DAIKIN

ENERGY-INTELLIGENT™ TECHNOLOGY
HEATING AND COOLING SYSTEMS

08.16

intelligent touch Manager

INTELLIGENT TOUCH MANAGER

ONE FOR ALL

ADVANCED MULTI-ZONE CONTROLLER

Intelligent Touch Manager

The intelligent Touch Manager (iTM) is an advanced multi-zone controller that controls and monitors the Daikin VRV system. The iTM can provide a cost-effective mini Building Management System (BMS) solution to integrate and control third-party devices through optional software and hardware. If a BMS already exists, the iTM can be used as a BACnet gateway for BMS integration with the new iTM BACnet Server Gateway Option.

Easy Operation and Configuration

- Intuitive user interface with 10.4" LCD touch screen
- Flexible screen views includes the icon view, list view and layout view for system configurations
- Easy engineering with use of the Preset Tool and USB port

Advanced Control Logic

- Independent Cool and Heat setpoints or Single setpoint in the occupied period
- Independent Setback setpoints in the unoccupied period
- Weekly Schedule with Optimum Start and Timed Override
- Auto Changeover with configurable methods

Facility Management and Billing

- Remote Web access
- Automatic Error and Alert emails
- Tenant Billing with iTM PPD option

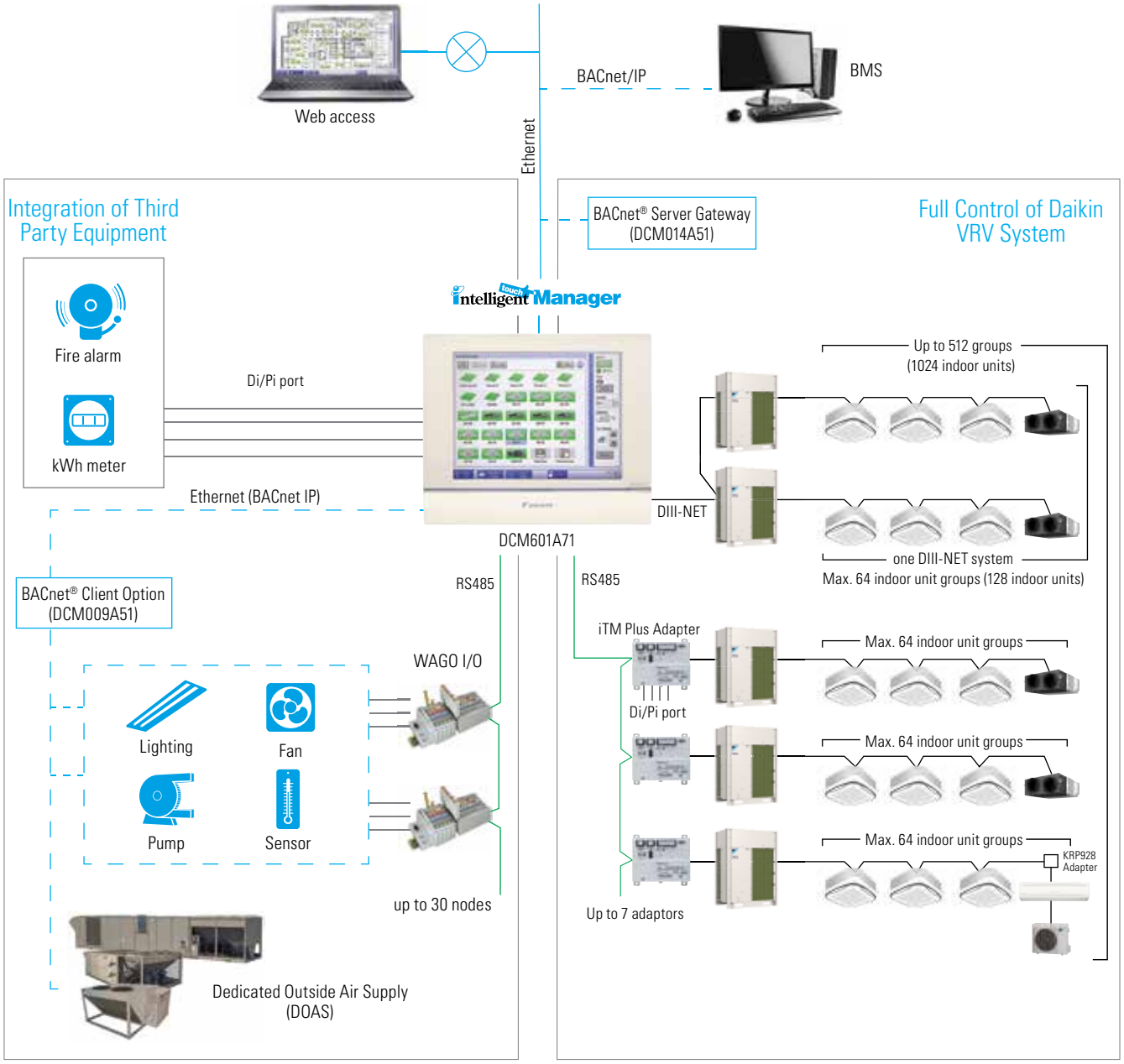
Mini BMS Solution with Software and Hardware Options

