2.8mm x 0.8mm) Quick connect tab

Low Voltage LED Interface Connector:

8 way RAST 2.5 connector (eg. Lumberg 3521 08 K00 or Tyco 3-829865-8)

Installation and Replacement Guidelines

Unit must only be used in a manner that meets all of the requirements of the Electrical and Gas Authorities. Provide additional protection if unit is to be subject to dripping or sprayed water or liquid.

To replace unit :

Ensure power is disconnected from the appliance prior to commencing servicing.

Caution: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

Unplug all connectors and spark cabling noting orientation of connector with respect to plugs and sockets. Note locking tab on LED connector block will need to be moved away from the locking position to allow removal of the LED plug. Remove fixing screws, then lift unit out from the appliance.

Install new unit and fix with screws. Plug in all connectors, ensuring locking tab points towards the top of the unit when plugs are replaced. Re-apply power, gas valve may kick ON momentarily only on application of power. Unit is now ready for operation. If a gas burner is switched ON and all operating conditions are

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6 of 18

Last Change:-

File: 500-0037-CS01-01

Iss. 1 C/No. L8576 By DdG Auth.

Date: 27/02/2007

CUSTOMER SPECIFICATION

Part No. :- 500-0037-00
Model No. :- RIV 120M-4 RoHS China

normal, gas will only flow after the gas valve operates 2 seconds later. Sparking will then commence. If abnormal conditions are detected at start up then LEDs will flash rapidly (if fitted) for all switches in the ON position. An abnormal condition at start up can be simulated by connecting a flame simulation device prior to burner switch ON. The 2 second delay to gas valve ON is due to the internal self test time at each and every single burner start. If a burner start has already been initiated then there will be no additional delays.

Definitions

Flame Failure Recognition Time: The period between loss of burner flame and a re-ignition attempt.

Flame Verification Time: The period between detection of burner flame and when sparking ceases.

No Flame Lockout Time: An uninterrupted period, commencing when power is applied to a channel in which no flame is detected.

Spark Gap: The closest distance from the electrode tip to any point on the cooktop range assembly that is connected to earth.

Electrode & Cable Load to Earth: The capacitance measured from the electrode to earth.

Leakage tolerance: The minimum impedance from the electrode to earth that does not affect the flame detection circuitry, which could result in a false flame sense.

No Flame Lockout Flash Rate: The flash rate of the LEDs when the unit locks out due a burner failing to light.

Safeguard Failure Lockout Flash Rate: The flash rate of the LEDs when the unit locks out due to a detected failure of the safeguard circuits, mains failure or switch on prior to the expiration of the *Power On Lockout Time*.

Power On Lockout Time: An initial delay required to elapse between mains being applied to the unit and a switch being switched on.

CUSTOMER SPECIFICATION

Part No. :- 500-0037-00
Model No. :- RIV 120M-4 RoHS China

Figure 1 - Top View Dimensions:

