

機種規格說明書

(SPECIFICATION)

本公司使用機種:

OUR PART NAME: 12mm Size Rotary Encoder

本公司使用名稱:

OUR PART NAME: EC128PSDVF-D-17.5F-15-30C-19WE

客戶名稱:

CUSTOMER'S NAME:

Page : 1 OF 11

Version : A

Drawing NO.: EC12PSD-031

1、General 一般事項

1-1、Scope 適用規格

This specification applies to 12mm size low-profile thin rotary encoder (incremental type) for microscopic current circuits used in electronic equipment.

本規格書適用於電子設備用微小電流回路12型回轉式編碼器。

1-2、Standard atmospheric conditions 標準狀態

Unless otherwise specified ,the standard range of atmospheric conditions for making measurements and test is as following limits:

除另有規定外，測量應在以下狀態下進行：

Ambient temperature 溫度：15℃ ～ 35℃

Relative humidity 相對濕度：25% ～ 85%

Air pressure 氣壓：86 kPa ～ 106 kPa

1-3、Operating temperature range 使用溫度範圍：-40℃ ～ 85℃

1-4、Storage temperature range 保存溫度範圍：-40℃ ～ 85℃

2、Construction 構造

2-1 Dimensions 尺寸 Refer to attached drawing 見所附成品圖

3、Rating 額定值

3-1、Rated voltage 額定電壓：DC 5 V

3-2、Maximum operating current (resistive load) 最大額定電流（阻抗負載）

Each lead 各相導線：0.5mA(MAX 5mA;MIN0.5mA)

Common lead 公共導線：1mA(MAX 10mA; MIN 0.5mA)

4、Application Notes 使用上的事項

4-1、Avoid storing the products in a place at high temperature, high humidity and in Corrosive gases. Please use this product as soon as possible with 6 months limitation . If any remainder left after packing is opened, please store it with proper moistureproofing, gasproofing etc.

避免儲藏於高溫、潮濕及腐蝕的場所，產品購入後盡可能在6個月內使用完。拆包裝後未使用完的剩餘產品需儲藏於防潮防毒的環境下。

備 注:
(REMARK)

核 準
APPROVED

審 核
REVIEWED

經 辦 者
PREPARED

Terry

Ryu

余 倩

2015.12.31

2015.12.31

2015.12.31

TOP-UP INDUSTRY CORP.

機種規格說明書

(SPECIFICATION)

本公司使用機種:

OUR PART NAME: 12mm Size Rotary Encoder

本公司使用名稱:

OUR PART NAME: EC12PSDVF-D-17.5F-15-30C-19WE

Page : 2 OF 11

客戶名稱:

Version : A

CUSTOMER'S NAME: _____

Drawing NO.: EC12PSD-031

4-2、The encoder pulses count method should be designed with taking operating speed ,sampling time and design software into consideration .

編碼器信號的計算方法應將操作的速度，信號的取樣時間及電子回路中的微電腦軟體等考慮進去。

4-3、With this products ,detent positon will always be aligned with A-OFF or ON phase. Therefore make the A phase of the microcomputer the reference at the soft ware design stage.

此產品在定位點狀態時A相波形是處於OFF或ON狀態，因此在設計軟體時請留意此現象。

4-4、At design of the pulse count process. Using the C/R filter circuit is Recommended.

在設計時要考慮到雜訊，須使用C/R濾波電路。

4-5、Care must be taken not to expose this product to water or dew to prevent possible problem in pluses output waveform.

本產品請勿碰觸到水，可能會導致輸出波形的異常。

備 注:
(REMARK)

核 準
APPROVED

審 核
REVIEWED

經 辦 者
PREPARED

Terry

Ryu

余 倩

2015.12.31

2015.12.31

2015.12.31

TOP-UP INDUSTRY CORP.

