



# ACFS700 Series

## 700W / Full Brick

### AC/DC

#### Applications



**3** Years Warranty



#### Features



#### Model Number Structure

AC F S 700 - 240 S - 700 - PL

| N | Series Name | Package    | Watt | Output Voltage (VDC) | Output Quantity | Actual Watt | (optional)    |
|---|-------------|------------|------|----------------------|-----------------|-------------|---------------|
|   |             |            |      | 120 : 12             |                 |             |               |
|   |             |            |      | 240 : 24             |                 |             |               |
| A | C series    | Full Brick | 700  | 280 : 28             | S : Single      | Actual Watt | Parallel Mode |
|   |             |            |      | 360 : 36             |                 |             |               |
|   |             |            |      | 480 : 48             |                 |             |               |

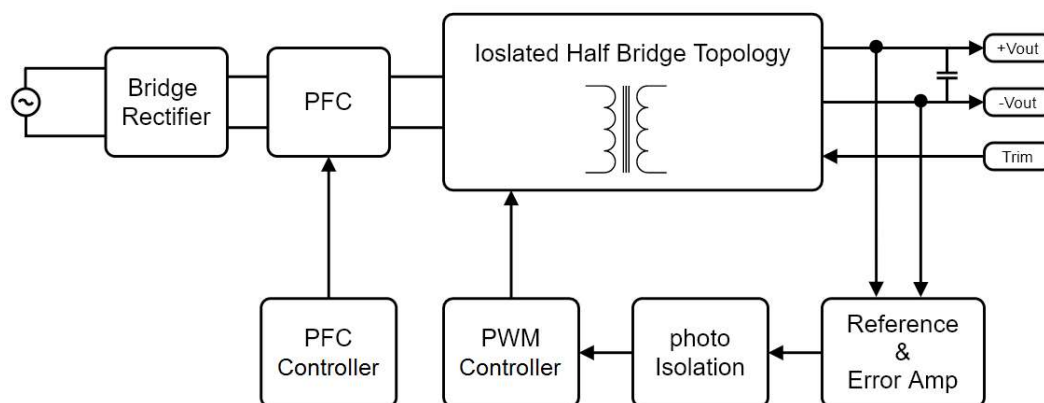
## Model Selection Guide

Typical @ Ta=+25 °C under nominal line voltage conditions unless noted

| Model            | Input       |         |             | Output  |         |       | Efficiency |
|------------------|-------------|---------|-------------|---------|---------|-------|------------|
|                  | Voltage (V) |         | Current (A) | Voltage | Current | Power |            |
|                  | Range       | Nominal | Full load   | (V)     | (A)     | (W)   | Typ.(%)    |
| ACFS700-120S-600 | 90-264      | 230     | 3.4         | 12      | 50      | 600   | 87         |
| ACFS700-240S-700 | 90-264      | 230     | 3.4         | 24      | 29.17   | 700   | 90         |
| ACFS700-280S-700 | 90-264      | 230     | 3.4         | 28      | 25      | 700   | 90         |
| ACFS700-360S-700 | 90-264      | 230     | 3.4         | 36      | 19.44   | 700   | 90         |
| ACFS700-480S-700 | 90-264      | 230     | 3.4         | 48      | 14.58   | 700   | 90         |

## Description

**AC series - Full Brick 700W converter** is a 700W isolated, regulated ac/dc converter with active PFC in full brick package and long hold-up time setting by external capacitors. It features a high efficiency up to 90%, wide working case temperature range -40~+100°C, no minimum load required, 3kVac reinforced insulation, OVP, OCP, SCP, OTP, etc. These power modules use advanced power processing, control and packaging technologies and are suitable for many applications with harsh environments where wide temperature variation and space limitations, etc.



ACFS700 Series Block Diagram

## Electrical Specifications

(Typical @ Ta=+25°C under nominal line voltage conditions unless noted.)