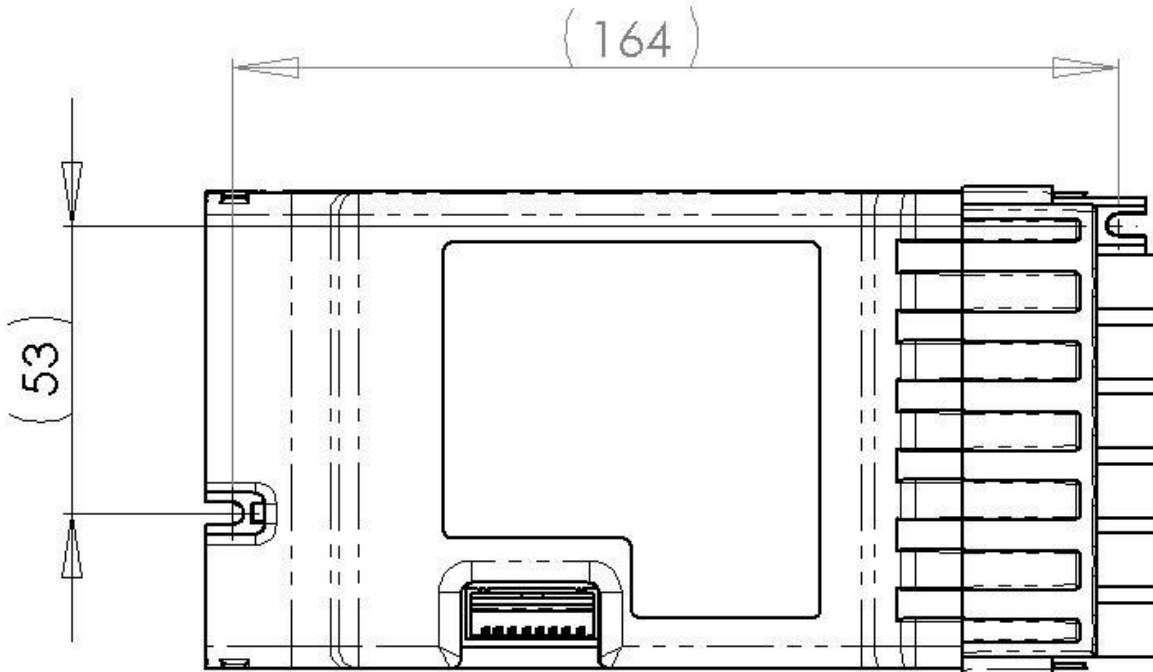
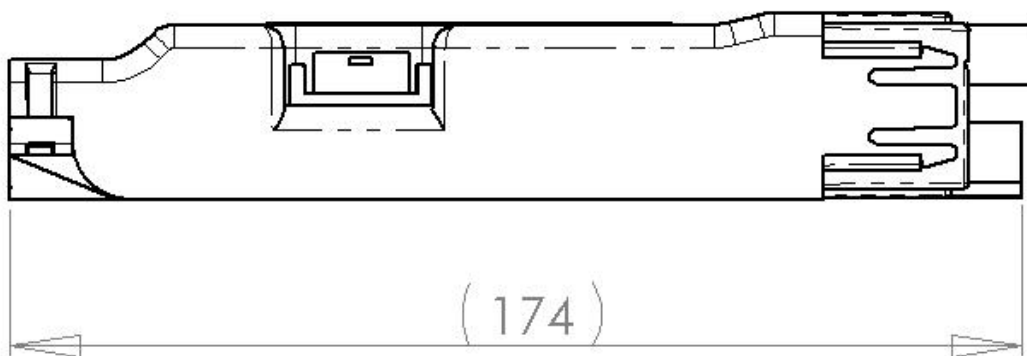


Figure 2 – Side View Dimensions:



CUSTOMER SPECIFICATION

Part No. :- 500-0037-00
 Model No. :- RIV 120M-4 RoHS China

Figure 3 – Front View Dimensions

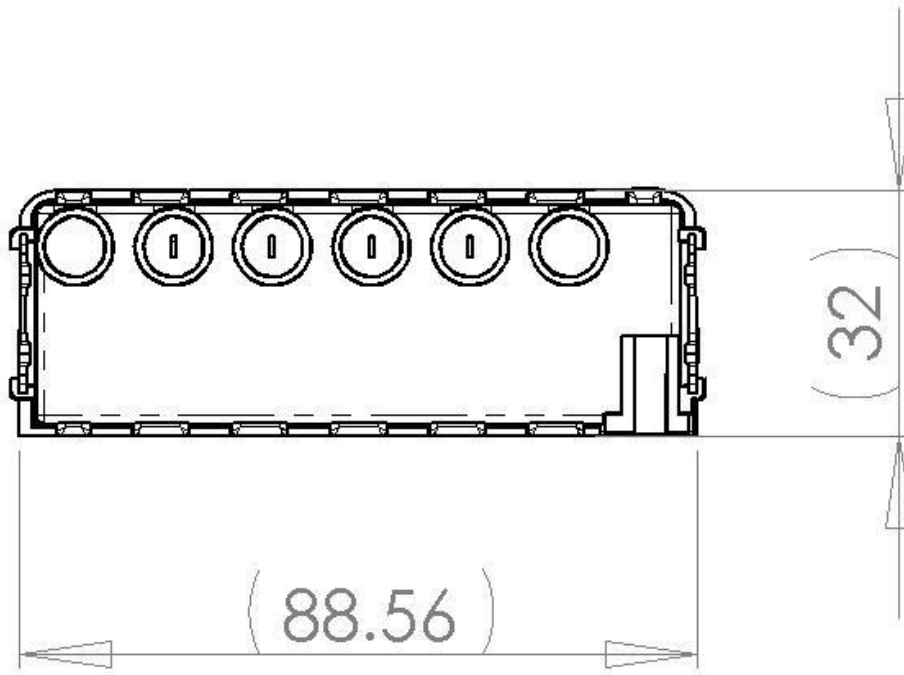
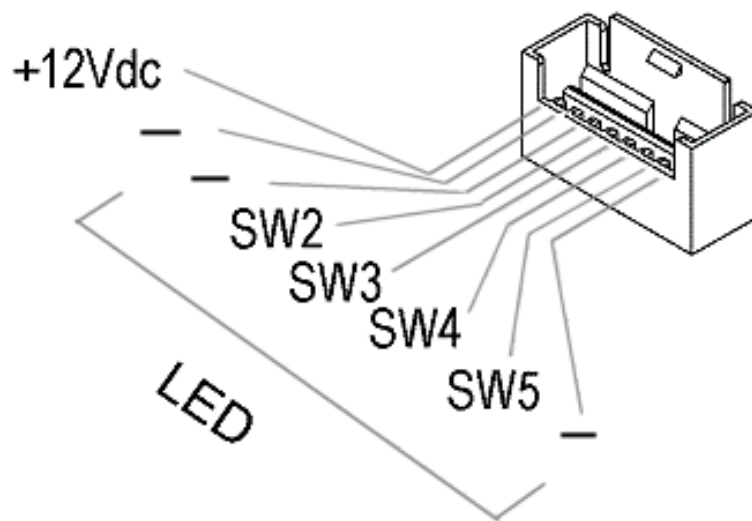


Figure 4 - Low Voltage Interface Connection Description:



Pin 1 = +12Vdc
 Pin 2, 3, 8 = Unused
 Pin 4 to Pin 7 = SW2 to SW5 LEDs

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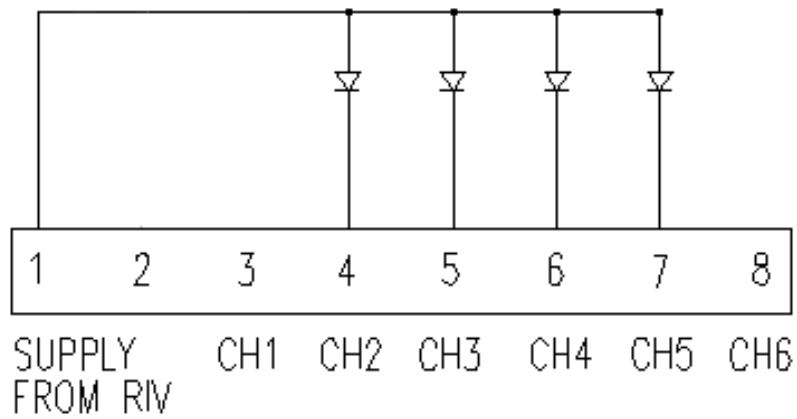
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Date: 27/02/2007