- Interlock and Emergency Stop for facility management
- DI, DO, Ai, AO points integrated via the WAGO I/O System
- BACnet points (AI, AO, AV. BI, BO. BV, MSI, MSO, MSV) integrated with the iTM BACnet Client Option
- DI and DO points integration via DIII-Net connected DI and DIO units

BACnet Server Gateway Option

- Direct connection to the VRV system using the iTM as a gateway
- Individual device ID assigned to each indoor unit management point
- Seamless control logic integration between the iTM and BMS
- Greatly reduces the need for BMS integrator programming

Overview

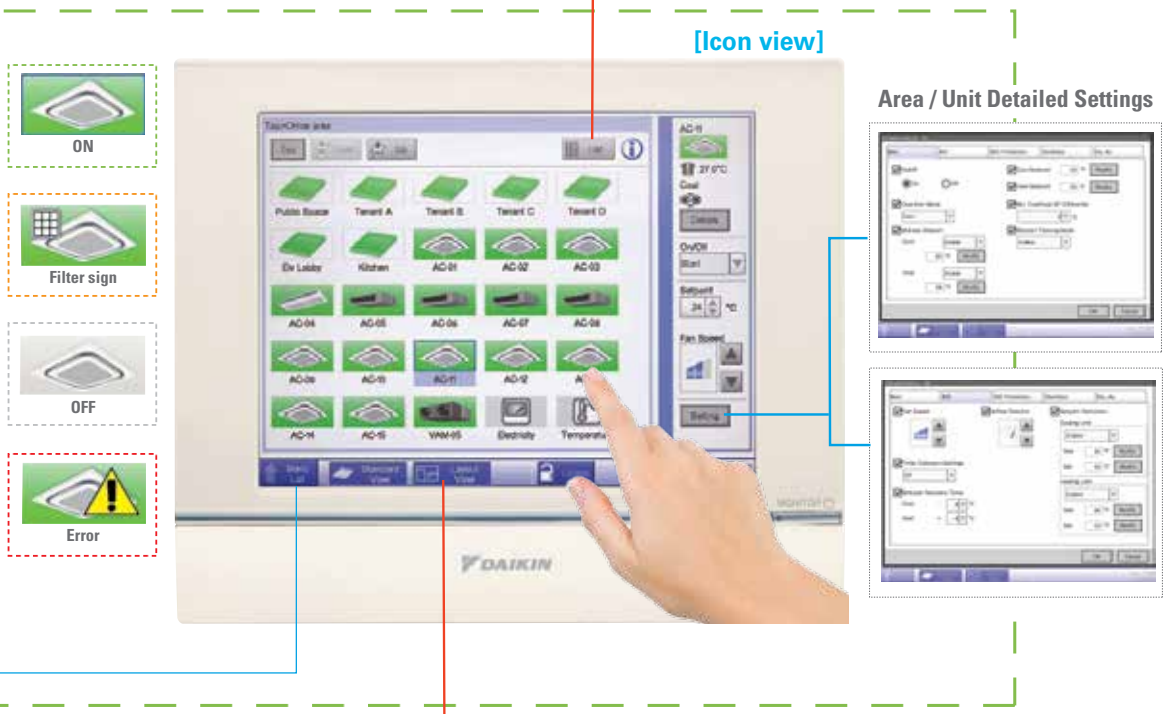

Web access
BACnet/IP
BMS
Ethernet
Integration of Third Party Equipment
BACnet® Server Gateway (DCM014A51)
Full Control of Daikin VRV System
intelligent Manager
Fire alarm
kWh meter
Di/Pi port
Ethernet (BACnet IP)
DCM601A71
DIII-NET
Up to 512 groups (1024 indoor units)
one DIII-NET system
Max. 64 indoor unit groups (128 indoor units)
RS485
RS485
BACnet® Client Option (DCM009A51)
WAGO I/O
Lighting
Fan
Pump
Sensor
up to 30 nodes
Dedicated Outside Air Supply (DOAS)
iTM Plus Adapter
Di/Pi port
Max. 64 indoor unit groups
Max. 64 indoor unit groups
Max. 64 indoor unit groups
KRP928 Adapter
Up to 7 adaptors

Easy Operation and Configuration

The easy to understand icon and intuitive menu will enable even a novice user to be proficient in managing the VRV system.

