

## R32 RAV Outdoor conversion for use with R410A Updated










**TOSHIBA** confirm that the current range of light commercial R32 RAV Digital Inverter and Super Digital Inverter outdoor units are compatible for use with R410A refrigerant subject to compliance with F-gas regulations. This will enable the continued use of R410A indoor equipment and AHU's during the phase down period for HFC refrigerants.

### 1. Guidance

- Installation Manual and Data Engineering Book are not available for converted outdoor units. Performance characteristic will be similar to current 4 series R410A equivalent models.
- Safe handling and recovery of R32 refrigerant in accordance with F-gas regulations is the responsibility of the installer.
- R32 Labelling must be removed from the outdoor unit and replaced with R410A labelling in accordance with F-gas regulations.
- Careful consideration should be made when choosing to continue with a higher GWP refrigerant.
- The operating charge for R410A is 20% higher than factory shipped R32 charge for converted models. Please refer to Table 1.

### 2. Line-up (No Change)

Factory shipped refrigerant charge volume for safe recovery is shown in the table below.

| HP  | Appearance  | Type                   | Model Name       | Power Supply<br>V/ph/Hz | Cooling<br>kW | Heating<br>kW | Factory Charge<br>kg |
|-----|---|------------------------|------------------|-------------------------|---------------|---------------|----------------------|
| 1   |  | Digital Inverter       | RAV-GM301ATP-E   | 220-240/1/50            | 2.5           | 3.4           | 0.6                  |
| 1.5 |   |                        | RAV-GM401ATP-E   | 220-240/1/50            | 3.6           | 4.0           | 0.9                  |
| 2   |   |                        | RAV-GM561ATP-E   | 220-240/1/50            | 5.0           | 5.3           | 0.9                  |
| 3   |   |                        | RAV-GM801ATP-E   | 220-240/1/50            | 6.7           | 7.7           | 1.3                  |
| 3.5 |  |                        | RAV-GM901ATP-E   | 220-240/1/50            | 8.0           | 9.0           | 2.0                  |
| 4   |  |                        | RAV-GM1101ATP-E  | 220-240/1/50            | 9.5           | 11.2          | 2.1                  |
| 5   |   |                        | RAV-GM1401ATP-E  | 220-240/1/50            | 12.1          | 12.8          | 2.1                  |
| 4   |   |                        | RAV-GM1101AT8P-E | 380-415/3/50            | 9.5           | 11.2          | 2.1                  |
| 5   |   |                        | RAV-GM1401AT8P-E | 380-415/3/50            | 12.1          | 12.8          | 2.1                  |
| 6   |  |                        | RAV-GM1601ATP-E  | 220-240/1/50            | 14.0          | 16.0          | 2.4                  |
| 6   |   |                        | RAV-GM1601AT8P-E | 380-415/3/50            | 14.0          | 16.0          | 2.4                  |
| 8   |  | Digital Inverter Big   | RAV-GM2241AT8-E  | 380-415/3/50            | 19.0          | 22.4          | 5.0                  |
| 10  |   |                        | RAV-GM2801AT8-E  | 380-415/3/50            | 22.5          | 27.0          | 5.0                  |
| 2   |  | Super Digital Inverter | RAV-GP561ATP-E   | 220-240/1/50            | 5.0           | 5.6           | 1.35                 |
| 3   |  |                        | RAV-GP801AT-E    | 220-240/1/50            | 7.1           | 8.0           | 1.9                  |
| 4   |  |                        | RAV-GP1101AT-E   | 220-240/1/50            | 10.0          | 11.2          | 3.1                  |
| 5   |   |                        | RAV-GP1401AT-E   | 220-240/1/50            | 12.5          | 14.0          | 3.1                  |
| 4   |  |                        | RAV-GP1101AT8-E  | 380-415/3/50            | 10.0          | 11.2          | 2.6                  |
| 5   |   |                        | RAV-GP1401AT8-E  | 380-415/3/50            | 12.5          | 14.0          | 2.6                  |
| 6   |   |                        | RAV-GP1601AT8-E  | 380-415/3/50            | 14.0          | 16.0          | 2.6                  |

### 3. Replacement R410A Refrigerant Pre-charge

The refrigerant pre-charged amount volume must be added to the outdoor unit to ensure correct operation up to the pre-charged length. Additional calculated charge must be added to the outdoor unit for liquid pipe lengths exceeding the pre-charged amount length up to the maximum length.