CUSTOMER SPECIFICATION

Part No. :- 500-0037-00
Model No. :- RIV 120M-4 RoHS China

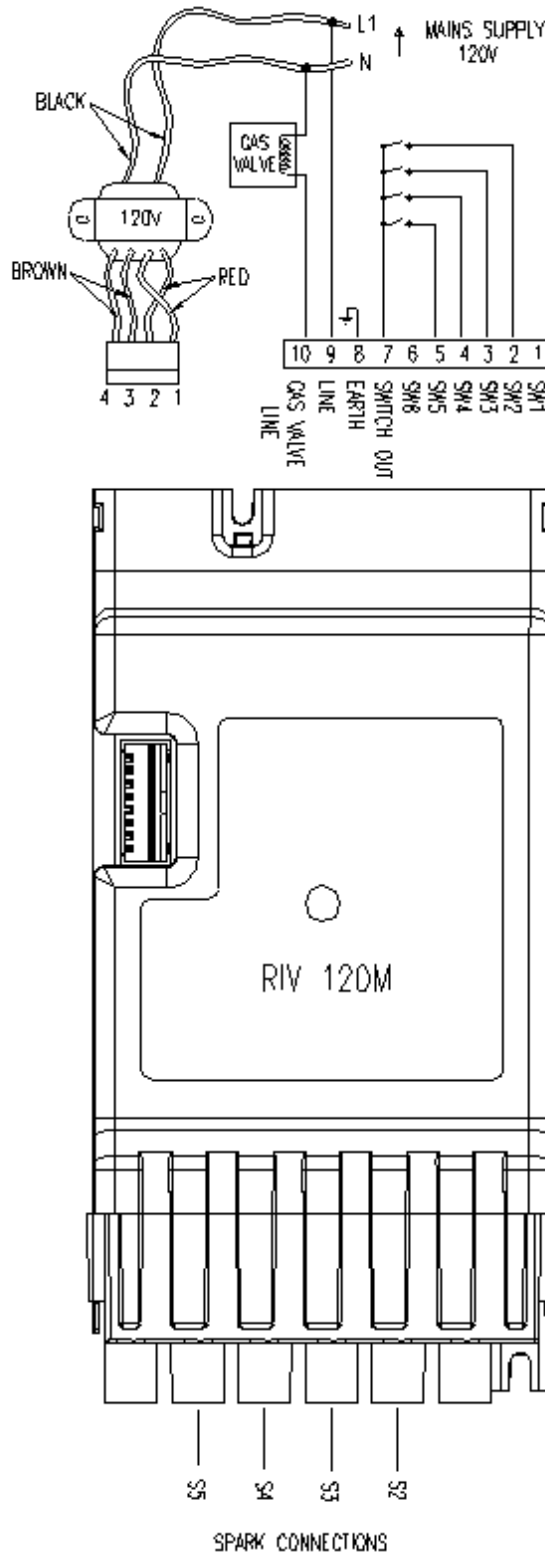
Figure 5: RIV Low Voltage Interface Connection Detail:



CUSTOMER SPECIFICATION

Part No. :- 500-0037-00
 Model No. :- RIV 120M-4 RoHS China

Figure 6: Typical Control Wiring Diagram for 120V Single Phase Mains Supply:



Note: Switches must be wired as shown! For 240V supply, adjust transformer and gas valve to suit

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File: 500-0037-CS01-01

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CUSTOMER SPECIFICATION

Part No. :- 500-0037-00
 Model No. :- RIV 120M-4 RoHS China

Appendix 1:
 Tytronics part no. 9902 301 00050
 120 Volt transformer sheet 1

SPECIFICATIONS

P(1)

Date:04.14.2004

Parts Number: T2 (120V)
 Drawn Number: SCD-91156EC04

(A) Electrical characteristics:

1. Primary rated voltage and rated frequency: 120V/60Hz
2. Secondary rated voltage, rated current

TAP	VIN	OUTPUT (WHT-BRN)	LOAD	OUTPUT (RED-YEL)	LOAD
BLK-BLK	120V	16.0V ± 5%	0	119V ± 2%	0
BLK-BLK	120V	13.7V ± 5%	140mA	108V ± 2%	12mA