[List view] Designed for simplicity, List View provides a quick view of overall status and essential information in a list format. Using the sorting function, the indoor units operating under the same conditions and status are identified for comparison and assessment.

[Icon view]



[Layout view] A special feature utilizes building floor plans to provide a visual representation of system equipment.

The users can visually locate any installed equipment on the floor plan without having to memorize equipment names.

Icon menus for configurations

Easy Engineering

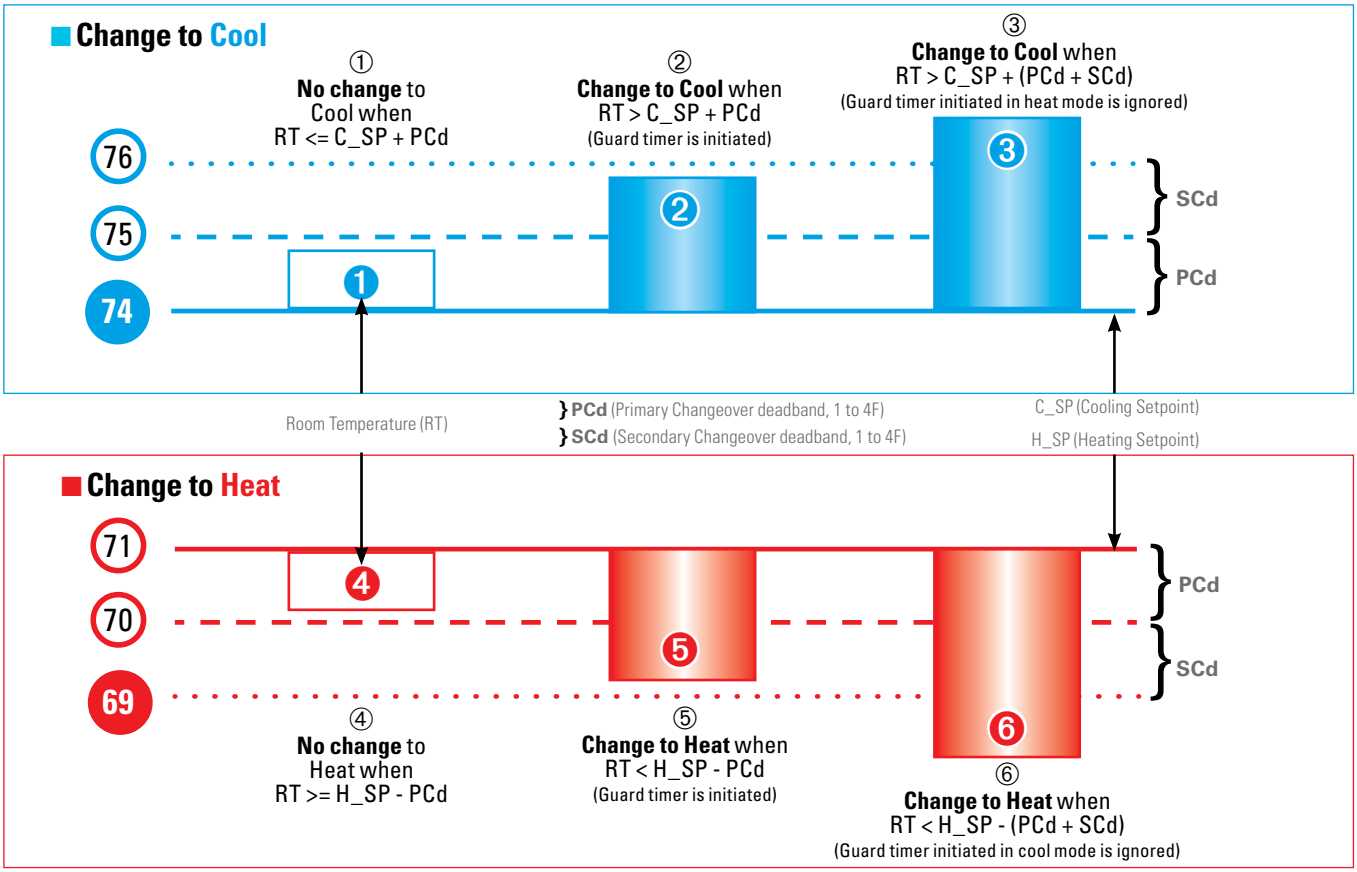
The system configuration can be done through the Preset Tool off-site then imported to the iTM via the USB port at the site. This feature makes engineering easier and more manageable.

