

## TABLE OF CONTENTS

<b>1. GENERAL DESCRIPTION AND SCOPE .....</b>	<b>3</b>
<b>2. REFERENCE DOCUMENTS .....</b>	<b>3</b>
2.1. <i>EMI regulatory</i> .....	3
2.2. <i>Safety</i> .....	3
<b>3. PHYSICAL REQUIREMENTS.....</b>	<b>3</b>
3.1. <i>Mechanical specifications</i> .....	3
3.2. <i>Connector specifications</i> .....	3
<b>4. ELECTRICAL REQUIREMENTS .....</b>	<b>4</b>
4.1. <i>Output electrical requirements</i> .....	4
4.1.1.        Output rating.....	4
4.1.2.        Load capacity specifications .....	5
4.1.3.        Hold-up time (@full load) .....	5
4.1.4.        Output rise time .....	5
4.1.5.        Over voltage protection .....	5
4.1.6.        Short circuit protection.....	5
4.1.7.        Over current protection .....	5
4.1.8.        Power good signal .....	5
4.2. <i>Output transient load response</i> .....	7
4.3. <i>Input electrical specifications</i> .....	7
4.3.1.        Voltage range .....	7
4.3.2.        Input frequency .....	8
4.3.3.        Inrush current .....	8
4.3.4.        Input line current .....	8
4.4. <i>Efficiency</i> .....	8
4.5. <i>(loading shown in Amps)</i> .....	8
4.6. <i>PS_ON#</i> .....	8
<b>5. ENVIRONMENTAL REQUIREMENTS .....</b>	<b>9</b>
5.1. <i>Temperature range</i> .....	9
5.2. <i>Humidity</i> .....	9
5.3. <i>Vibration</i> .....	9
5.4. <i>Shock</i> .....	9
<b>6. SAFETY .....</b>	<b>9</b>
6.1. <i>Leakage current</i> .....	9
<b>7. ELECTROMAGNETIC COMPATIBILITY.....</b>	<b>10</b>

7.1. *Line conducted emi* ..... 10  
7.2. *Radiated EMI*..... 10  
**8. LABELLING ..... 10**  
8.1. *Model number label* ..... 10  
8.2. *DC output identification*..... 10  
**9. RELIABILITY ..... 10**  
9.1. *MTBF*..... 10  
**10. MECHANICAL..... 10**  
10.1. *Outside dimension*..... 10  
10.2. *Drawing*..... 11

## **1. GENERAL DESCRIPTION AND SCOPE**

This is the specification of Model TC-2U60PD8; AC-line powered switching power supply with active PFC (Power Factor Correction) circuit, meet EN61000-3-2 and with Full Range Input features.

The specification below is intended to describe as detail as possible the functions and performance of the subject power supply. Any comment or additional requirements to this specification from our customers will be highly appreciated and treated as a new target for us to approach.

## **2. REFERENCE DOCUMENTS**

The subject power supply will meet the EMI requirements and obtain main safety approvals as following:

### **2.1. EMI regulatory**

- CISPR 22 Class 'B' 230 Vac operation.

### **2.2. Safety**

- UL/CUL 60950
- TUV EN60950
- CB 1EC60950
- CCC

## **3. PHYSICAL REQUIREMENTS**

### **3.1. Mechanical specifications**

The mechanical drawing of the subject power supply, which indicate the form factor, location of the mounting holes, location, the length of the connectors, and other physical specifications of the subject power supply. Please refer to the attachment drawing.

### **3.2. Connector specifications**

The power supply connectors are:

AC Inlet	: Standard inlet socket 10A/250V, UL/CSA/VDE approved.
P1	: The equivalent of MOLEX 39-01-2240, 24 pin connector
PA,PB,PC,	: The equivalent of AMP 1-480424-0, 4 pin connector
PD	:The equivalent of AMP 171822-4, 4 pin connector
P2	:The equivalent of Molex 39-01-2080, 8pin connector

## 4. ELECTRICAL REQUIREMENTS

### 4.1. Output electrical requirements

The subject power supply will meet all electrical specifications below, over the full operation temperature range and dynamic load regulation.

