

# OUTDOOR UNIT BRANCH PIPE INSTALLATION MANUAL

Thank you very much for purchasing our air conditioner. Before using your air conditioner, please read this manual carefully and keep it for future reference.

## Branch List

| Name        | Low-pressure gas side joints | High-pressure gas side joints | Liquid side joints | Heat insulation material |
|-------------|------------------------------|-------------------------------|--------------------|--------------------------|
| TODK002 HRU |                              |                               |                    | (3 sets)                 |
| TODK003 HRU |                              |                               |                    | (6 sets)                 |

## Application

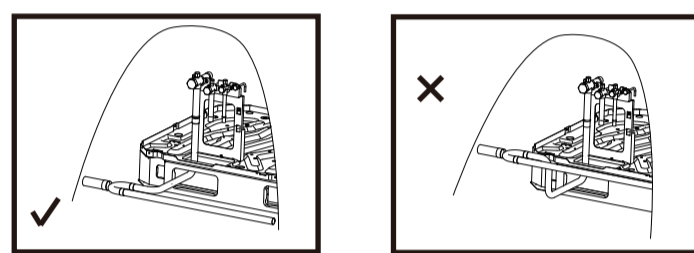
Branch pipes for outdoor unit  
 Table 2  

| Quantity of outdoor units | Branch pipe |
|---------------------------|-------------|
| 2                         | TODK002HRU  |
| 3                         | TODK003HRU  |

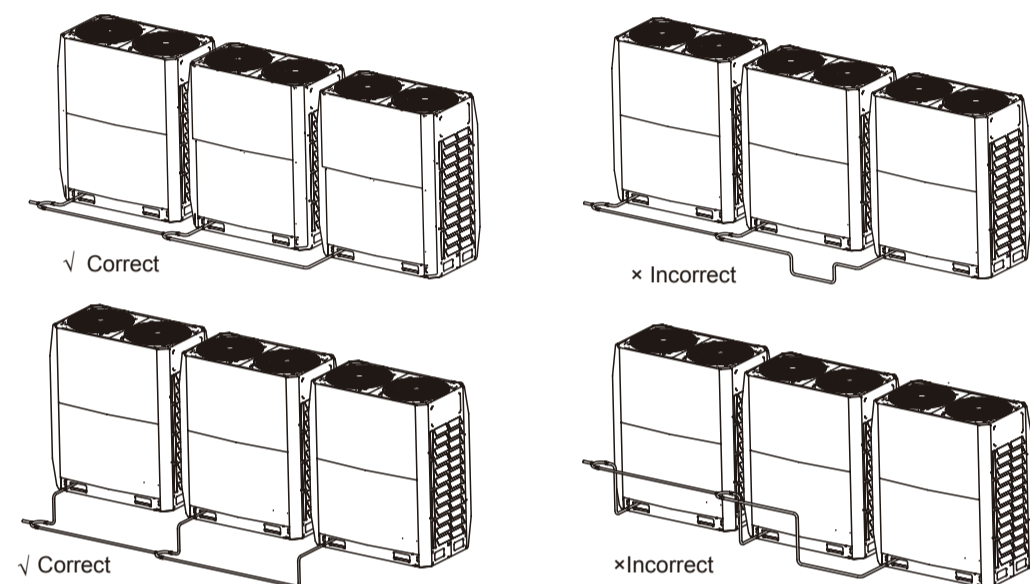
 Use with two or three-module TVR Ultra Heat Recovery combinations.  
 The refrigerant piping branch kit is used to combine two or three outdoor units to create a larger capacity system.