Auto Changeover

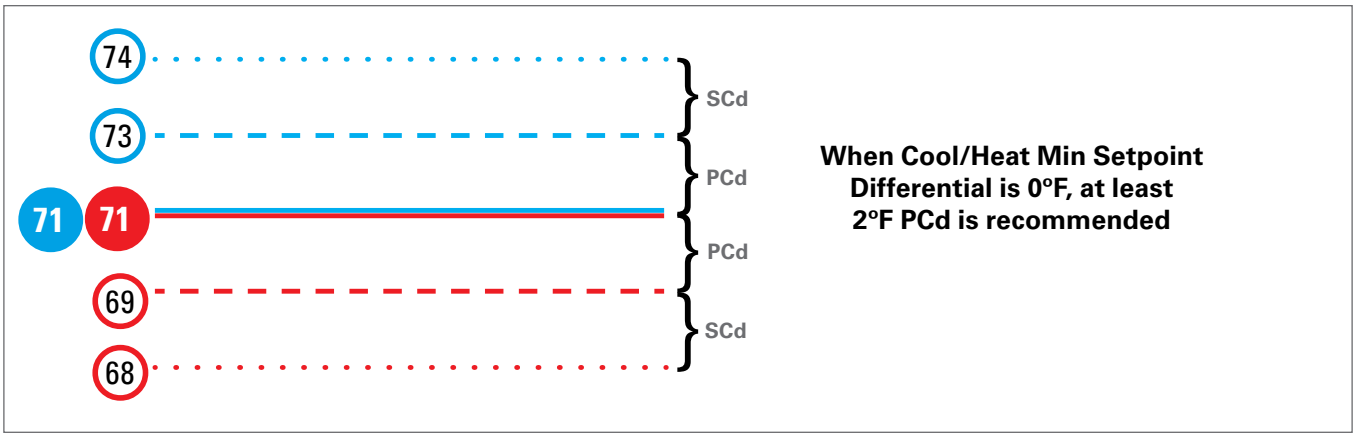
The iTM extends the Auto Changeover capabilities based on cooling or heating demand.

The changeover is evaluated by how much the room temperature is deviated from the cooling or heating setpoint. For example, when the room temperature exceeds the primary changeover deadband from the cooling setpoint, iTM initiates a change from the heating mode to the cooling mode.

The changeover deadbands can be configured to the minimum of 1˚F to a maximum of 4˚F.



- The guard timer prevents another changeover for 15, 30 or 60 minutes (configurable).
- When the setpoint is changed manually or by the schedule, the guard timer is not active.



Auto Changeover (cont.)

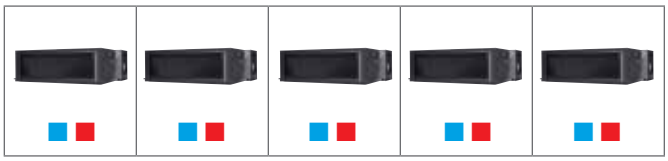
Auto Changeover is applicable to both VRV Heat Pump and Heat Recovery system.

The iTM provides four changeover methods to meet a variety of expectations in your project. Fixed, Individual, Average or Vote methods can be specified in the changeover group with targeted indoor units as well as Primary / Secondary Changeover deadbands.

Fixed method

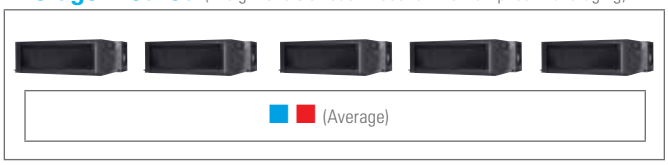
- Changeover is evaluated with the representative indoor unit.
- Changeover affects all indoor units.
- Good for prioritizing the representative indoor unit for the Heat Pump system (or multiple units on the same port of the BS Box in Heat Recovery system).

Individual method



- Changeover is evaluated with, and affects each indoor unit individually.
- Good for Hotel / Nursing home application with the Heat Recovery system.

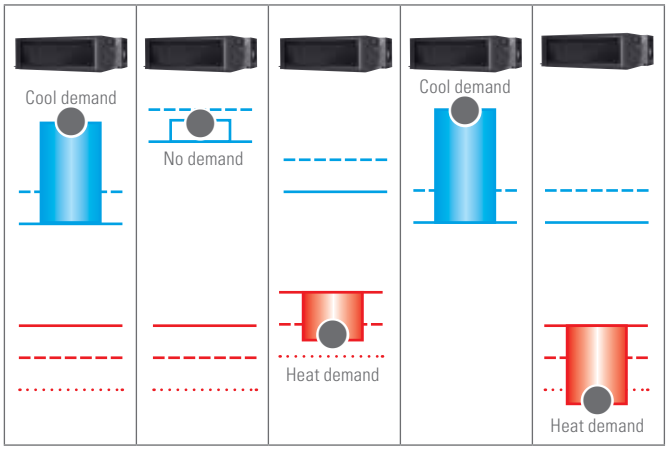
Average method (Weight 0 to 3 on each indoor unit is multiplied in averaging)



■ = **Cool Mode** ■ = **Heat Mode**

- Changeover is evaluated with the average of room temperature and setpoints.
- Changeover affects all indoor units.
- Good for Open office application with Heat Pump system (or multiple units on the same port of the BS Box in Heat Recovery system).

