

1.0 Advanced Integration Panel

A. General Specification

1. The provider of the control platform as specified within this section shall be engineered, programmed and commissioned by the manufacturer of the VRF system being installed.
2. Software used in the control of the VRF system shall be provided by the manufacturer of the VRF equipment being installed.
3. The Advanced Integration Panel shall export CITY MULTI control points via BACnet IP or MS/TP.
4. The panel shall export as many as 8 centralized controllers.
5. The panel shall provide a single IP address to integrate into a building automation system.
6. The panel shall be pre-programmed and pre-assembled before shipment to a customer or job site.
7. The panel shall be capable of secure remote user access via a 4G cellular connection.

B. BACnet Point Export Specification

1. The BACnet points available shall be
 - i. Greater than 90 points for each indoor unit.
 - ii. Greater than 70 points for each outdoor unit
 - iii. A limited set of maintenance tool data
 - iv. Zone occupancy, brightness, and humidity when a Smart ME remote controller is installed on a zone.
 - v. AI controller points
 - vi. PI Controller data

C. Panel Assembly Specification

1. The panel shall consist of a NEMA 1 rated enclosure and accessories.
2. All accessories and equipment in the panel shall be specifically designed for extended operation in a NEMA 1 panel environment.
3. The panel shall include 120 VAC convenience outlet with overcurrent protection for connected panel mounted equipment.
4. An uninterruptible power supply will be included to provide against intermittent power fluctuations and brief outages.

5. All components shall be pre-assembled in a UL rated panel shop prior to shipment to a customer or job site.

D. Shop Drawings and Record Drawings

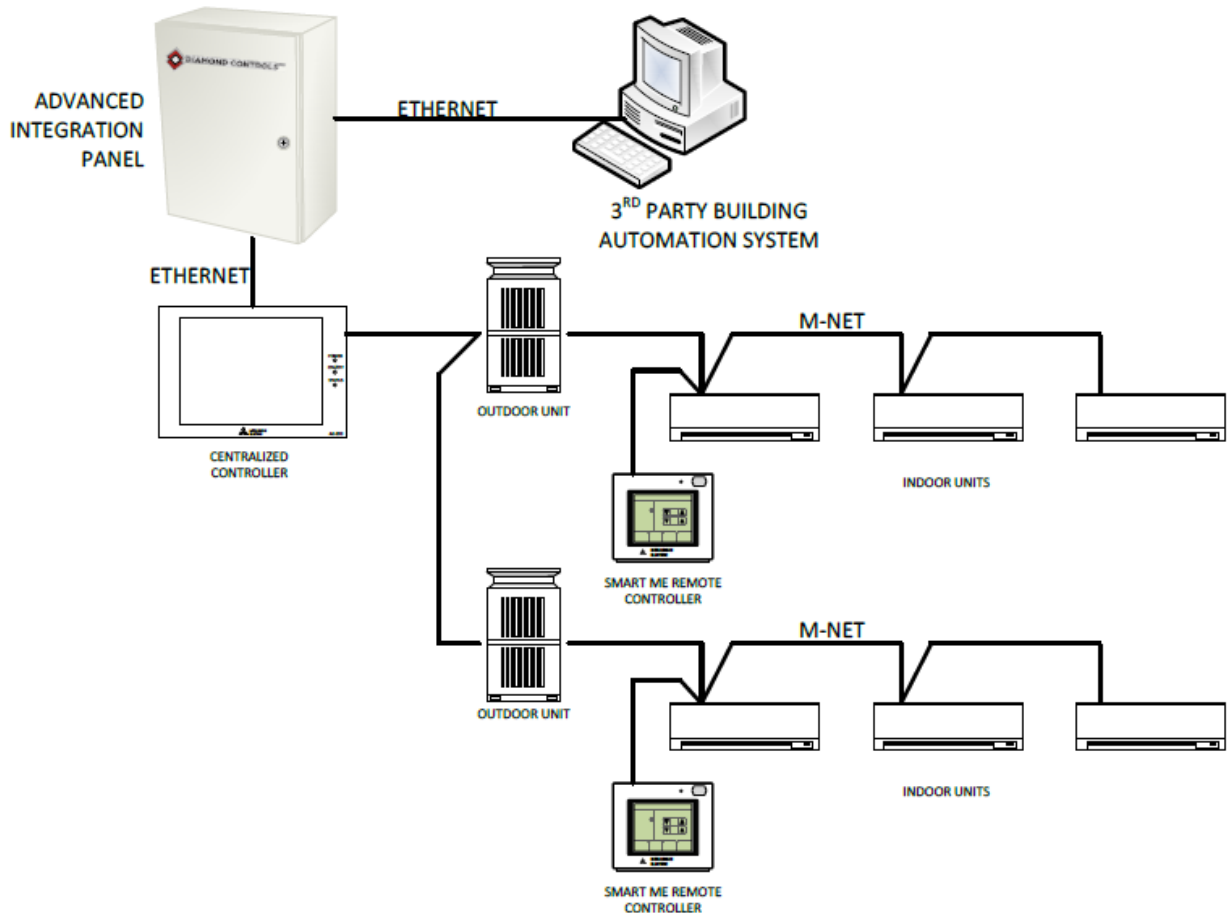
1. Project-specific engineered shop drawings will be provided following the execution of a signed purchase order.
2. Engineered record drawings will be created following the completion of a project