### Input Specifications

| Parameter                        | Notes and Conditions                       | Min.                                        | Typ.         | Max. | Unit |
|----------------------------------|--------------------------------------------|---------------------------------------------|--------------|------|------|
| Operating Input Voltage Ranges   |                                            | 90                                          | 230          | 264  | VAC  |
| Operating Input Frequency Ranges |                                            | 47                                          | 50/60        | 63   | Hz   |
| Input Current                    | at 115VAC 100% load<br>at 230VAC 100% load |                                             | 7.0<br>3.4   |      | A    |
| Inrush Current                   | cold start at 230Vac, 25°C                 | Limited by external components (Thermistor) |              |      |      |
| Power Factor                     | at 115VAC 100% load<br>at 230VAC 100% load |                                             | 0.99<br>0.97 |      |      |
| Leakage Current                  | at 240VAC 60Hz 100% load                   |                                             |              | 0.75 | mA   |

### Output Specifications

| Parameter                       | Notes and Conditions                                                                | Min.                                             | Typ. | Max. | Unit                |
|---------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------|------|------|---------------------|
| Output Voltage Accuracy         | 100% Load                                                                           |                                                  |      | ±1.5 | %                   |
| Line Regulation                 | High Line to Low Line                                                               |                                                  |      | ±0.5 | %                   |
| Load Regulation                 | 10% to 100% Load                                                                    |                                                  |      | ±1   | %                   |
| Output Ripple & Noise Voltage   | Bandwidth 20MHz and with 10uF+0.1uF MLCC, Output Capacitor by recommended component |                                                  |      | 2    | %V <sub>pk-pk</sub> |
| Output Voltage Adjustment Range | adjustable by external resistor                                                     |                                                  |      | ±5   | %                   |
| Minimum Load                    |                                                                                     | 0                                                |      |      | A                   |
| Hold Up Time                    | at full load & 115 VAC                                                              | Setting by external capacitors between +BC & -BC |      |      |                     |
| Over Voltage Protection         |                                                                                     | 120                                              |      | 140  | %                   |
| Over Current Protection         | Hiccup mode                                                                         | 120                                              |      | 160  | %                   |
| Short-circuit Protection        | Hiccup mode                                                                         | Auto-Recovery                                    |      |      |                     |

## General Specifications & Environmental Specifications

| Parameter                   | Notes and Conditions            | Min.                                          | Typ.    | Max. | Unit    |
|-----------------------------|---------------------------------|-----------------------------------------------|---------|------|---------|
| Switching Frequency         | PFC/LLC                         |                                               | 133/120 |      | kHz     |
| Storage Temperature Range   | All models                      | -55                                           |         | 125  | °C      |
| Over Temperature Protection | Auto Recovery                   |                                               | 110     |      | °C      |
| Operating Temperature       | on aluminum base plate          | -40                                           |         | 100  | °C      |
| Humidity (non condensing)   | All models                      |                                               |         | 95   | %       |
| Isolation Voltage           | Input to Output                 |                                               | 3000    |      | VAC     |
|                             | Input to Base                   |                                               | 1500    |      | VAC     |
|                             | Output to Base                  |                                               | 500     |      | VAC     |
| Calculated MTBF             | BellCore-TR-332@ 50°C G.B       | 1.0                                           |         |      | M HR    |
| Weight                      |                                 | 220 (7.76)                                    |         |      | g (oz.) |
| Dimensions                  |                                 | 4.60" x 2.40" x 0.52" (117.3 x 60.0 x 13.2mm) |         |      |         |
| Case Material               | Aluminum base with plastic case |                                               |         |      |         |