Vote method (Weight 0 to 3 on each indoor unit is multiplied for the demand)



- Option available for heating override if there is an indoor unit which the heating demand exceeds (H_SP – (PCd + SCd))

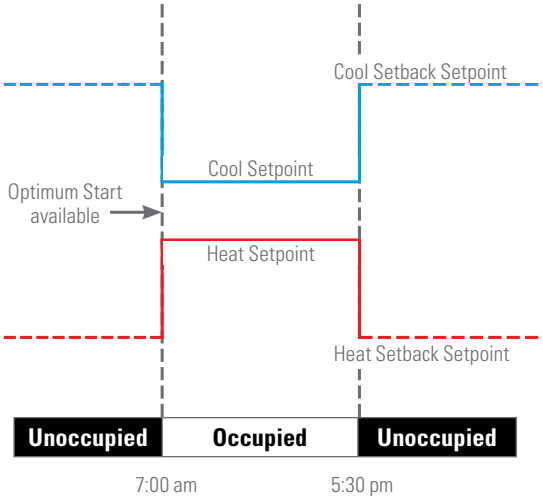
- Changeover is evaluated based upon total cooling demand and total heating demand. If the total cooling demand is greater than the total heating demand (like the figure left), the iTM changes the indoor units in the changeover group to cooling mode.
- When the changeover group is in cooling mode the total cooling demand will be decreased, at that point the total heating demand may become greater than the cooling demand and change the mode to heating (a guard timer applies).
- The setpoints can be different in each indoor unit within the changeover group. The demand is calculated based on the setpoints in comparison to room temperature for each indoor unit. The demand within the Primary Changeover deadband (PCd) is considered as no demand.
- Good for the Heat Pump system (or multiple units on the same port of the BS Box in Heat Recovery system) as pseudo simultaneous cooling and heating operation.
- A weight (0-3) can be added to each indoor units demand in the changeover group. The default is 1.

Schedule

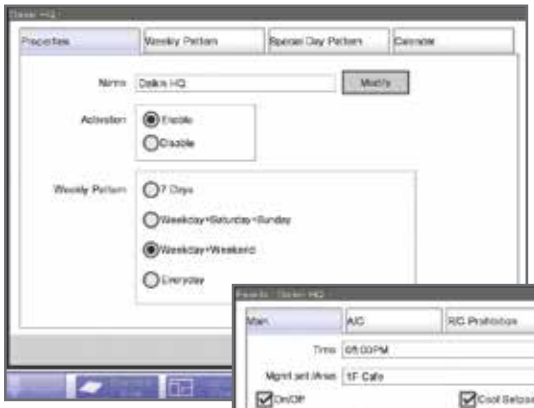
Weekly Schedule with dual setpoints for the occupied period and Setback setpoints for the unoccupied period provides year round schedule programming.

- Up to 100 schedule programs can be created with up to 20 events per day.
- 7 day, 5+2 (Weekday + Weekend), 5+1+1 (Weekday + Saturday + Sunday), 1 (Everyday) weekly patterns are available with Annual scheduling that provides 5 special day programs for holiday scheduling or events outside the weekly schedule.
- Special day programming can be specified on calendar as a specific day (like Jan 1st) or a floating day (like 1st Monday in September).
- Timer Extension offers 30 to 180 minutes (configurable) Override in the unoccupied period.
- Optimum Start insures the room temperature achieves setpoint at the scheduled event time.
- Daylight Savings Time (DST) setting automatically adjust the iTM clock to insure schedule times are met.