E. On-Site Startup and System Verification

1. Startup and verification shall be performed by the manufacturer of the VRF equipment

F. System Example

SYSTEM EXAMPLE:



2.0 System Automation Panel

A. General Specification

1. The provider of the control platform as specified within this section shall be engineered, programmed and commissioned by the manufacturer of the VRF system being installed.
2. Software used in the control of the VRF system shall be provided by the manufacturer of the VRF equipment being installed.
3. The System Automation Panel shall provide an HTML 5 graphical user interface for operating a CITY MULTI VRF system.
4. The GUI shall include:
 - a. Maintenance tool data in tabular form
 - b. Animated Equipment graphics
 - c. Preventative maintenance data
 - d. Summary unit information data in tabular form
 - e. Histories
 - f. Alarms
5. The panel shall be offered in four different models:
 - a. SAP 50 shall control up to 50 indoor units
 - b. SAP 100 shall control up to 100 indoor units
 - c. SAP 150 shall control up to 150 indoor units
 - d. SAP 200 shall control up to 200 indoor units
6. The panel shall be capable of secure remote user access via a 4G cellular connection.

B. On-Site Startup and System Verification

1. Startup and verification shall be performed by the manufacturer of the VRF equipment
2. The panel shall come with on-site startup and system verification included in the base price for the panel. The SAP 50 shall include 1 day of startup, the SAP 100 shall include 2 days, SAP 150 shall include 3 days, and the SAP 200 shall include 4 days of startup and verification.

C. Intelligent Changeover

1. The panel also includes the ability to perform intelligent changeover for non-simultaneous heating and cooling systems such as the S-Series and

Mitsubishi Electric Trane HVAC US LLC.

Y-Series systems. This does not apply to simultaneous heating and cooling systems such as R2 systems.

2. Heating and cooling mode is intelligently determined using the outside air temperature.
3. System mode will be locked into heating below the minimum setpoint, cooling above the maximum setpoint, and will oscillate on an adjustable duty cycle between the two setpoints
4. The duty cycle for mode changes is based on a linear reset with minimum and maximum mode run times.

D. Panel Assembly Specification

1. The panel shall consist of a NEMA 1 rated enclosure and accessories.
2. All accessories and equipment in the panel shall be specifically designed for extended operation in a NEMA 1 panel environment.
3. The panel shall include 120 VAC convenience outlet with overcurrent protection for connected panel mounted equipment.
4. An uninterruptible power supply will be included to provide against intermittent power fluctuations and brief outages.
5. All components shall be pre-assembled in a UL rated panel shop prior to shipment to a customer or job site.

E. Shop Drawings and Record Drawings

1. Project-specific engineered shop drawings will be provided following the execution of a signed purchase order.
2. Engineered record drawings will be created following the completion of a project

3.0 Energy Management Panel

A. General Specification

1. The provider of the control platform as specified within this section shall be engineered, programmed and commissioned by the manufacturer of the VRF system being installed.
2. Software used in the control of the VRF system shall be provided by the manufacturer of the VRF equipment being installed.

Mitsubishi Electric Trane HVAC US LLC.

3. The Energy Management Panel shall provide an HTML 5 graphical user interface for apportioning indoor unit electrical consumption and reviewing historical trend logs.
4. The panel shall be capable of secure remote user access via a 4G cellular connection.
5. The panel shall be offered in four different models:

Panel	# of Units	Days on Site	# of Power Meters	# of PI Controllers	Dimensions (HxWxD)
EMP1200	200	1	1	1	30" x 24" x 6"
EMP4200	200	3	4	1	36" x 30" x 6"
EMP8400	400	4	8	2	42" x 36" x 6"

B. On-Site Startup and System Verification

1. Startup and verification shall be performed by the manufacturer of the VRF equipment
2. The panel shall come with on-site startup and system verification included in the base price for the panel. The EMP1200 shall include 1 day of startup, the EMP4200 shall include 3 days, and the EMP8400 shall include 3 days startup and verification.