3. Primary current: 120V/60Hz 25mA Max. At no Load.
4. Temperature rise: (Resistance method)
 Less than 40 °C for rated load. AT TAP 1-2 INPUT 120V/60Hz
5. Dielectric strength: (Shall withstand without breakdown)
 - (1) 50/60Hz 2500 V for one minute between primary winding and secondary winding. (cut off current:2mA)
 - (2) 50/60Hz 2500 V for one minute between primary winding and core. (cut off current:2mA)
 - (3) 50/60Hz 1250 V for one minute between secondary and secondary. (cut off current: 2mA)
 - (4) 50/60Hz 1200 V for one minute between secondary and core. (cut off current: 2mA)
6. Sample test data:

LEADS	VIN	Hz	IO (mA)	W	VOUT (WHT-BRN)	LOAD	VOUT (RED-YEL)	LOAD
BLK-BLK	120	60	15.9	0.89	16.05V	0	119.0V	0
BLK-BLK	120	60	40.1	4.55	13.89V	140mA	108.4V	12mA

CUSTOMER SPECIFICATION

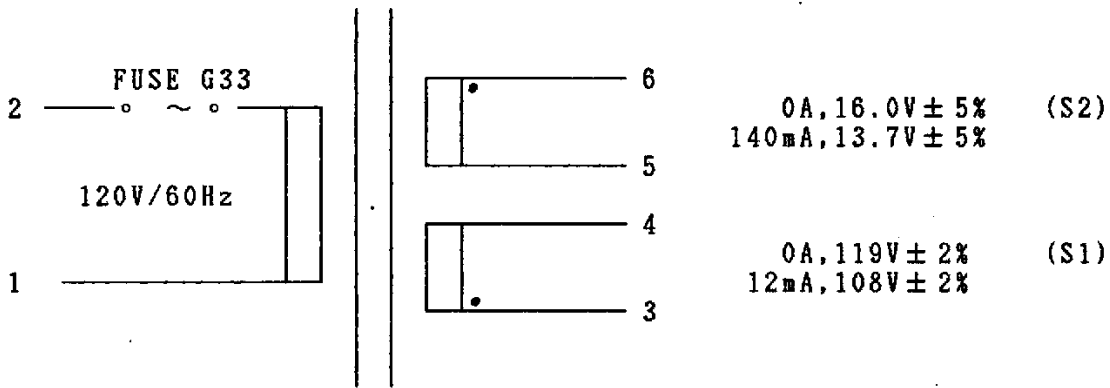
Part No. :- 500-0037-00
 Model No. :- RIV 120M-4 RoHS China


Appendix 1:
 Tytronics part no. 9902 301 00050
 120 Volt transformer sheet 2

PART NUMBER: T2 (120V)
 DRAWN NO: SCD-91156EC04

P (2)