## Installation Notices

The branch joints must not be higher than the refrigerant piping

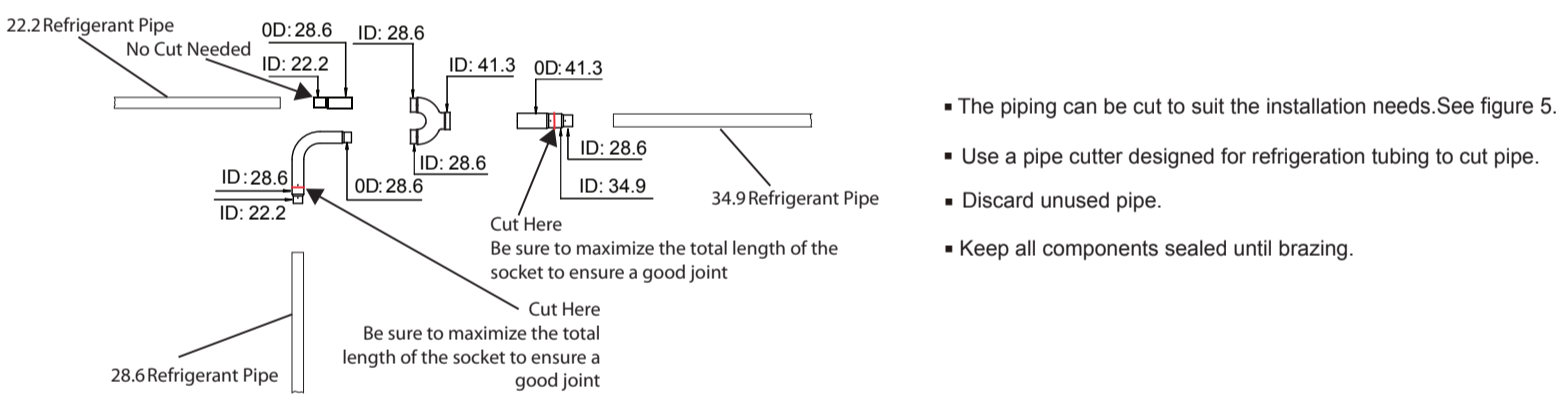


The piping between the outdoor units must be level or slightly upwards.



The piping connecting the outdoor units should be horizontal and must not be higher than the refrigerant outlets. If necessary, to avoid obstacles the piping may be vertically offset below the outlets. When inserting a vertical offset to avoid an obstacle, the whole outdoor piping should be offset, rather than just the section adjacent to the obstacle.