機種規格說明書

(SPECIFICATION)

本公司使用機種:

OUR PART NAME:

12mm Size Rotary Encoder

本公司使用名稱:

OUR PART NAME:

EC128PSDVF-D-17.5F-15-30C-19WE

客戶名稱:

CUSTOMER'S NAME:

Page : 3 OF 11

Version : A

Drawing NO.: EC12PSD-031

5. Electrical Characteristics		電氣特性			
NO. 序號	ITEM 項 目	CONDITIONS 條 件		SPECIFICATIONS 規格	
5-1	Output signal format 輸出訊號	Note: Output signal is 1 pulse per 2 detents. And terminal A-C is pulse ON or OFF at detent position. No specified output of terminal B-C at detent position. 注意事項：輸出信號方式是2個定位1個脈 衝。在定位點位置時A-C端子處於ON或 OFF狀態，而B-C端子間不作特定要求		2 Phase-different signals (signal A, signal B) Details shown in 〈 fig.1 〉 (The broken line shows detent position .) A、B 兩相不同信號,輸出波形詳細見 〈圖 1〉。虛線表示帶卡點裝置的卡點 處位置	
		Shaft rotational direction 軸迴轉方向	Signal 信號	Output 輸出波形	
		C.W. 順時針方向	A (Terminal A-C) A (A-C 端子間)		
			B (Terminal B-C) B (B-C 端子間)		
		C.C.W. 逆時針方向	A (Terminal A-C) A (A-C 端子間)		
			B (Terminal B-C) B (B-C 端子間)		
5-2	Resolution 分解能力	Number of pulses in 360o rotation. 回轉360°的輸出脈衝數		15 pulses/360° for each phase 15個脈衝/360°	
備 注: (REMARK)			核 準 APPROVED	審 核 REVIEWED	經 辦 者 PREPARED
			Terry	Ryu	余 倩
			2015.12.31	2015.12.31	2015.12.31

TOP-UP INDUSTRY CORP.

機種規格說明書

(SPECIFICATION)

本公司使用機種:

OUR PART NAME: 12mm Size Rotary Encoder

本公司使用名稱:

OUR PART NAME: EC128PSDVF-D-17.5F-15-30C-19WE

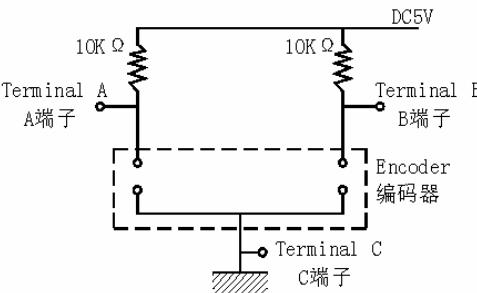
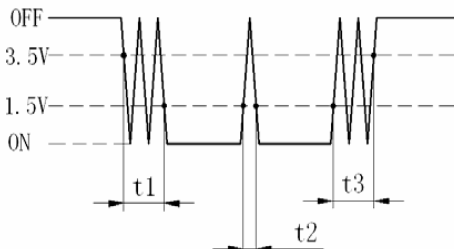
客戶名稱:

CUSTOMER'S NAME: _____

Page : 4 OF 11

Version : A

Drawing NO.: EC12PSD-031

NO. 序號	ITEM 項目	CONDITIONS 條件	SPECIFICATIONS 規格
5-3	Switching characteristics 開關特性	<p>Measurement shall be made under the condition as follows.</p> <p>1)Shaft rotational speed : 360°/S</p> <p>2)Test circuit : (fig.2)</p> <p>下 (圖2) 所示回路，軸以360°/秒的速度回轉測定。</p> <p><Fig.2></p>  <p><Fig.3></p>  <p>(Note) Code-OFF area : The area which the voltage is 3.5V or more.</p> <p>Code-ON area : The area which the voltage is 1.5V or less.</p> <p>(注) 編碼器 OFF 指輸出電壓 3.5V 以上的狀態。</p> <p>編碼器 ON 指輸出電壓 1.5V 以下的狀態。</p>	
5-3-1	Chattering 振蕩	<p>Specified by the signal's passage time from 1.5V to 3.5V of each switching position (code OFF~ON or ON~OFF) (Fig.3)</p> <p>編碼從OFF→ON 或 ON→OFF時，輸出1.5V~3.5V通過的時間應符合規定。圖三</p>	<p>On the case within detent, B signal will be irregular oscillation.</p> <p>帶卡點時,在卡點位置上的 B 信號振盪無規定。t1,t3 ≤ 3mS</p>
5-3-2	Sliding noise (Bounce) 滑動雜音 (突跳)	<p>Specified by the time of voltage change exceed 1.5V in code-ON area. When the bounce has code-ON time less than 1mS between chattering(t1 or t3).the voltage change shall be regarded as a part of chattering. When the code-ON time between 2 bounces is less than 1mS.they are regarded as 1 linked bounce.</p> <p>編碼ON部分的1.5V以上的電壓變動時間在振盪t1,t3之間會產生1毫秒以上1.5V以下的ON部分.另外,如果各突跳間1.5V以下的範圍在1毫秒以上時,則判定為另一個突跳.</p>	t2 ≤ 2mS
備 注: (REMARK)		核 準 APPROVED	審 核 REVIEWED
		Terry	Ryu
		2015.12.31	2015.12.31
		經 辦 者 PREPARED	
		余 倩	
		2015.12.31	