#### 4.1.1. Output rating

Output	Nominal	Regulation	Ripple/Noise	Min	Max	peak
1	+3.3V	±5%	50mV	0.5A	24.0 A	
2	+5V	±5%	50mV	0.5A	24.0 A	
3	+12V1	±5%	120mV	3.0A	48.0 A	
4	-5V	±10%	100mV	0 A	0.3 A	
5	-12V	±10%	120mV	0 A	0.5 A	
6	+5VSB	±5%	50mV	0 A	2.5A	

- (1) The +3.3V and +5V total output shall not exceed 150watts.
- (2) total output for this subject power supply is 600 watts.
- (3) Max continuous load combined 12V should not exceed 48A.
- (4) Ripple and noise measurements shall be made under all specified load conditions through a single pole low pass filter with 20MHz cutoff frequency. Outputs shall bypassed at the connector with a 0.1uF ceramic disk capacitor and a 47uF electrolytic capacitor to simulate system loading.
- (5) -5V is option.

#### 4.1.2. Load capacity specifications

The cross regulation defined as follows, the voltage regulation limits DC include DC Output ripple & noise.

LOAD	STM.	+3.3V	+5V	+12V	-5V	-12V	5VSB
3.3V FULL	HMHHHH	24.0A	14.16A	35.84A	0.3A	0.5A	2.5A
5V FULL	MHHHHH	9.1A	24.0A	35.84A	0.3A	0.5A	2.5A
+5V CROSS	LHLLLLL	0.5A	24.0 A	3.0A	0A	0A	2.5A
+3.3V CROSS	HLLLLLL	24.0 A	0.5 A	3.0A	0A	0A	2.0A
+12V CROSS	LLHLLLL	0.5 A	4.0A	48.0A	0A	0A	0.1A
ALL MIN	LLLLLLL	0.5 A	0.5 A	3.0A	0A	0A	0A

#### 4.1.3. Hold-up time (@full load)

115V / 60Hz : 16 mSec. Minimum.

230V / 50Hz : 16 mSec. Minimum.

#### 4.1.4. Output rise time

(10% TO 90% OF FINAL OUTPUT VALUE, @FULL LOAD)

115V-rms or 230V-rms + 5Vdc : 20ms Maximum

#### 4.1.5. Over voltage protection

Voltage Source	Protection Point
+ 3.3 V	3.5V-4.5V
+5V	5.5V-6.82V
12V	13.4V-15.6V

#### 4.1.6. Short circuit protection

Output short circuit is defined to be a short circuit load of less than 0.1 ohm.

In the event of an output short circuit condition on +3.3V, +5V or +12V output, the power supply will shutdown and latch off without damage to the power supply. The power supply shall return to normal operation after the short circuit has been removed and the power switch has been turned off for no more than 2 seconds.

In the event of an output short circuit condition on -12V output, the power supply will not be damaged. The power supply shall return to normal operation as soon as the short circuit has been removed. and the power switch has been turned off for no more than 2 seconds.