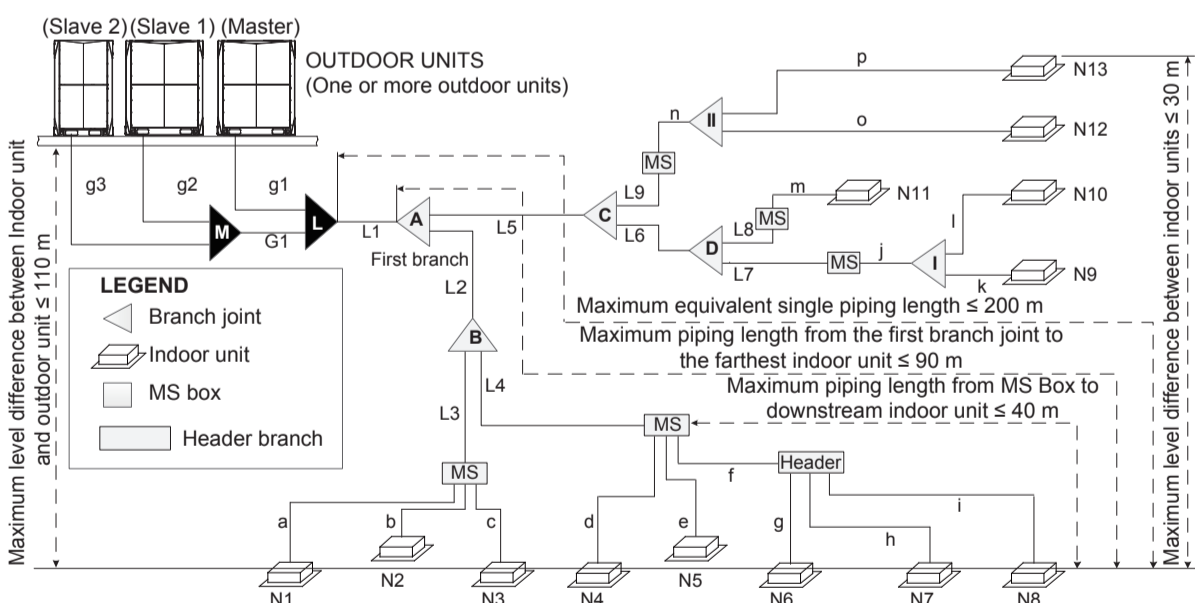
## Example of Cutting Branch Pipe



- The pipe can be cut to suit the installation needs. See figure 5.
- Use a pipe cutter designed for refrigeration tubing to cut pipe.
- Discard unused pipe.
- Keep all components sealed until brazing.

## Refrigerant Piping Details TVR Ultra Heat Recovery

Figure 1 Permitted refrigerant piping lengths and level differences (A)



- Notes:
- The total length of piping in one refrigerant system should not exceed 1000m. When calculating the total length of piping, the actual length of the indoor main pipes (the piping between the first branch joint and MS box, L2 to L9) should be doubled.
  - The piping between the farthest indoor unit (N8) and outdoor unit or the last multi-outdoor piping branch joint (L) should not exceed 175 m (actual length) and 200 m (equivalent length). (The equivalent length of each branch joint is 0.5 m). When the equivalent piping length from outdoor units to the farthest indoor unit is  $\leq 90$  m, the liquid pipe of the main pipe (L1) should be increased as Table 5.
  - The piping between the farthest indoor unit (N8) and first branch joint (A) should not exceed 40 m in length ( $L2 + L4 + f + i \leq 40$  m) unless the following conditions are met and the following measures are taken, in which case the permitted length is up to 90 m:  
 Conditions:  
 a) The piping length from each indoor unit to the nearest MS box must be  $\leq 40$  m.  
 b) The difference in length between the outdoor unit to the farthest indoor unit and the outdoor unit to the nearest indoor unit is  $\leq 40$  m. Example: The farthest indoor unit is N8, the nearest indoor unit is N3,  $(L1 + L2 + L4 + f + i) - (L1 + L2 + L3 + c) \leq 40$  m.  
 Measures:  
 a) Increase the diameter of the indoor main liquid pipes (the piping between the first branch joint and MS box, L2 to L9) as Table 5. If the increased liquid pipe size is larger than the pipe size of the main liquid pipe (L1), also increase the size of the main liquid pipe.  
 b) If the outdoor unit is above and the level difference is greater than 50 m, the liquid pipe of the main pipe (L1) should be increased as Table 5. And it is recommended that an oil return bend with dimensions as specified in Figure 2 is set every 10 m in the gas pipe of the main pipe.  
 c) If the outdoor unit is below and the level difference is more than 40 m, the liquid pipe of the main pipe (L1) should be increased as Table 5.  
 d) The main liquid pipe (L1) and indoor main liquid pipes (L2 to L9) can only be sized once if one or more of requirements are met in note 2 to note 5.  
 e) If the downstream indoor units include HT hydrobox units or AHUs, according to TVR Ultra HR installation manual.

- Figure 2 Oil return bend (unit: mm)
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Table 3 Piping and Component Names

| NAME  | Designation    |
|---|----------------|
| Outdoor unit connection pipe                | g1, g2, g3, G1 |
| Outdoor unit branch joint                   | L, M           |
| Main pipe                                   | L1             |
| Indoor unit main pipe                       | L2 to L9       |
| Branch joint between main pipe and MS box   | A to D         |
| Branch joint between MS box and indoor unit | I, II          |
| Indoor unit auxiliary pipe                  | a to p         |
| VRF indoor unit                             | N1 to N13      |