TOP-UP INDUSTRY CORP.

機種規格說明書

(SPECIFICATION)

本公司使用機種:

OUR PART NAME: 12mm Size Rotary Encoder

本公司使用名稱:

OUR PART NAME: EC128PSDVF-D-17.5F-15-30C-19WE

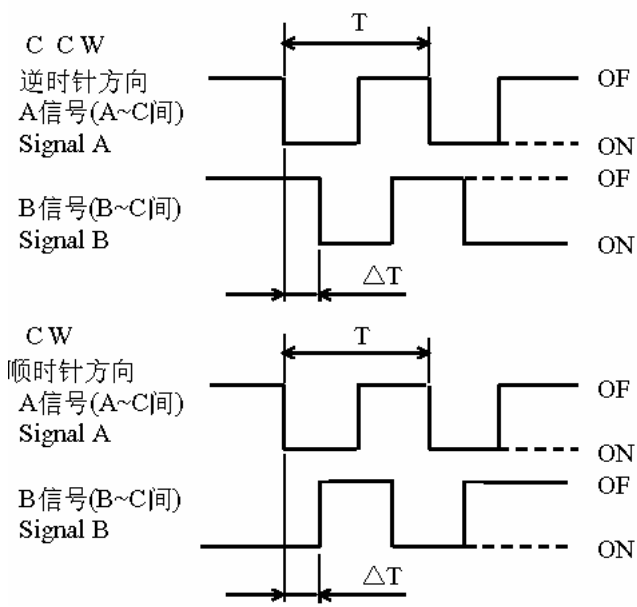
客戶名稱:

CUSTOMER'S NAME: _____

Page : 5 OF 11

Version : A

Drawing NO.: EC12PSD-031

NO. 序號	ITEM 項目	CONDITIONS 條件	SPECIFICATIONS 規格
5-3-3	Sliding noise 滑動噪音	The voltage change in code - OFF area. 編碼 OFF 部分的電壓變動。	3.5V MIN 3.5V 以上
5-4	Phase difference 相位差	<p>Measurement shall be made under the condition which the shaft is rotated in speed 360°/s. 以 360°/s 的速度操作軸進行回轉。</p>  <p style="text-align: center;">(Fig.4)圖 4</p>	$\Delta T \geq 5 \text{ ms}$ In(fig.4) 見圖 4
5-5	Insulation resistance 絕緣阻抗	Measurement shall be made under the condition which a voltage of 50V DC 1min is applied between individual terminals and bushing. 在端子和安裝板間施加電壓 50V DC 1 分鐘	Between individual terminals and bushing 10MΩ MIN. 端子安裝板間電阻 10MΩ 以上。
5-6	Dielectric strength 耐電壓	A voltage of 50V AC shall be applied for 1 minute between individual terminals and bushing. 在端子和安裝板間施加 AC 50V 電壓 1 分鐘。	Without arcing or breakdown. 不得有絕緣破壞。
備 注: (REMARK)		核 準 APPROVED	審 核 REVIEWED
		Terry	Ryu
		2015.12.31	2015.12.31
		經 辦 者 PREPARED	
		余 倩	
		2015.12.31	

TOP-UP INDUSTRY CORP.