#### 4.1.7. Over current protection

3.3V	25A-40A
5V	25A-40A
12V1	50.4A – 72A

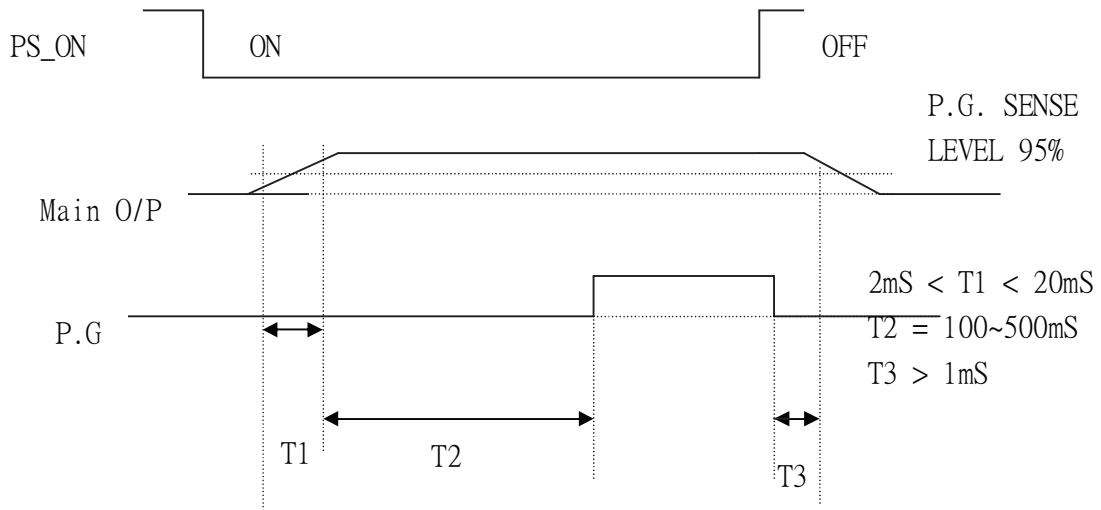
#### 4.1.8. Power good signal

The power good signal is a TTL compatible signal for the purpose of initiating an orderly star-up procedure under normal input operating conditions. This signal is asserted (low) until +5Vdc has reached 4.75 volts during power up. Characteristics:

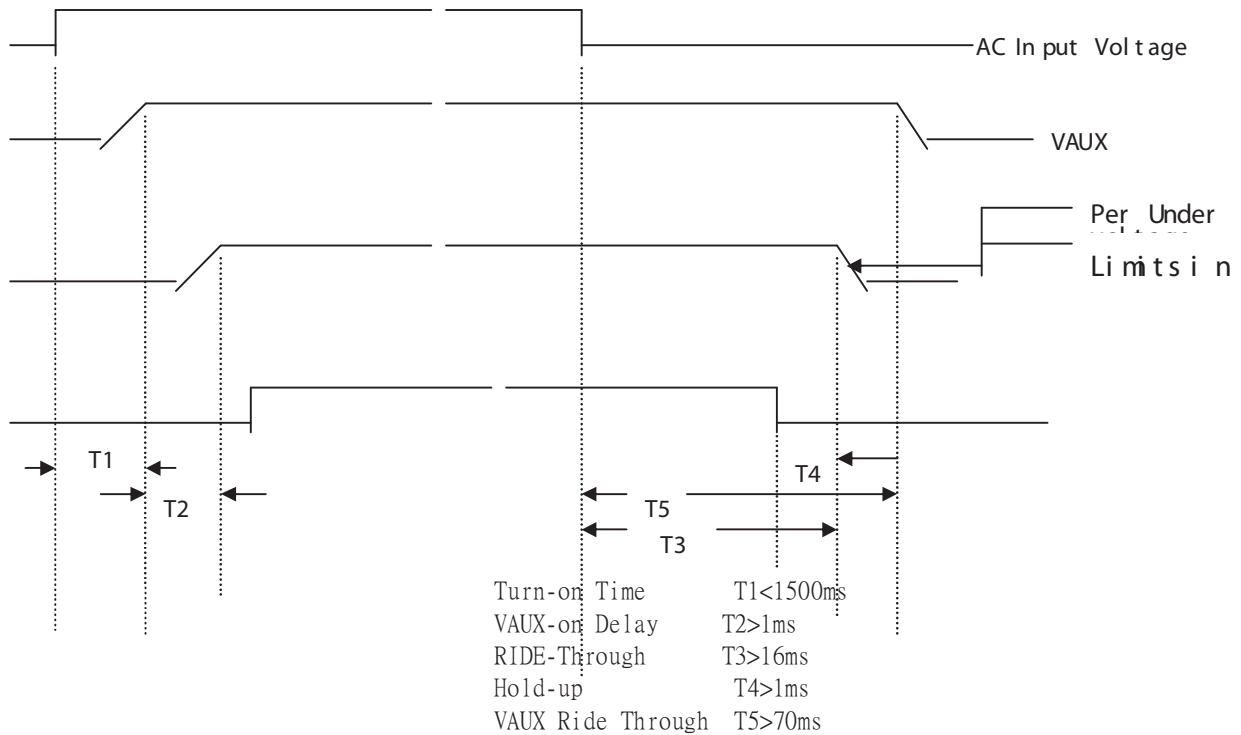
TTL signal asserted (low state) : less than 0.5V while sinking 10mA.  
 TTL signal asserted (high state): greater than 4.75V while sourcing 500uA.  
 High state output impedance: less or equal to 1Kohm from output to common.