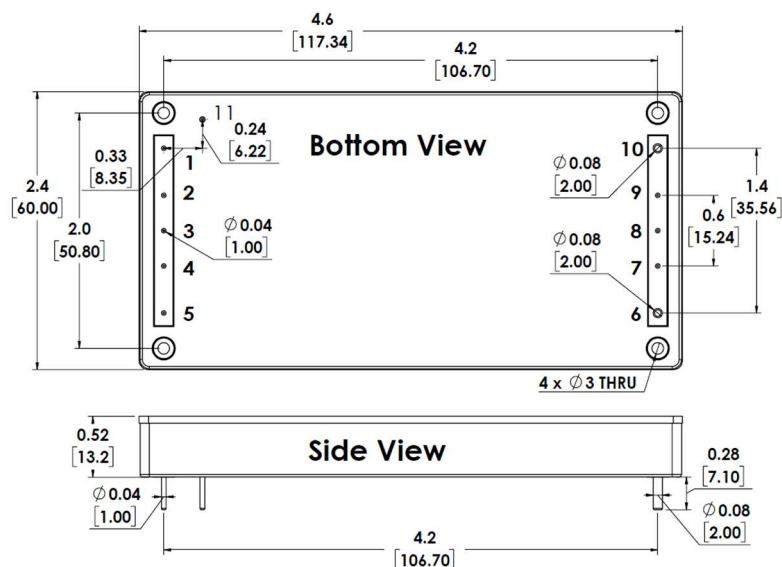
It is recommended to protect the input by fuses or other protection devices.

Modules could meet EN55022 Class A and Class B standard with external components.

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## Mechanical Dimensions & Pin Assignments

### Shape



### Pin Assignments:

| Pin#  | Description |
|-------|-------------|
| 1     | BC-         |
| 2     | BC+         |
| 3     | EN          |
| 4     | AC1         |
| 5     | AC2         |
| 6     | +Vo         |
| 7     | +S          |
| 8     | Trim        |
| 9     | -S          |
| 10    | -Vo         |
| 11    | R           |
| Other | Base        |

### Note:

Pin Material: Copper Alloy

Pin Plating: Gold

Dimensions in inches [mm]

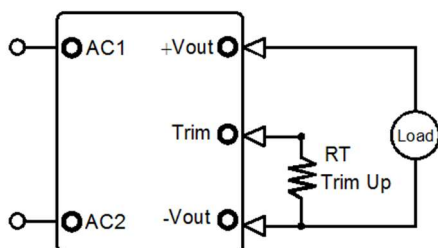
Tolerances: .XX±0.03 [ .X±0.75mm]

## Trimming Output Voltage – for Single output models

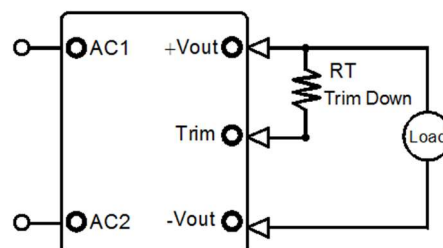
Only the single output converters have a trim function. That allows users to adjust the output voltage from +5% to -5%, please refer to the trim table that follow for details. Adjustments to the output voltage can be used with a simple fixed resistor as shown in Figures 1 and 2. A single fixed resistor can increase or decrease the output voltage depending on its connection.

### Note:

- ✖ Trim adjustments higher than the specified range can have an adverse effect on the converter's performance and are not recommended.
- ✖ If the trim function is not used, leave the trim pin open.



**Figure 1.** Trim Connections To increase Output Voltages Using Fixed Resistors



**Figure 2.** Trim Connections To Decrease Output Voltages Using Fixed Resistors

|      | Trim up resistor value(KΩ) |        |        |        |      |
|------|----------------------------|--------|--------|--------|------|
| Vout | 1%                         | 2%     | 3%     | 4%     | 5%   |
| 24   | 228.91                     | 83.45  | 34.97  | 10.73  | 0.00 |
| 28   | 693.51                     | 246.76 | 97.84  | 23.38  | 0.00 |
| 36   | 545.73                     | 197.87 | 81.91  | 23.93  | 0.00 |
| 48   | 1407.66                    | 537.83 | 247.89 | 102.91 | 0.00 |