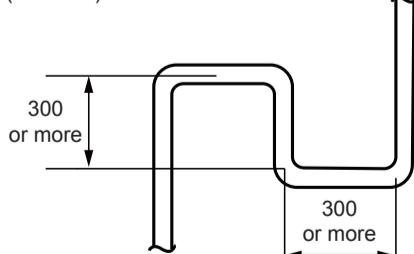
Table 4 Summary of permitted refrigerant piping lengths and level differences

| Piping lengths  | Permitted values  |  | Piping in Fig. 4-2  |
|---|---|--|---|
|   | Total piping length <sup>1</sup>                              | Actual length  |   |
| Outdoor unit connection pipe  | $\leq 1000$ m   | $\leq 175$ m   | $L1 + 2 \times \sum(L2 \text{ to } L9) + \sum(a \text{ to } p)$ |
| Piping between farthest indoor unit and outdoor unit or the last multi-outdoor piping branch <sup>2</sup> | $\leq 200$ m  | $\leq 200$ m   | $L1 + L2 + L4 + f + i$  |
| Piping between farthest indoor unit and first branch joint <sup>3</sup>                                   | $\leq 40$ m / 90 m  | $\leq 40$ m / 90 m   | $L2 + L4 + f + i$   |
| Piping between MS box to downstream indoor unit   | $\leq 40$ m   | $f + i$  | $f + i$   |
| Piping between outdoor unit and outdoor branch joint  | $\leq 10$ m   | $g1 \leq 10$ m; $g2+G1 \leq 10$ m; $g3 + G1 \leq 10$ m                   |   |
| Level differences   | Largest level difference between indoor unit and outdoor unit | Outdoor unit is above <sup>4</sup><br>Outdoor unit is below <sup>5</sup> | $\leq 110$ m<br>$\leq 110$ m                                    |
|   | Largest level difference between indoor units                 |  | $\leq 30$ m   |

Table 5 Pipe size allowable increase diameters (mm)

|              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|
| 9.53 to 12.7 | 12.7 to 15.9 | 15.9 to 19.1 | 19.1 to 22.2 | 22.2 to 25.4 |
|--------------|--------------|--------------|--------------|--------------|

Figure 2 Oil return bend (unit: mm)



## Refrigerant Piping Details TVR Ultra Heat Recovery

Table 6 Main pipe (L1) and first branch joint (A)

| Outdoor Unit Capacity (HP) | Pipe Diameter (mm OD) |                       |                        | Branch joint kit |
|----------------------------|-----------------------|-----------------------|------------------------|------------------|
|                            | Liquid pipe           | Low Pressure Gas Pipe | High Pressure Gas Pipe |                  |
| 8                          | Φ9.53                 | Φ19.1                 | Φ15.9                  | TRDK112HRU       |
| 10                         | Φ9.53                 | Φ22.2                 | Φ19.1                  | TRDK112HRU       |
| 12                         | Φ12.7                 | Φ28.6                 | Φ19.1                  | TRDK242HRU       |
| 14-16                      | Φ12.7                 | Φ28.6                 | Φ22.2                  | TRDK242HRU       |
| 18                         | Φ15.9                 | Φ28.6                 | Φ22.2                  | TRDK242HRU       |
| 20-22                      | Φ15.9                 | Φ28.6                 | Φ28.6                  | TRDK242HRU       |
| 24                         | Φ15.9                 | Φ34.9                 | Φ28.6                  | TRDK354HRU       |
| 26-34                      | Φ19.1                 | Φ34.9                 | Φ28.6                  | TRDK354HRU       |
| 36                         | Φ19.1                 | Φ41.3                 | Φ28.6                  | TRDK573HRU       |
| 38-60                      | Φ19.1                 | Φ41.3                 | Φ34.9                  | TRDK573HRU       |

Note:  
 When the equivalent piping length from outdoor units to the farthest indoor unit exceed 90 m, or the level difference is greater than 50 m (outdoor unit is above) or 40 m (outdoor unit is below), the liquid pipe of the main pipe (L1) should be increased as Table 5. More details are explained in the part of Permitted Piping Lengths and Level Differences.