POWER GOOD @ 115/230V,FULL LOAD	100 -500mSec.
POWER FAIL @115/230V, FULL LOAD	1 mSec. minimum

(A) Remote ON-OFF Timing:



**(B) AC ON / OFF Timing :**



**4.2. Output transient load response**

The output voltages shall remain within the limits specified in 4.1.1 output rating table in page 6 for the step loading and within the limits specified in Table 1 for the capacitive loading. The load transient repetition rate shall be tested between 50Hz and 5 kHz at duty cycles ranging from 10%-90%. The load transient repetition rate is only a test specification. The step load may occur anywhere within the MIN load to the MAX load shown in Table 1.

**Table 1: Transient Load Requirements**

Output	Step Load Size	Load Slew Rate	Capacitive Load
+3.3V	30% of max load	0.5A/us	1000uF
+5V	30% of max load	0.5A/us	1000uF
12V	65% of max load	1.0A/us	6600uF
+5Vsb	25% of max load	0.1A/us	100uF

**4.3. Input electrical specifications**

**4.3.1. Voltage range**

PARAMETER		UNITS
V-in Range	90 - 264	V-rms

#### 4.3.2. Input frequency

INPUT FREQUENCY	47–63Hz
-----------------	---------

#### 4.3.3. Inrush current

(Cold start – 25 deg. C)

115V	NO damage
230V	NO damage

(No damage)

#### 4.3.4. Input line current

115V	10.0 Amps – rms maximum
230V	5.0 Amps – rms maximum

#### 4.4. Efficiency

	Full load (100%)	Typical load (50%)	Light load (20%)
115VAC	80%	80%	80%
230VAC	80%	80%	80%

#### 4.5. (loading shown in Amps)

Loading	+12V	+5V	+3.3V	-5V	-12V	+5Vsb
Full (100%)	38.68	14.56	14.56	0.25	0.4	2.01
Typical (50%)	19.34	7.28	7.28	0	0.2	1.01
Light (20%)	7.70	2.91	2.91	0	0.08	0.4

#### 4.6. PS\_ON#

PS\_ON# is an active-low, TTL-compatible signal that allows a motherboard to remotely control the power supply in conjunction with features such as soft on/off, Wake on LAN+, or wake-on-modem. When PS\_ON# is pulled to TTL low, the power supply should turn on the five main DC output rails: +12VDC,+5VDC,+3.3VDC,-5VDC,and -12VDC. When PS\_ON# is pulled to TTL high or open-circuited, the DC output rails should not deliver current and should be held at zero potential with respect to ground. PS\_ON# has no effect on the +5VSB output, which is always enabled whenever the AC power is present. Table 15 lists PS\_ON# signal characteristics.

The power supply shall provide an internal pull-up to TTL high. The power supply shall also provide debouche circuitry on PS\_ON# to prevent it from oscillating on/off at startup when activated by a mechanical switch. The DC output enable circuitry must be SELV-compliant.