機種規格說明書

(SPECIFICATION)

本公司使用機種:

OUR PART NAME: 12mm Size Rotary Encoder

本公司使用名稱:

OUR PART NAME: EC12PSDVF-D-17.5F-15-30C-19WE

客戶名稱:

CUSTOMER'S NAME: _____

Page : 6 OF 11

Version : A

Drawing NO.: EC12PSD-031

6. Mechanical characteristics 機械性能			
NO. 序號	ITEM 項 目	CONDITIONS 條 件	SPECIFICATIONS 規格
6-1	Total rotational angle 全迴轉角度	/	360°(Endless) 360°(無止擋點)
6-2	Detent torque 定位點力矩	Only suitable for C.C, equipment. 只適用於附卡點裝置	5±3mN.m. (50±30gf.cm)
6-3	Number and position of detents 定位點數及位置	Only suitable for C.C, equipment. 只適用於附卡點裝置	30 detents(Step angle: 12°±3°) 30 點定位(間隔角度 12°±3°)
6-4	Push-pull strength of shaft 軸推拉強度	Push and pull static load of 100 N(10 kgf) shall be applied to the shaft in the axial direction for 10S.(After soldering of the PC board) 在軸端,沿軸向施加 100 N(10 kgf)的靜負荷力推和拉各 10 秒鐘 (焊錫固定在 PCB 上)	Without damage or excessive play in shaft . No excessive abnormality in rotational feeling. And electrical characteristics shaft be satisfied 軸無破損,回轉無異常.電氣性能無異常.
6-5	Terminal strength 端子強度	A static load of 3N(0.31Kgf) shall be applied to the tip of terminals for 10S in any direction 端子前端的任意方向施加 3N(0.31Kgf)的靜負荷力 10 秒鐘.	Without excessive play in terminal or poor contact. 端子不得有明顯鬆動及接觸不良
6-6	Shaft wobble 軸擺動	A momentary load of 2N(200gf) shall be applied at the point 5mm from the tip of the shaft in a direction perpendicular to the axis of shaft. 在軸前端 5mm 處,沿徑向瞬間施加 2N (200gf) 的力.	1.0x L / 30mm p-p MAX (L: shaft length) 1.0 x L / 30mm p-p 以下(L:安裝長度)
備 注: (REMARK)		核 準 APPROVED	審 核 REVIEWED
		Terry	Ryu
		2015.12.31	2015.12.31
		經 辦 者 PREPARED	
		余 倩	
		2015.12.31	

TOP-UP INDUSTRY CORP.

機種規格說明書

(SPECIFICATION)

本公司使用機種:

OUR PART NAME:

12mm Size Rotary Encoder

本公司使用名稱:

OUR PART NAME:

EC128PSDVF-D-17.5F-15-30C-19WE

客戶名稱:

CUSTOMER'S NAME:

Page : 7 OF 11

Version : A

Drawing NO.: EC12PSD-031

NO. 序號	ITEM 項 目	CONDITIONS 條 件	SPECIFICATIONS 規格
6-7	Side thrust strength of shaft 軸的垂直押引強度在	A load of 20 N(2.04 kgf) shall be applied at the point 5 mm from the tip of the shaft in a direction perpendicular to the axis of shaft for 10 s. 在軸前端 5 mm 處加 20 N(2.04 kgf)的靜負荷力 10 秒鐘	Without excessive play of bending in shaft. No mechanical abnormally. 軸不得有明顯鬆動及接觸不良.
6-8	Shaft play in rotational wobble 軸的回轉方向擺動	Testing by angle board. 用角度板測定	4° MAX 4°以下

7、Endurance characteristics 耐久性能

NO. 序號	ITEM 項 目	CONDITIONS 條 件	SPECIFICATIONS 規格
7-1	Rotational life 回轉壽命	The shaft of encoder shall be rotated to 30,000 cycles at a speed of 600~1000 cycles/H without electrical load,after which measurements shall be made. Rotate Torque $\leq 100\text{gf}\cdot\text{cm}$ 在無負荷條件下軸以 600~1000 周/小時速度回轉 30,000 周 1 cycle: rotate 360° CCW rotate 360° CW 1 周指順時針轉 360°逆時針轉 360°。	Chattering $t_1, t_3 \leq 5\text{mS}$ 振蕩 $t_1, t_3 \leq 5\text{mS}$ Bounce $t_2 \leq 3\text{mS}$ 突跳 $t_2 \leq 3\text{mS}$ Torque: Relative to the previously specified value:-50%~+10% 力矩：初期規格值的 -50%~+10% Phase-difference: 3ms Min. 相位差大於 3ms

備 注:
(REMARK)

核 準
APPROVED

審 核
REVIEWED

經 辦 者
PREPARED

Terry

Ryu

余 倩

2015.12.31

2015.12.31

2015.12.31

TOP-UP INDUSTRY CORP.