C. Panel Assembly Specification

1. The panel shall consist of a NEMA 1 rated enclosure and accessories.
2. All accessories and equipment in the panel shall be specifically designed for extended operation in a NEMA 1 panel environment.
3. The panel shall include 120 VAC convenience outlet with overcurrent protection for connected panel mounted equipment.
4. An uninterruptible power supply will be included to provide against intermittent power fluctuations and brief outages.

Mitsubishi Electric Trane HVAC US LLC.

5. All components shall be pre-assembled in a UL rated panel shop prior to shipment to a customer or job site.
6. The voltage inputs for each panel shall include the necessary fuses for overcurrent protection of the voltage inputs of the power meter(s).

D. Shop Drawings and Record Drawings

1. Project-specific engineered shop drawings will be provided following the execution of a signed purchase order.
2. Engineered record drawings will be created following the completion of a project

4.0 Custom Automation Panel

A. General Specification

1. The provider of the control platform as specified within this section shall be engineered, programmed and commissioned by the manufacturer of the VRF system being installed.
2. Software used in the control of the VRF system shall be provided by the manufacturer of the VRF equipment being installed.
3. The Custom Automation Panel shall provide an HTML 5 graphical user interface for operating a CITY MULTI VRF system.
4. The GUI shall include:
 - a. Fully rendered 3-D floor plans
 - b. Custom dashboards
 - c. Maintenance tool data in tabular form
 - d. Animated Equipment graphics
 - e. Preventative maintenance data
 - f. Summary unit information data in tabular form
 - g. Histories
 - h. Alarms
 - i. Additional features as outlined in the scope of work.
5. The panel shall be capable of secure remote user access via a 4G cellular connection.

B. On-Site Startup and System Verification

Mitsubishi Electric Trane HVAC US LLC.

1. Startup and verification shall be performed by the manufacturer of the VRF equipment
2. The panel shall come with on-site startup and system verification as included in the scope of work outlined in the sales quote.

C. Custom Controls Sequences

1. The custom automation panel may be used to execute custom sequences of operations within the limits of the VRF equipment. Examples may include intelligent changeover, VRF as 2nd stage of heat, or seamless integration with third-party equipment.

D. Panel Assembly Specification

1. The panel shall consist of a NEMA 1 rated enclosure and accessories.
2. All accessories and equipment in the panel shall be specifically designed for extended operation in a NEMA 1 panel environment.
3. The panel shall include 120 VAC convenience outlet with overcurrent protection for connected panel mounted equipment.
4. An uninterruptible power supply will be included to provide against intermittent power fluctuations and brief outages.
5. All components shall be pre-assembled in a UL rated panel shop prior to shipment to a customer or job site.

E. Shop Drawings and Record Drawings

1. Project-specific engineered shop drawings will be provided following the execution of a signed purchase order.
2. Engineered record drawings will be created following the completion of a project

5.0 Centralized Controller Panel

A. General Specification

1. The provider of the control platform as specified within this section shall be engineered, programmed and commissioned by the manufacturer of the VRF system being installed.

Mitsubishi Electric Trane HVAC US LLC.

2. Software used in the control of the VRF system shall be provided by the manufacturer of the VRF equipment being installed.
3. The panel shall provide an HTML 5 graphical user interface for operation, scheduling, and license application through Integrated Centralized Control Web.
4. The panel shall be capable of secure remote user access via a 4G cellular connection.
5. The panel shall be offered in four different models:

Panel	# of Units	Days on Site	AE-200 qty.	EW-50 qty. Controllers	Dimensions (HxWxD)
DC-CCP-50	50	1	1	0	30" x 24" x 6"
DC-CCP-100	100	1	1	1	36" x 30" x 6"
DC-CCP-150	150	2	1	2	36" x 30" x 6"
DC-CCP-200	200	2	1	3	42" x 36" x 6"

B. On-Site Startup and System Verification

1. Startup and verification shall be performed by the manufacturer of the VRF equipment
2. The panel shall come with on-site startup and system verification included in the base price for the panel.
3. Panel startup includes

C. Panel Assembly Specification

1. The panel shall consist of a NEMA 1 rated enclosure and accessories.
2. All accessories and equipment in the panel shall be specifically designed for extended operation in a NEMA 1 panel environment.
3. An uninterruptible power supply will be included to provide against intermittent power fluctuations and brief outages.

Mitsubishi Electric Trane HVAC US LLC.

4. All components shall be pre-assembled in a UL rated panel shop prior to shipment to a customer or job site.

D. Shop Drawings and Record Drawings

1. Project-specific engineered shop drawings will be provided following the execution of a signed purchase order.
2. Engineered record drawings will be created following the completion of a project