	Min.	Max.
VIL, Input Low Voltage	0.0V	0.8V
IIL, Input Low Current (Vin = 0.4V)		-1.6mA
VIH, Input High Voltage (Iin = -200µA)	2.0V	
VIH OPEN circuit, Iin = 0		5.25V

## 5. ENVIRONMENTAL REQUIREMENTS

The power supply will be compliant with each item in this specification for the following environmental conditions.

### 5.1. Temperature range

Operating	0 to +40 deg. C
Storage	-20 to +80 deg. C

### 5.2. Humidity

Operating	85% RH, Non-condensing
Storage	95% RH, Non-condensing

### 5.3. Vibration

The subject power supply will withstand the following imposed conditions without experiencing non-recoverable failure or deviation from specified output characteristics.

Vibration Operating – Sine wave excited, 0.25 G maximum acceleration, 10-250 Hz swept at one octave / min. Fifteen minute dwell at all resonant points, where resonance is defined as those exciting frequencies at which the device under test experiences excursions two times larger than non-resonant excursions.

Plane of vibration to be along three mutually perpendicular axes.

### 5.4. Shock

The subject power supply will withstand the following imposed conditions without experiencing non-recoverable failure or deviation from specified output characteristics.

Storage –40G, 11 mSec. half-sine wave pulse in both directions on three mutually perpendicular axes.

Operating -10G, 11mSec. half-sine wave pulse in both directions on three mutually Perpendicular axes.

## 6. SAFETY

### 6.1. Leakage current

The leakage current from AC to safety ground will not exceed 3.5 mA-rms at 264Vac, 50 Hz.

## **7. ELECTROMAGNETIC COMPATIBILITY**

### **7.1. Line conducted emi**

The subject power supply in system case will meet CCC class B requirements full load conditions.

### **7.2. Radiated EMI**

The subject power supply in system case will meet CCC class B requirements full load conditions.

## **8. LABELLING**

Label marking will be permanent, legible and complied with all agency requirements.

### **8.1. Model number label**

Labels will be affixed to the sides of the power supply showing the following:

- Manufacturer's name and logo.
- Model no., serial no., revision level, location of manufacturer.
- The total power output and the maximum load for each output.
- AC input rating.

### **8.2. DC output identification**

Each output connector will be labeled.

## **9. RELIABILITY**

### **9.1. MTBF**

The power supply have a minimum predicted MTBF(SR-332) of 100,000 hours of continuous operation at 25 deg. C, maximum-output load, and nominal AC input voltage.