機種規格說明書

(SPECIFICATION)

本公司使用機種:

OUR PART NAME: 12mm Size Rotary Encoder

本公司使用名稱:

OUR PART NAME: EC128PSDVF-D-17.5F-15-30C-19WE

客戶名稱:

CUSTOMER'S NAME: _____

Page : 8 OF 11

Version : A

Drawing NO.: EC12PSD-031

NO. 序號	ITEM 項 目	CONDITIONS 測 試 條 件	SPECIFICATIONS 規 格				
7-2	Damp heat 耐濕性	The encoder shall be stored at temperature of 40±2℃ with relative humidity of 90% to 95% for 96±4H in a thermostatic chamber .And the encoder shall be subjected to standard atmospheric conditions for 1.5H, After which measurements shall be made. 溫度 40±2℃,濕度 90~95%的恒溫恒濕槽中放置 96±4 小時後,在常溫、常濕中放置 1.5 小時後測試..	Specifications in clause all items is shall be satisfied. 所有項應滿足初期規格				
7-3	Dry heat 耐熱性	The encoder shall be stored at a temperature of 85±3℃ for 240±10h in a thermostatic chamber. And then the encoder shall be subjected to standard atmospheric conditions for 1.5h .After witch measurement shall be made. 溫度 85±3℃ 的恒溫箱中放置 240±10 小時,常溫、常濕放置 1.5 小時後測試.					
7-4	Cold 低溫特性	The encoder shall be stored at a temperature of -40±3℃ for 96±4H in a thermostatic chamber . And then the encoder shall be subjected to standard atmospheric conditions for 1.5H .After witch measurement shall be made . 溫度-40±3℃ 的恒溫箱中放置 96±4 小時,常溫、常濕放置 1.5 小時後測試					
7-5	Solder ability 焊錫性	The terminals shall be immersed into solder bath at 260℃±5℃ for 3s±0.5s in the same manner as para. 端子在 260℃±5℃ 溫度的焊錫槽內浸錫 3 秒±0.5 秒	A new uniform coating of solder shall cover 75% minimum of the surface being immersed. 浸漬面須有 75%以上焊錫附著				
備 注: (REMARK)		核 準 APPROVED		審 核 REVIEWED		經 辦 者 PREPARED	
		Terry		Ryu		余 倩	
		2015.12.31		2015.12.31		2015.12.31	

TOP-UP INDUSTRY CORP.

機種規格說明書

(SPECIFICATION)

本公司使用機種:

OUR PART NAME: 12mm Size Rotary Encoder

本公司使用名稱:

OUR PART NAME: EC128PSDVF-D-17.5F-15-30C-19WE

客戶名稱:

CUSTOMER'S NAME: _____

Page : 9 OF 11

Version : A

Drawing NO.: EC12PSD-031

NO. 序號	ITEM 項 目	CONDITIONS 測 試 條 件	SPECIFICATIONS 規格
7-6	Resistance to soldering heat 耐焊接熱	<input type="checkbox"/> Manual soldering 手工焊接 Bit temperature of soldering iron : 350°C less than Application time of soldering iron : within 3 s. 溫度 350°C 以下，時間 3 秒以內。 <input type="checkbox"/> Dip soldering 槽焊 1. Printed wiring board : single-sided copper clad laminate board with thickness of 1.6mm; 使用基板：t=1.6mm 的單面覆銅板 2. Solder flux: Flux of 0.82 specific weight in bubbling type, solder flux coating apparatus shall be used and bubbling surface height shall be defined substantially as half thickness of substrate, Flux shall not flow up on substrate surface; 助焊劑：使用發泡式比重 0.82 以上的焊劑，發泡面高大致在基板厚度一半的位置,而且助焊劑不可流入基板表面上。 3. Preheating : Surface temperature of board: 100°C or less; Preheating time : within 2 min. 預熱: 基板表面溫度 100°C 以下，時間 2 分鐘以內。 4. Soldering : Solder temperature : 260°C±5°C less Immersion time: within 5±1 s 焊接：溫度 260°C±5°C，時間 5±1 s。 Apply the above soldering process for 1 or 2 times. 以上工程適用 1 至 2 次	Electrical characteristics shall be satisfied No mechanical abnormality. 不得有絕緣體的破損、變形、接觸無異常
備 注: (REMARK)		核 準 APPROVED	審 核 REVIEWED
		Terry	Ryu
		2015.12.31	2015.12.31
		經 辦 者 PREPARED	
		余 倩	
		2015.12.31	

TOP-UP INDUSTRY CORP.