Table 1

| HP  | Model Name       | NEW<br>Pre-charged<br>R410A (kg) | Pre-charged<br>Length (m) | Maximum<br>Length (m) | Additional Charge per<br>meter (grams) |
|-----|------------------|----------------------------------|---------------------------|-----------------------|--|
| 1   | RAV-GM301ATP-E   | 0.72                             | 15                        | 20                    | 20                                     |
| 1.5 | RAV-GM401ATP-E   | 1.08                             | 15                        | 20                    | 20                                     |
| 2   | RAV-GM561ATP-E   | 1.08                             | 20                        | 30                    | 20                                     |
| 3   | RAV-GM801ATP-E   | 1.56                             | 20                        | 30                    | 40                                     |
| 3.5 | RAV-GM901ATP-E   | 2.4                              | 30                        | 50                    | 40                                     |
| 4   | RAV-GM1101ATP-E  | 2.52                             | 30                        | 50                    | 40                                     |
| 4   | RAV-GM1101AT8P-E | 2.52                             | 30                        | 50                    | 40                                     |
| 5   | RAV-GM1401ATP-E  | 2.52                             | 30                        | 50                    | 40                                     |
| 5   | RAV-GM1401AT8P-E | 2.52                             | 30                        | 50                    | 40                                     |
| 6   | RAV-GM1601ATP-E  | 2.88                             | 30                        | 50                    | 40                                     |
| 6   | RAV-GM1601AT8P-E | 2.88                             | 30                        | 50                    | 40                                     |
| 2   | RAV-GP561ATP-E   | 1.62                             | 20                        | 50                    | 40                                     |
| 3   | RAV-GP801AT-E    | 2.28                             | 30                        | 50                    | 40                                     |
| 4   | RAV-GP1101AT-E   | 3.72                             | 30                        | 75                    | 40                                     |
| 5   | RAV-GP1401AT-E   | 3.72                             | 30                        | 75                    | 40                                     |
| 4   | RAV-GP1101AT8-E  | 3.12                             | 30                        | 75                    | 40                                     |
| 5   | RAV-GP1401AT8-E  | 3.12                             | 30                        | 75                    | 40                                     |
| 6   | RAV-GP1601AT8-E  | 3.12                             | 30                        | 75                    | 40                                     |
| 8   | RAV-GM2241AT8-E  | 6.0                              | 30                        | 100                   | 80                                     |
| 10  | RAV-GM2801AT8-E  | 6.0                              | 30                        | 100                   | 80                                     |

### 4. Example

$$\begin{array}{l} \text{Additional refrigerant} \\ \text{charge amount at site} \\ \text{exceeding pre-charged} \\ \text{length} \end{array} = \begin{array}{l} \text{Real length of liquid pipe} \\ - \text{pre-charged length} \end{array} \times \begin{array}{l} \text{Additional refrigerant} \\ \text{charge grams amount per} \\ \text{liquid pipe 1 m (Table 1)} \end{array}$$

RAV-GM1101ATP-E installed pipe length 40m

Additional charge 40m - 30m = 10m x 40g = 400grams

Pre-charged 2.52 + 0.4 additional charge = 2.92 kg system charge

### 5. Regulations

Changes to standard units must be safely managed and undertaken in accordance with: -

EC Regulation 517/2014 (F-gas Regulations)

The Dangerous Substances and Explosive Atmospheres Regulation 2002 including hazard classes H220, H221 and H280 and Approved Code of Practice (ACOP).

For further information please contact our customer support team on **0870 843 0333**, your local representative, your supplier of **TOSHIBA** products or email any enquiries to: - [general.enquiries@toshiba-ac.com](mailto:general.enquiries@toshiba-ac.com)