1. SCHEMATIC DIAGRAM

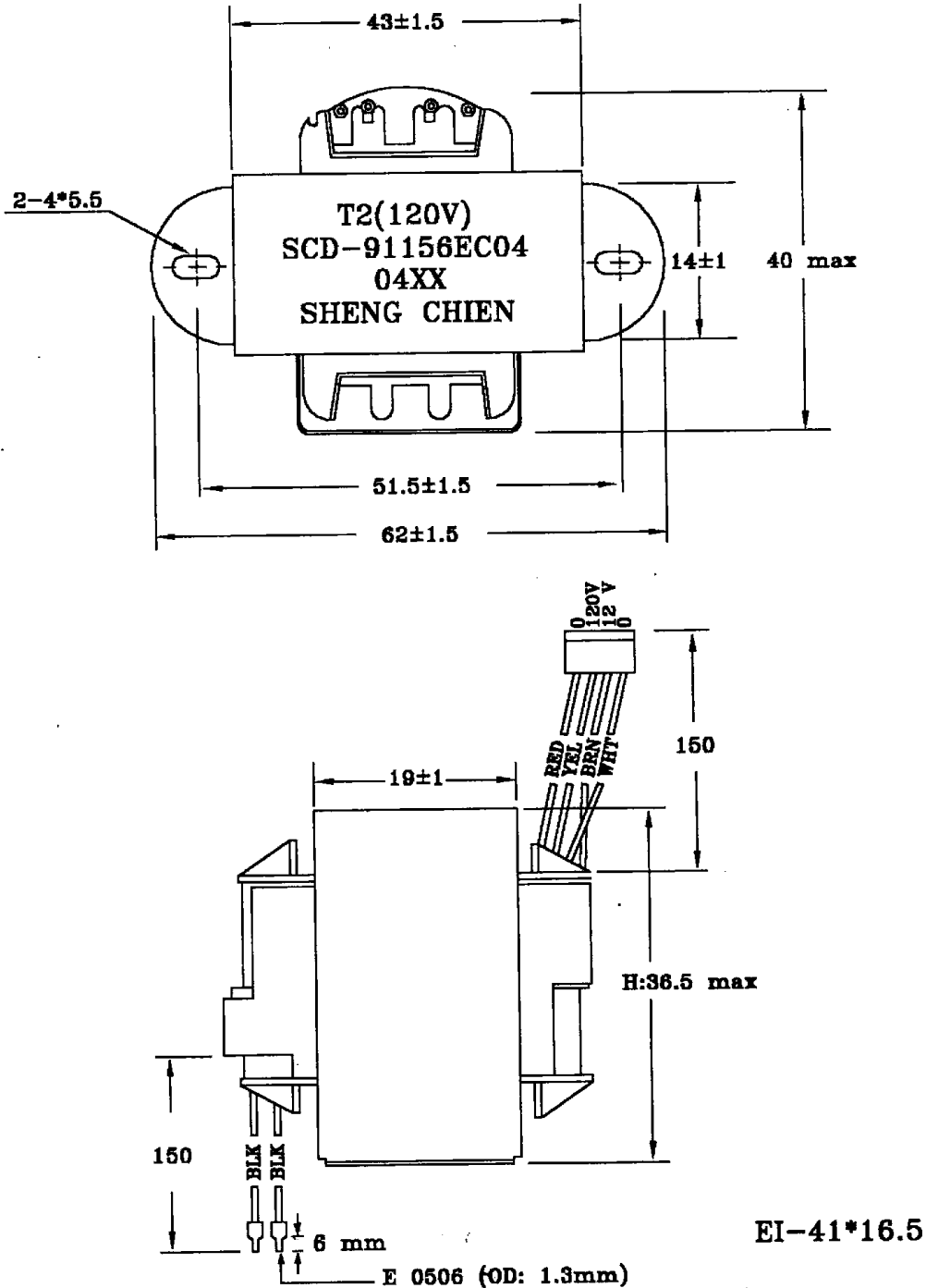


NO	COLOR	MATERIAL	AWG	LENGTH	STRIP & TIN	HOUSING	TERMINAL
1	BLACK	UL-1015	22	150 ± 10	3 REF		KST E0506
2	BLACK	UL-1015	22	150 ± 10	3 REF		KST E0506
3	RED	UL-1015	22	150 ± 10	3 REF	 P24508-04 (PITCH: 5.08mm)	9060T
4	YELLOW	UL-1015	22	150 ± 10	3 REF		9060T
5	BROWN	UL-1015	22	150 ± 10	3 REF		9060T
6	WHITE	UL-1015	22	150 ± 10	3 REF		9060T

CUSTOMER SPECIFICATION

Part No. :- 500-0037-00
 Model No. :- RIV 120M-4 RoHS China

Appendix 1:
 Tytronics part no. 9902 301 00050
 120 Volt transformer sheet 3



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File: 500-0037-CS01-01

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Date: 27/02/2007

CUSTOMER SPECIFICATION

Part No. :- 500-0037-00
 Model No. :- RIV 120M-4 RoHS China

Appendix 2:
 Tytronics part no. 9902 301 00051
 230 Volt transformer sheet 1

SPECIFICATIONS

P(1)
 Date: 04.14.2004

Parts Number: T1 (230V)
 Drawn Number: SCD-91155EC04

(A) Electrical characteristics:

1. Primary rated voltage and rated frequency: 230V/50Hz
2. Secondary rated voltage, rated current

TAP	VIN	OUTPUT (WHT-BRN)	LOAD	OUTPUT (RED-YEL)	LOAD
BLK-BLK	230V	16.0V ± 5%	0	118.7 ± 2%	0
BLK-BLK	230V	13.7V ± 5%	140mA	108.0 ± 2%	12mA

3. Primary current: 230V/50Hz 25mA Max. At no Load.
4. Temperature rise: (Resistance method)
 Less than 40 °C for rated load. AT TAP 1-2 INPUT 230V/50Hz
5. Dielectric strength: (Shall withstand without breakdown)
 - (1) 50/60Hz 2500 V for one minute between primary winding and secondary winding. (cut off current: 2mA)
 - (2) 50/60Hz 2500 V for one minute between primary winding and core. (cut off current: 2mA)
 - (3) 50/60Hz 1250 V for one minute between secondary and secondary. (cut off current: 2mA)
 - (4) 50/60Hz 1200 V for one minute between secondary and core. (cut off current: 2mA)

6. Sample test data:

LEADS	VIN	Hz	IO (mA)	W	VOUT (WHT-BRN)	LOAD	VOUT (RED-YEL)	LOAD
BLK-BLK	230	50	16.2	1.25	16.01V	0	118.7 V	0
BLK-BLK	230	50	24.2	4.83	13.85V	140mA	108.1 V	12mA

CUSTOMER SPECIFICATION

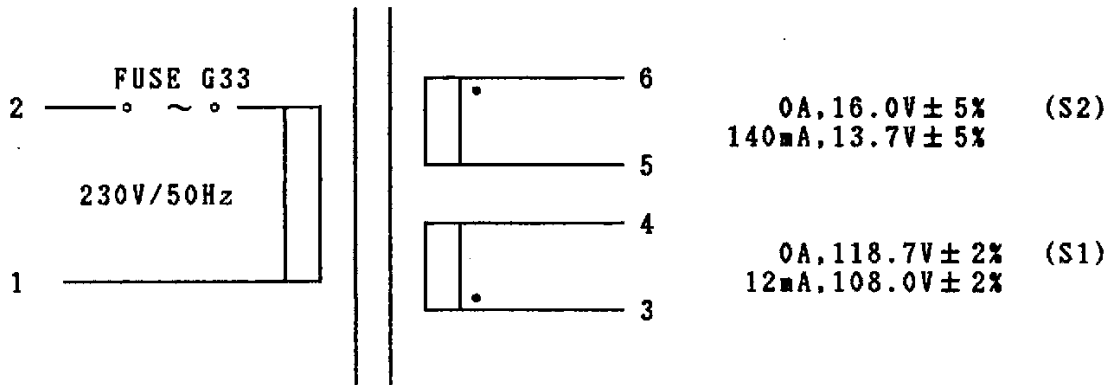
Part No. :- 500-0037-00
 Model No. :- RIV 120M-4 RoHS China


Appendix 2:
 Tytronics part no. 9902 301 00051
 230 Volt transformer sheet 2

PART NUMBER: T1 (230V)
 DRAWN NO: SCD-91155EC04

P (2)