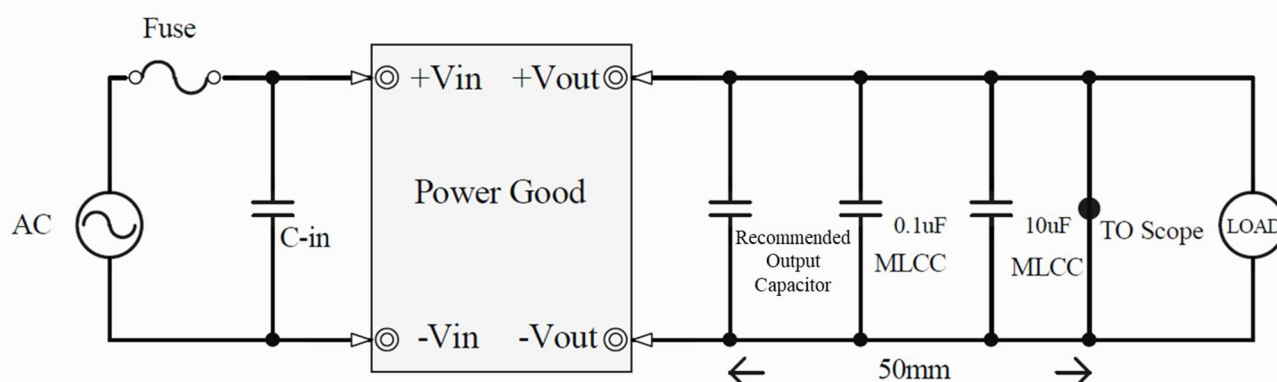
|      | Trim down resistor value(KΩ) |          |         |         |         |
|------|------------------------------|----------|---------|---------|---------|
| Vout | -1%                          | -2%      | -3%     | -4%     | -5%     |
| 24   | 2419.09                      | 1164.55  | 746.36  | 537.27  | 411.82  |
| 28   | 8806.49                      | 4253.24  | 2735.50 | 1976.62 | 1521.30 |
| 36   | 9054.27                      | 4402.13  | 2851.42 | 2076.07 | 1610.85 |
| 48   | 30796.34                     | 15066.17 | 9822.78 | 7201.09 | 5628.07 |

## Output Ripple Noise

The two copper strips simulate real-world PCB impedances between the converter and its load. Scope measurements should be made using BNC connectors or the probe ground should be less than 1/2 inch and soldered directly to the fixture.

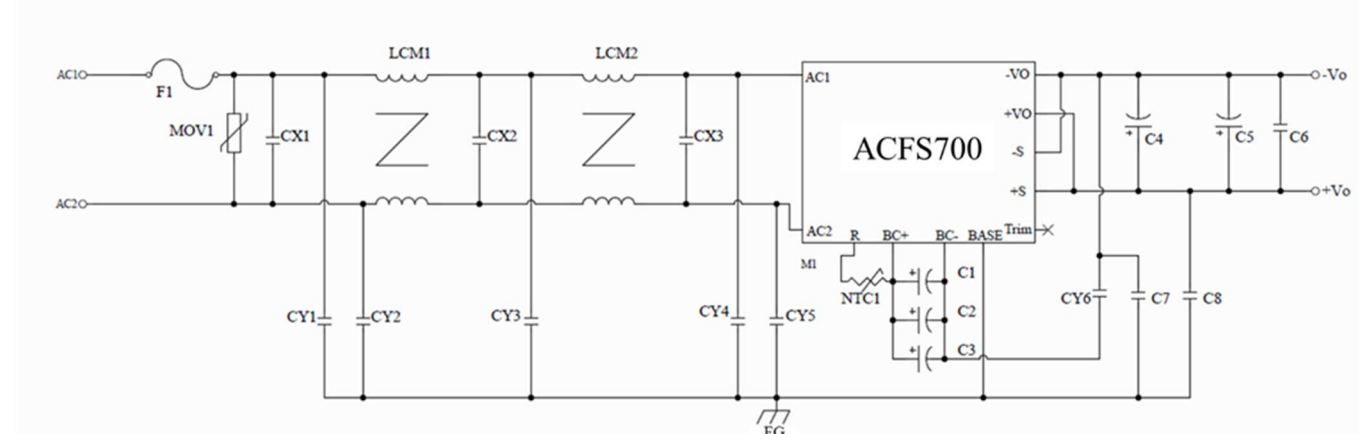
All external capacitors should have appropriate voltage ratings and be located as close to the converter as possible.