## **10. MECHANICAL**

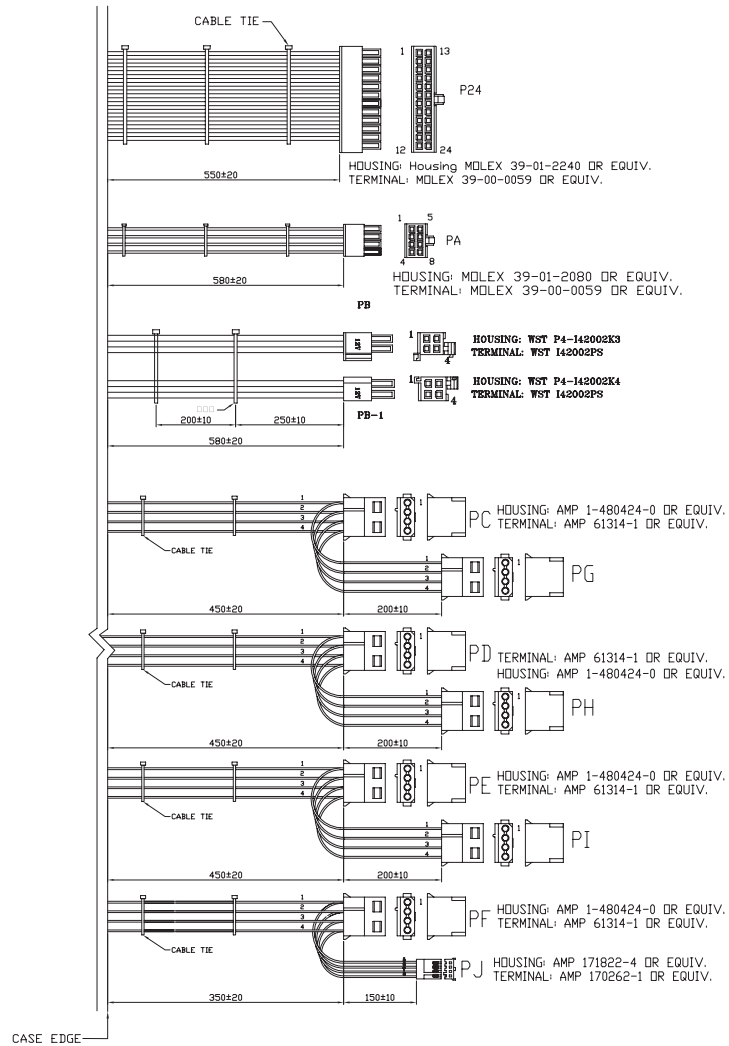
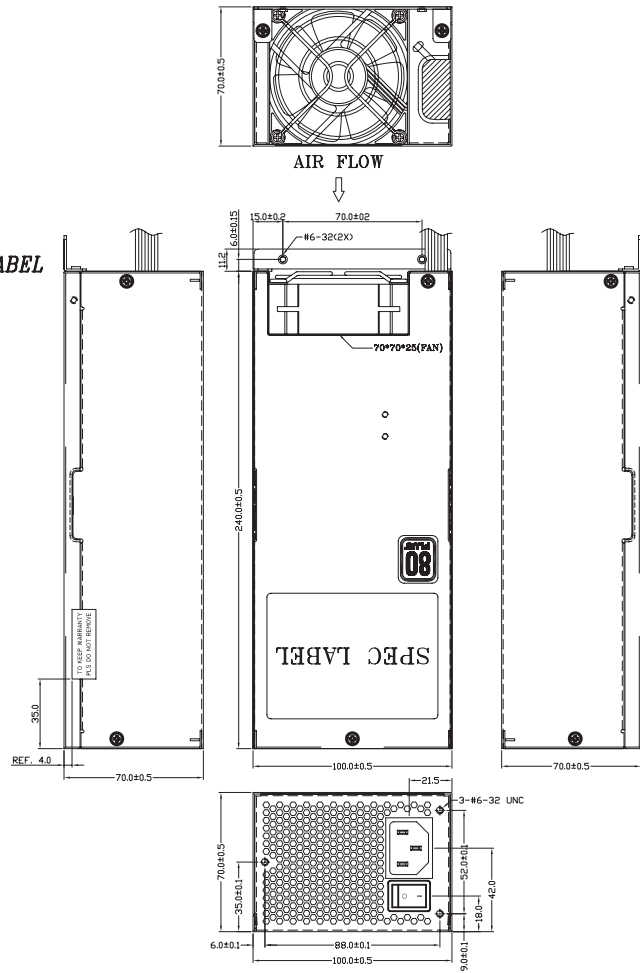
### **10.1. Outside dimension**

The power supply outline dimension is L240 x W100 x H70 (mm)

# 10.2. Drawing

PART No :		
REV.	DESCRIPTION	DATE
00	ORIGINAL RELEASE	01/08/09'

80PLUS LABEL  
SCALE: 5:1



PF/PJ: L4P/S4P

CONN. NO	RATING	WIRE TYPE	WIRE COLOR	CONN. NO	RATING	WIRE TYPE	WIRE COLOR
POS. 1	+12V	18 AWG	YELLOW	POS. 5	22 AWG	YELLOW	
POS. 2	GND	18 AWG	BLACK	POS. 6	22 AWG	BLACK	
POS. 3	GND	18 AWG	BLACK	POS. 7	22 AWG	BLACK	
POS. 4	+5V	18 AWG	RED	POS. 8	22 AWG	RED	