Table 7 Outdoor unit connection pipes (g1 to g3, G1)

| Pipes    | Outdoor unit capacity (HP) | Pipe Diameter (mm OD) |                       |                        |
|----------|----------------------------|-----------------------|-----------------------|------------------------|
|          |                            | Liquid pipe           | Low Pressure Gas Pipe | High Pressure Gas Pipe |
| g1 to g3 | 8                          | Φ9.53                 | Φ19.1                 | Φ15.9                  |
|          | 10                         | Φ9.53                 | Φ22.2                 | Φ19.1                  |
|          | 12                         | Φ12.7                 | Φ28.6                 | Φ19.1                  |
|          | 14-16                      | Φ12.7                 | Φ28.6                 | Φ22.2                  |
|          | 18                         | Φ15.9                 | Φ28.6                 | Φ22.2                  |
|          | 20                         | Φ15.9                 | Φ28.6                 | Φ28.6                  |
| G1       | $\leq 24$                  | Φ15.9                 | Φ34.9                 | Φ28.6                  |
|          | 26-34                      | Φ19.1                 | Φ34.9                 | Φ28.6                  |
|          | 36                         | Φ19.1                 | Φ41.3                 | Φ28.6                  |
|          | $\geq 38$                  | Φ19.1                 | Φ41.3                 | Φ34.9                  |

Table 8 Outdoor unit branch joint kits (L, M)

| Number of outdoor units | Branch joint kit |
|-------------------------|------------------|
| 2                       | L: TODK002HRU    |
| 3                       | L+M: TODK003HRU  |

Table 9 Indoor unit main pipes (L2 to L8) and indoor unit branch joint kits

| Total capacity of downstream indoor units ( $\leq 100$ W) | Pipe Diameter (mm OD) |                       |                        | Branch joint kit |
|---|-----------------------|-----------------------|------------------------|------------------|
|   | Liquid pipe           | Low Pressure Gas Pipe | High Pressure Gas Pipe |                  |
| $\leq 168$  | Φ9.5                  | Φ15.9                 | Φ12.7                  | TRDK057HRU       |
| $168 \leq A < 224$  | Φ9.5                  | Φ19.1                 | Φ15.9                  | TRDK112HRU       |
| $224 \leq A < 330$  | Φ9.5                  | Φ22.2                 | Φ19.1                  | TRDK112HRU       |
| $330 \leq A < 470$  | Φ12.7                 | Φ28.6                 | Φ19.1                  | TRDK242HRU       |
| $470 \leq A < 710$  | Φ15.9                 | Φ28.6                 | Φ28.6                  | TRDK242HRU       |
| $710 \leq A < 1040$                                       | Φ19.1                 | Φ34.9                 | Φ28.6                  | TRDK354HRU       |
| $1040 \leq A$   | Φ19.1                 | Φ41.3                 | Φ28.6                  | TRDK573HRU       |

- Notes:
- Choose indoor main pipes from the above table in accordance with total downstream indoor capacity, which is the total capacity of all the indoor units, connected downstream. Do not let the indoor unit main pipe exceed the main pipe chosen by outdoor unit capacity.
  - When the piping length between the farthest indoor unit and first branch joint (A) exceed 40 m, increase the diameter of the indoor main liquid pipes (the piping between the first branch joint and MS BOX) as Table 5. If the increased liquid pipe size is larger than the pipe size of the main liquid pipe (L1), also increase the size of the main liquid pipe. More details are explained in the part of Permitted Piping Lengths and Level Differences.

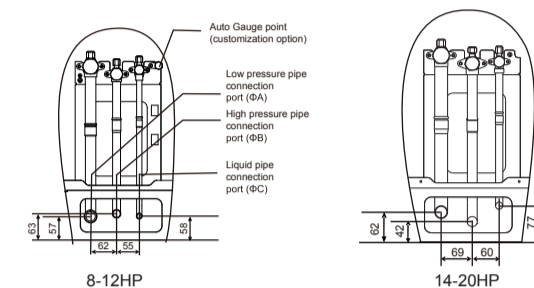
Table 10 Indoor unit auxiliary pipes (a to e) and branch joint kits between MS BOX and downstream indoor units

| Capacity of indoor units ( $\times 100$ W) | Pipe Diameter (mm OD) |               | Branch joint kit |
|--|-----------------------|---------------|------------------|
|  | Liquid pipe (mm)      | Gas Pipe (mm) |                  |
| $A < 56$                                   | Φ6.35                 | Φ12.7         | TRDK056HP        |
| $56 \leq A < 160$                          | Φ9.53                 | Φ15.9         | TRDK056HP        |
| $\leq 224$                                 | Φ9.53                 | Φ19.1         | TRDK056HP        |
| $\leq 280$                                 | Φ9.53                 | Φ22.2         | TRDK112HP        |