機種規格說明書

(SPECIFICATION)

本公司使用機種:

OUR PART NAME: 12mm Size Rotary Encoder

本公司使用名稱:

OUR PART NAME: EC128PSDVF-D-17.5F-15-30C-19WE

客戶名稱:

CUSTOMER'S NAME: _____

Page : 10 OF 11

Version : A

Drawing NO.: EC12PSD-031

Push switch portion 推動開關部分

Note: The following specification is only suitable for the one type with switch construction of EC12 encoder series.

注：以下規格只適用於此 EC12 編碼器系列帶開關結構。

1-1、Rated capacity (Resistance load) 額定容量 (電阻負荷)

DC 5V 10mA (1mA MIN)

1-2 Electrical characteristics 電氣性能

NO. 序號	ITEM 項目	CONDITIONS 測試條件	SPECIFICATIONS 規格
1-2-1	Contact resistance 接觸電阻	Voltage step-down test at DC 5V 1mA 用 DC 5V 1mA 電壓降下法測定.	100mΩ MAX 100mΩ 以下
1-2-2	Chattering 振盪	Switch is operated at the rate of 1 cycle 1 sec .The 1 cycle shall be OFF-ON-OFF 以 1 秒鐘 1 往返(OFF-ON-OFF)操作開關.	10ms MAX 10ms 以下
1-2-3	Insulation resistance 絕緣電阻	Measurement shall be made under the condition which a voltage 50V DC 1min±5s is applied between individual terminals and tracked 在端子與安裝板間施加電壓 DC 50V 1 分鐘±5 秒	Between individual terminals and bracket 10MΩ MIN. 在端子安裝板間 10MΩ 以上
1-2-4	Dielectric strength 耐電壓	A voltage of 50V AC /min or 60 V AC /2S(leak current 1mA) be applied between individual terminals and bracket. 在端子與安裝板間施加 AC 50V 1 分鐘或 AC 60V 2 秒鐘(漏電流 1mA)	Without arcing or breakdown. 不得有絕緣損壞

1-3 Mechanical characteristics 機械性能

1-3-1	Switch circuit and number of pulse 開關電路、接點數		Single pole and single throw (push on) 單極單投 (推 ON)
-------	--	--	---

備 注:
(REMARK)

核 準
APPROVED

審 核
REVIEWED

經 辦 者
PREPARED

Terry

Ryu

余 倩

2015.12.31

2015.12.31

2015.12.31

TOP-UP INDUSTRY CORP.

機種規格說明書

(SPECIFICATION)

本公司使用機種:

OUR PART NAME: 12mm Size Rotary Encoder

本公司使用名稱:

OUR PART NAME: EC12PSDVF-D-17.5F-15-30C-19WE

客戶名稱:

CUSTOMER'S NAME: _____

Page : 11 OF 11

Version : A

Drawing NO.: EC12PSD-031

1-3-2	Travel of switch 開關移動量		0.5±0.3mm	
1-3-3	Operating force of switch 開關作動力		4±1.5 N (400±150gf)	
1-4 Endurance characteristics 耐久性能				
1-4-1	Push operating life 壽命特性	The encoder's shall be pushed to 20,000 cycles at a speed of 1800±300/h without electrical load.(shaft push load: 1kgf max.) 在無負荷條件下,對軸以每小時 1800±300 次的速度推動 20000 次.(軸按壓力 1kgf 以下).	Contact resistance : 200mΩ max. Specification in clause 1-2-2~4,1-3-1~2 shall be satisfied. Operating force: 80% of initial value. 接觸電阻 : 200mΩ 以下. 1-2-2~4,1-3-1~2 滿足初期規格. 開關動作力為壽命前的 80%.	
<div>RoHS Compliance</div>				
備 注: (REMARK)		核 準 APPROVED	審 核 REVIEWED	經 辦 者 PREPARED
		Terry	Ryu	余 倩
		2015.12.31	2015.12.31	2015.12.31

TOP-UP INDUSTRY CORP.