Typical Weekday Office Schedule



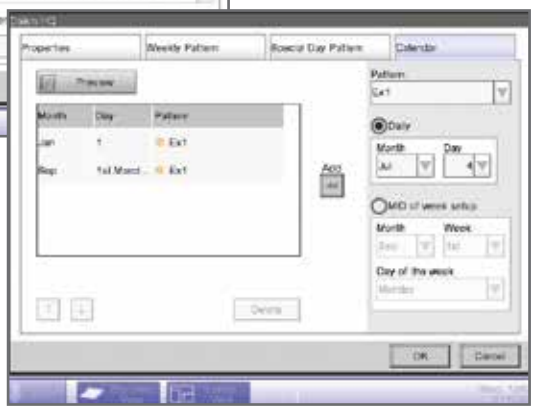
Weekly Patterns



Schedule Event

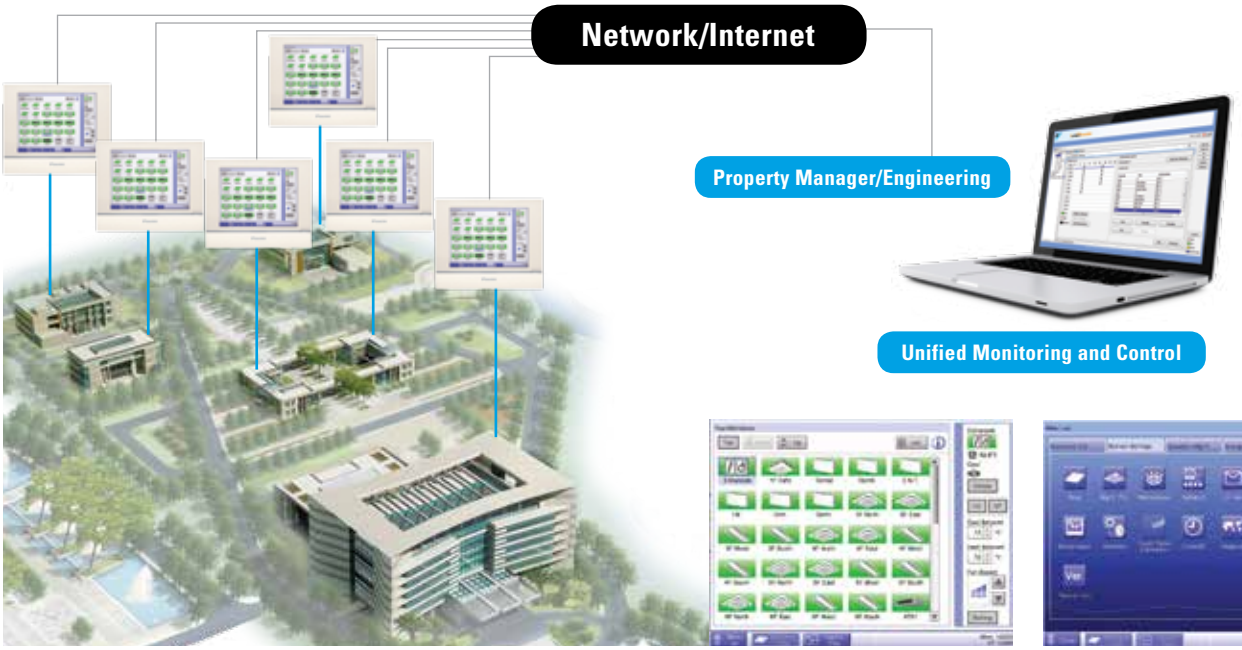
Daylight Savings Time

Special Day



Remote Monitoring / Maintenance

- The Web function enables remote management for the Daikin VRV system with other general equipment integrated into the iTM so they can be accessed from your PC (*).
  - Up to 4 administrators and 60 general users can be registered.
  - Screens and operation accessible to general users can be restricted.
- Automatic Alert/Error e-mail enables prompt response by service personnel based on timely and precise knowledge of what happened in the system at the remote site.
  - Up to 10 e-mail addresses can be set.
  - The SMTP server authentication method is selectable from no authentication, POP before SMTP, and SMTP-AUTH.



(*) Flash Player is required.

Indoor icon view via Web

Configuration menu via Web

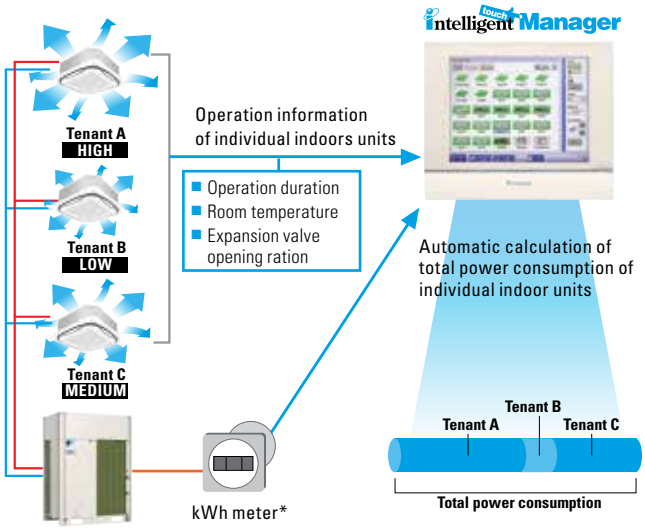
Tenant Billing (PPD Option)

The iTM PPD (Power Proportional Distribution) option records all the operation duration, room temperature, electronic expansion valve opening ratio data, etc. Based on the recorded data, the energy consumption of the VRV system is proportionally calculated for each indoor unit. The calculated data can be used for tenant billing.

Easy to output PPD data

PPD data can be downloaded in CSV format to a PC or USB flash drive.