Temperature variations for all relevant parameters should be taken into consideration. The most effective combination of external I/O capacitors will be a function of line voltage and source impedance, as well as particular load and layout conditions. See Figure 3.



**Figure 3.** Measuring Output Ripple/Noise (20MHz bandwidth)

## Recommended Circuit Diagram



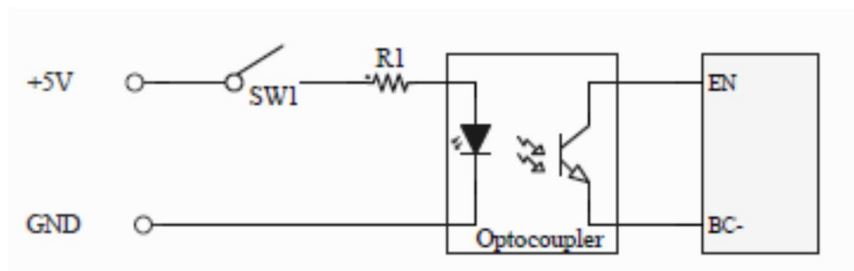
## Bill of Materials

| No. | Sch Symbol     | Description             | Rating        |            | Manufacturer / Part Number             |
|-----|----------------|-------------------------|---------------|------------|----------------------------------------|
| 1   | F1             | Fuse                    | 5A/250Vac     |            | Littelfuse 39215000000                 |
| 2   | MOV1           | Varistor                | 620V          |            | Thinking TVR10471KSY                   |
| 3   | CX1、CX2<br>CX3 | X Capacitor             | 0.47uF/310Vac |            | CHENG TUNG CTX474K310VP15              |
| 4   | LCM1、LCM2      | Common Mode Choke       | 15mH          |            | ACME A10T16X9.6X6.1C                   |
| 5   | CY5            | Y Capacitor             | 2200pF/250Vac |            | Murata DE1E3KX222MN4AN01F              |
| 6   | CY2、CY3        | Y Capacitor             | 4700pF/250Vac |            | Murata DE1E3KX472MN4AN01F              |
| 7   | CY6            | Y Capacitor             | 3300pF/250Vac |            | Murata DE1E3KX332MB4BN01F              |
| 8   | NTC1           | NTC                     | 10R/5A        |            | Thinking SCK15105MSY                   |
| 9   | C7             | General Film Capacitors | 0.22uF/1KVdc  |            | Panasonic ECQ-E10224JF                 |
| 10  | C1、C2、C3       | PFC boost capacitor     | 220uF/450Vdc  |            | NIPPON CHEMI-CON<br>EKMR451VSN221MR25S |
| 11  | C4、C5          | Output Capacitor        | 12V           | 1000uF/35V | UPL1V102M1021                          |
|     |                |                         | 24V           | 1000uF/35V | UPL1V102M1021                          |
|     |                |                         | 28V           | 1000uF/35V | UPL1V102M1021                          |
|     |                |                         | 48V           | 330uF/63V  | UPL1J331M1021                          |
| 12  | C6             | Bypass Capacitor        | 1uF/100Vdc    |            | Murata GRJ31CR72A105ME11L              |

### \*Note:

1. C1, C2, C3 capacitor is needed, PSU will not normally work without C1, C2, C3.
2. Output Capacitor minimum 660uF maximum 4000uF.
3. Aluminum base can be connected to FG through M3 mounting screw holes.
4. CY1, CY4 are reserved positions for EMI filter design adjustment and not listed in BOM.
5. C8 are reserved positions and not listed in BOM.

## Enable Control



### Note :

SW1 On = Module Off  
SW1 Off = Module On

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