NOTES: UNIT:mm  
1. OUTLINE DIMENSION : 240L\*100W\*70H  
2. OUTPUT CONNECTOR & PIN ASSIGNMENT:

P24: 24PIN

CONN. NO	RATING	WIRE COLOR	WIRE TYPE
POS. 1	+3.3V	ORANGE	18 AWG
POS. 2	+3.3V	ORANGE	18 AWG
POS. 3	GND	BLACK	18 AWG
POS. 4	+5V	RED	18 AWG
POS. 5	GND	BLACK	18 AWG
POS. 6	+5V	RED	18 AWG
POS. 7	GND	BLACK	18 AWG
POS. 8	PW-ON	GRAY	22 AWG
POS. 9	+5VSB	PURPLE	18 AWG
POS. 10	+12V	YELLOW	18 AWG
POS. 11	+12V	YELLOW	18 AWG
POS. 12	+3.3V	ORANGE	18 AWG
POS. 13	+3.3V	ORANGE	18 AWG
POS. 14	+3.3V\$	BROWN	22 AWG
POS. 15	-12V	BLUE	18 AWG
POS. 16	GND	BLACK	18 AWG
POS. 17	PS-ON	GREEN	22 AWG
POS. 18	GND	BLACK	18 AWG
POS. 19	GND	BLACK	18 AWG
POS. 20	-5V	WHITE	22 AWG
POS. 21	+5V	RED	18 AWG
POS. 22	+5V	RED	18 AWG
POS. 23	+5V	RED	18 AWG
POS. 24	GND	BLACK	18 AWG

PA: 8PIN

CONN. NO	RATING	WIRE COLOR	WIRE TYPE
POS. 1	GND	BLACK	18 AWG
POS. 2	GND	BLACK	18 AWG
POS. 3	GND	BLACK	18 AWG
POS. 4	GND	BLACK	18 AWG
POS. 5	+12V	YELLOW	18 AWG
POS. 6	+12V	YELLOW	18 AWG
POS. 7	+12V	YELLOW	18 AWG
POS. 8	+12V	YELLOW	18 AWG

PB/PB-1: 4+4PIN

CONN. NO	RATING	WIRE COLOR	WIRE TYPE
POS. 1	GND	BLACK	18 AWG
POS. 2	GND	BLACK	18 AWG
POS. 3	+12V	YELLOW	18 AWG
POS. 4	+12V	YELLOW	18 AWG

PC/PG: L4P/L4P

CONN. NO	RATING	WIRE COLOR	WIRE TYPE
POS. 1	+12V	YELLOW	18 AWG
POS. 2	GND	BLACK	18 AWG
POS. 3	GND	BLACK	18 AWG
POS. 4	+5V	RED	18 AWG

PD/PH: L4P/L4P

CONN. NO	RATING	WIRE COLOR	WIRE TYPE
POS. 1	+12V	YELLOW	18 AWG
POS. 2	GND	BLACK	18 AWG
POS. 3	GND	BLACK	18 AWG
POS. 4	+5V	RED	18 AWG

PE/PI: L4P/L4P

CONN. NO	RATING	WIRE COLOR	WIRE TYPE
POS. 1	+12V	YELLOW	18 AWG
POS. 2	GND	BLACK	18 AWG
POS. 3	GND	BLACK	18 AWG
POS. 4	+5V	RED	18 AWG

**iStarUSA™**

USED ON MODEL	DO NOT SCALE DRAWING	APPROVED	RD	PE	SAFETY	ME	DESIGNER
TC-2U60PD8	UNLESS OTHERWISE SPECIFIED DIMENSION TOLERANCES ARE:						
	DECIMALS TOL.	X ± 0.5	X.X ± 0.3	X.XX ± 0.1			
	ANGLES TOL.	± 1°					

TITLE/PART NAME: TC-2U60PD8 Drawing

MATERIAL: \_\_\_\_\_

FINISH: \_\_\_\_\_

SCALE : — UNIT:mm THIRD ANGLE PROJECTION SHEET 1 OF 1