- Output data can be customized using the PPD Calculation Tool

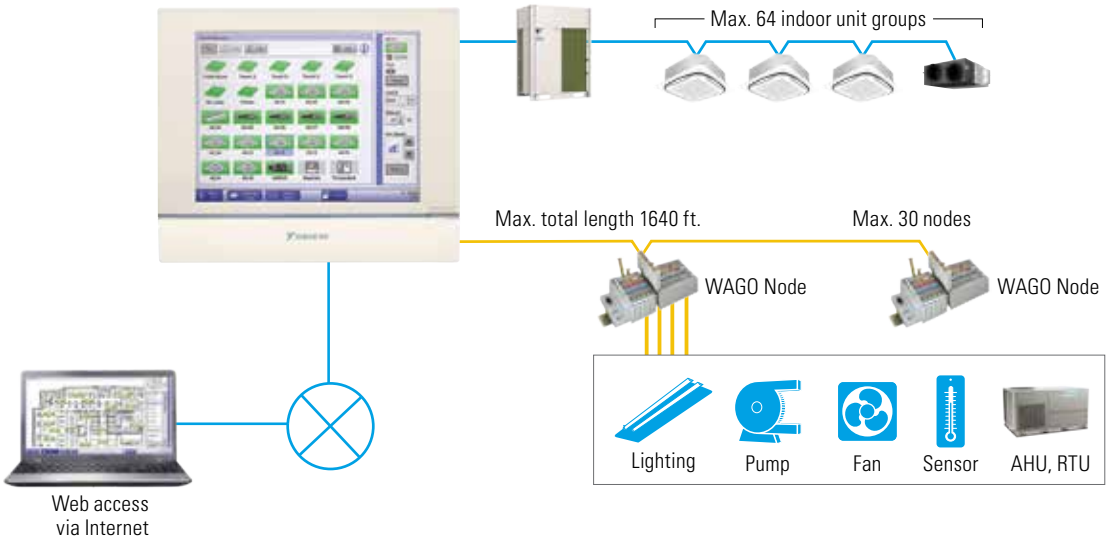


* Pulse power meter that provides an output of 1 pulse per 1 kw and has a width of 40-400 milliseconds.

Integration of General Equipment

General equipment can be integrated with the iTM by using the WAGO I/O modules. The general equipment can be monitored and controlled via interlock/stand alone, manual operation, schedule and Web function. The WAGO I/O Modules provide Digital Inputs (Di) for monitoring equipment status and alarms, Digital Outputs (Do) for On/Off control, Analog Outputs (Ao) for step control of fan speeds and damper opening and Analog Inputs (Ai) for temperature, humidity and CO_2 monitoring.

- ON/OFF operation and status monitoring
- Get Alert/Error e-mail upon malfunction
- Manage with remote accessibility



Interlock Variety

The iTM offers monitoring and control that extends beyond simply starting and stopping connected units. It also enables the iTM to control the HVAC and ancillary equipment through interlock control such as occupancy control and demand response ventilation.

HVAC interlock based upon room occupancy status

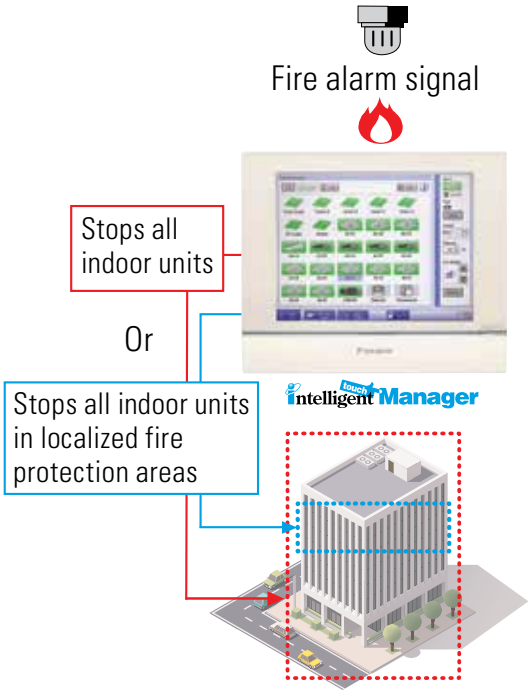
Key control systems and occupancy sensors are employed to detect room occupancy status and automatically perform setback or stop operations for unoccupied rooms depending on settings.

Ventilation control

Ventilation equipment is controlled depending on the indoor CO_2 levels. Air conditioning losses attributed to unnecessary ventilation are reduced while maintaining appropriate indoor air quality and enabling energy savings.

Emergency stop for localized fire protection areas

The iTM offers options to select areas or the whole system to interlock with the fire alarm system and to perform an emergency stop.