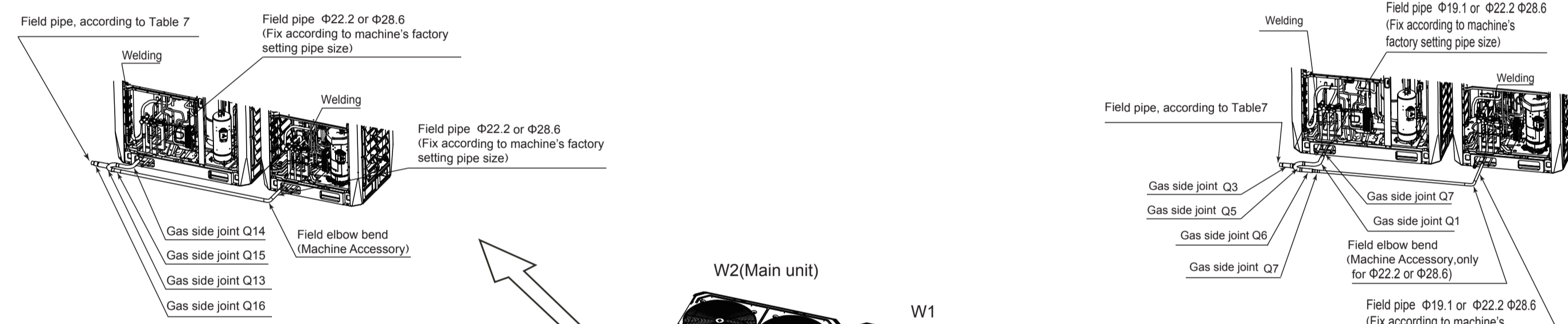
- Notes:
- The branch joint kits are required only when two or more indoor units are connected to 1 port of MS BOX.
  - Indoor units with a capacity more than 16 kW should be connected to 2 ports merged in a multi MS unit using branch joints (TRU995HRU). Merged ports must start on an odd number and with the next sequential even number (i.e. 1, 2 or 3, 4 and so on). And if the single MS BOX is used, a downstream indoor units can be up to a maximum capacity of 32kW.

Table 11 Pipe Fittings

- The schematic after the L-shaped pipe (from accessories) is properly connected to the unit is shown below:

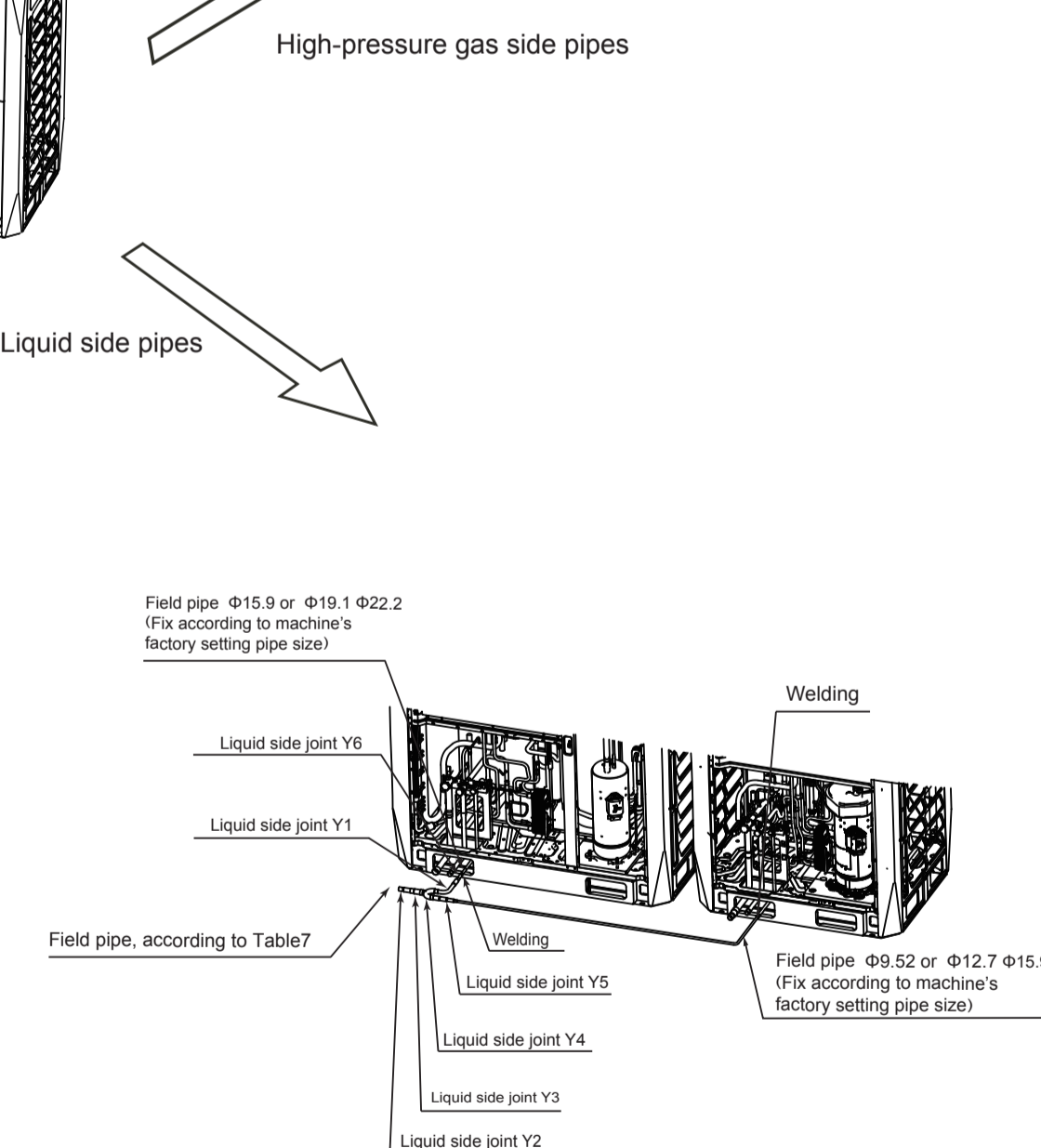


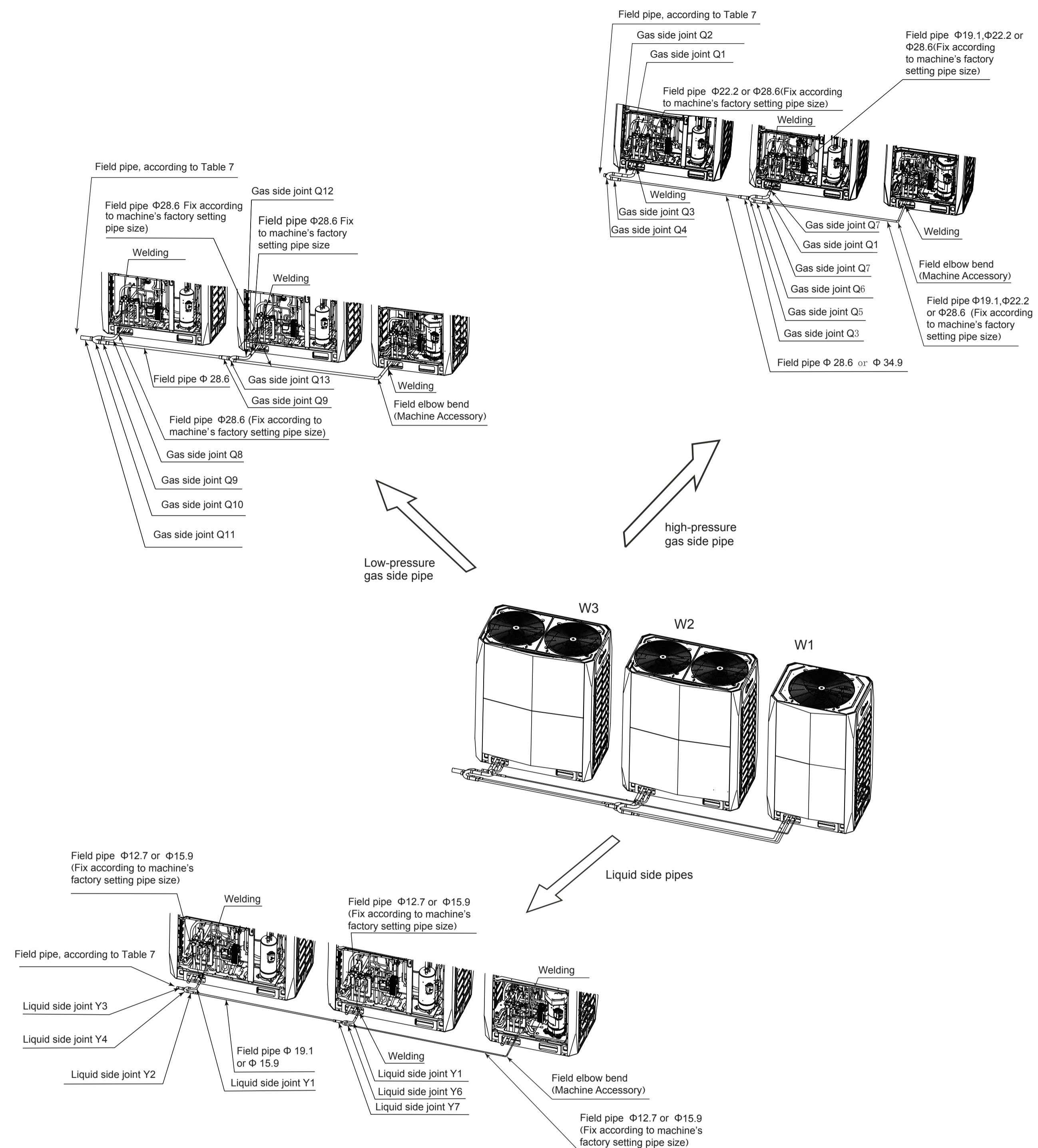
## Appearance And Connection Sketch Of TODK002HRU



## NOTE

- When numbers in brackets represent the equivalent length of all liquid pipes  $< 90$  m, means the selected pipe size value.
- It's advised to use the Max. HP unit as the main unit. See above figure W2 outdoor unit (main unit). Arranging the units with a sequence of Max. to Min. (i.e. W2-W1).
- Please select T-style three direct links according to user guide of the external packaging bag; please dumping the redundant T-style three direct links in the accessories and do not use for other purposes.
- Machine factory pipe size according to Table 11.





此要求部分不做菲林，只做说明  
 材料：双胶纸100g/m<sup>2</sup>  
 大小：A1，厂家折叠成A5供货  
 黑白印刷，内容清晰

版本更换明细（本页不出菲林，仅作为电子文档说明）



NOTE

1. When numbers in brackets represent the equivalent length of all liquid pipes < 90m, means the selected pipe size value.
2. It's advised to use the Max. HP unit as the main unit. See above figure W3 outdoor unit (main unit). Arranging the units with a sequence of Max. to Min. (i.e. W3>W2>W1).
3. Please select T-style three direct links according to user guide of the external packaging bag; please dumping the redundant T-style three direct links in the accessories and do not use for other purposes.
4. Machine factory pipe size according to Table 11.