1. SCHEMATIC DIAGRAM



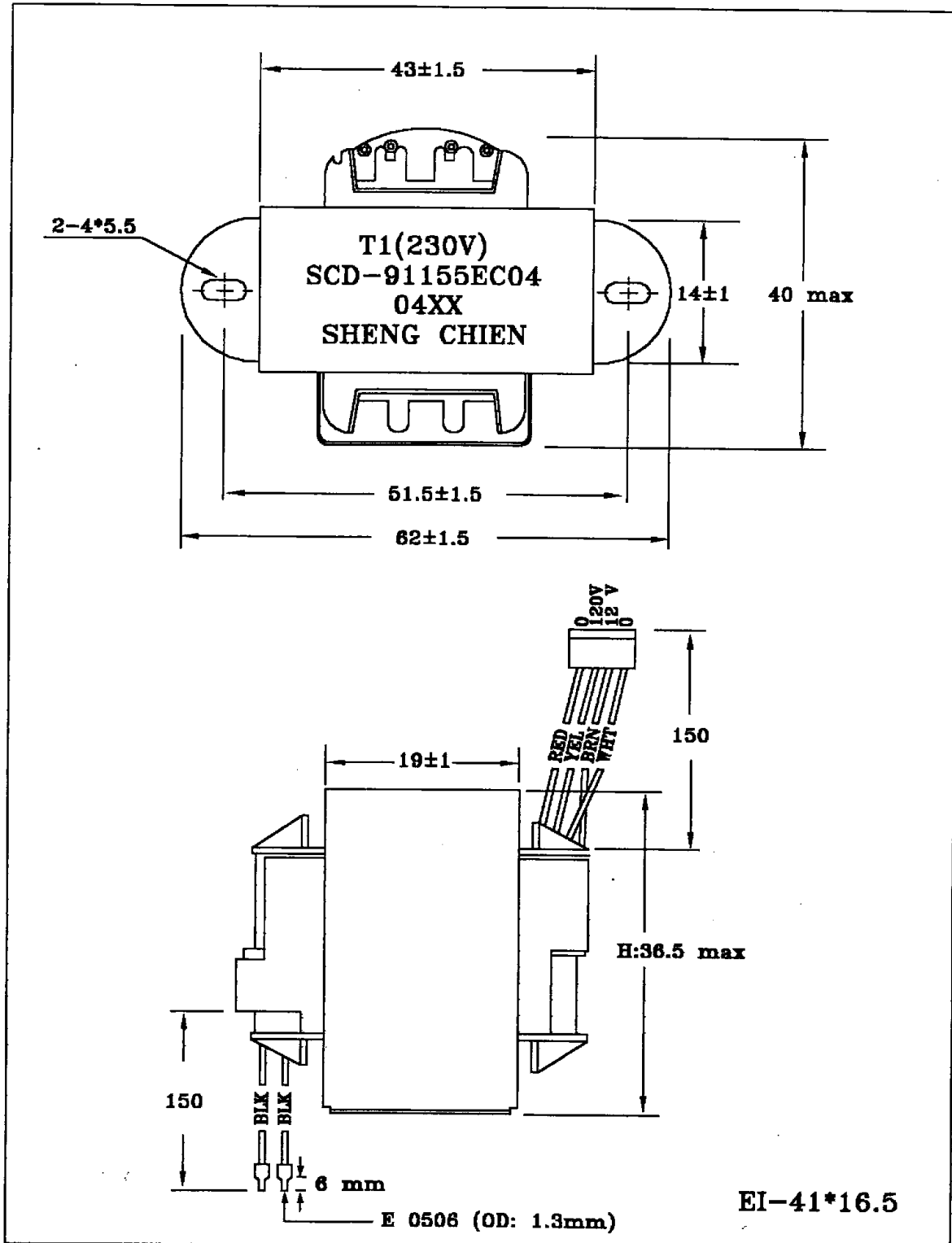
NO	COLOR	MATERIAL	AWG	LENGTH	STRIP & TIN	HOUSING	TERMINAL
1	BLACK	UL-1015	22	150 ± 10	3 REF		KST E0506
2	BLACK	UL-1015	22	150 ± 10	3 REF		KST E0506
3	RED	UL-1015	22	150 ± 10	3 REF	 P24508-04 (PITCH: 5.08mm)	9060T
4	YELLOW	UL-1015	22	150 ± 10	3 REF		9060T
5	BROWN	UL-1015	22	150 ± 10	3 REF		9060T
6	WHITE	UL-1015	22	150 ± 10	3 REF		9060T

CUSTOMER SPECIFICATION

Part No. :- 500-0037-00
 Model No. :- RIV 120M-4 RoHS China

Appendix 2:

Tytronics part no. 9902 301 00051
 230 Volt transformer sheet 3



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Iss. 1 C/No. L8576 By DdG Auth.

File: 500-0037-CS01-01

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