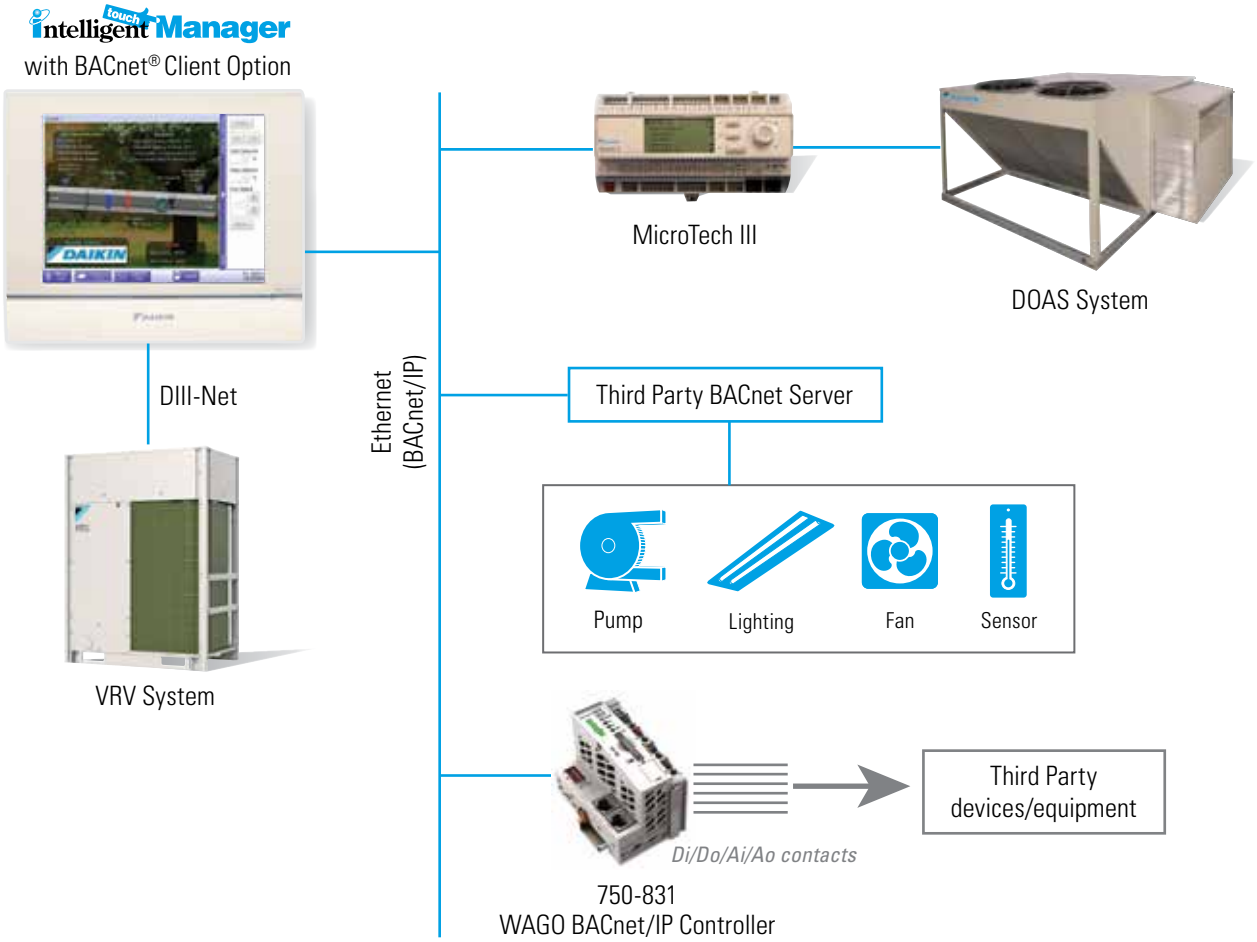
Mini BMS Solution with the BACnet® Client Option

DCM009A51 - BACnet® Client Option

The iTM offers an advanced and cost-effective solution for Building Management Systems (BMS) applications. The iTM BACnet Client Option (DCM009A51) provides more flexibility to enhance the iTM's function as a mini BMS. With this new option, the iTM is able to manage DOAS systems and other third party equipment through the BACnet/IP protocol. By registering equipment connected to a BACnet server as management points in the iTM, you can now monitor and control the equipment via the iTM.

Features/Benefits

- Cost- effective BMS solution
- Direct connection on iTM using the BACnet/IP Protocol
- Integrated control on Daikin VRV system and Daikin Applied System
- Monitors and controls third party equipment
- Easy commissioning with pre-Engineering Preset Tool
- Easy monitoring with preconfigured GUI



Object Types

- Analog Input, Analog Output, Analog Value
- Binary Input, Binary Output, Binary Value
- Multi-State Input, Multi-State Output, Multi-State Value

Applications

- Simple I/O: Sensor, Pump, Light, Fan
- Multi-State Objects: AHU, Alarm, Elevator
- The iTM can integrate with the WAGO BACnet/IP Controller (750-831) using the BACnet Client Option

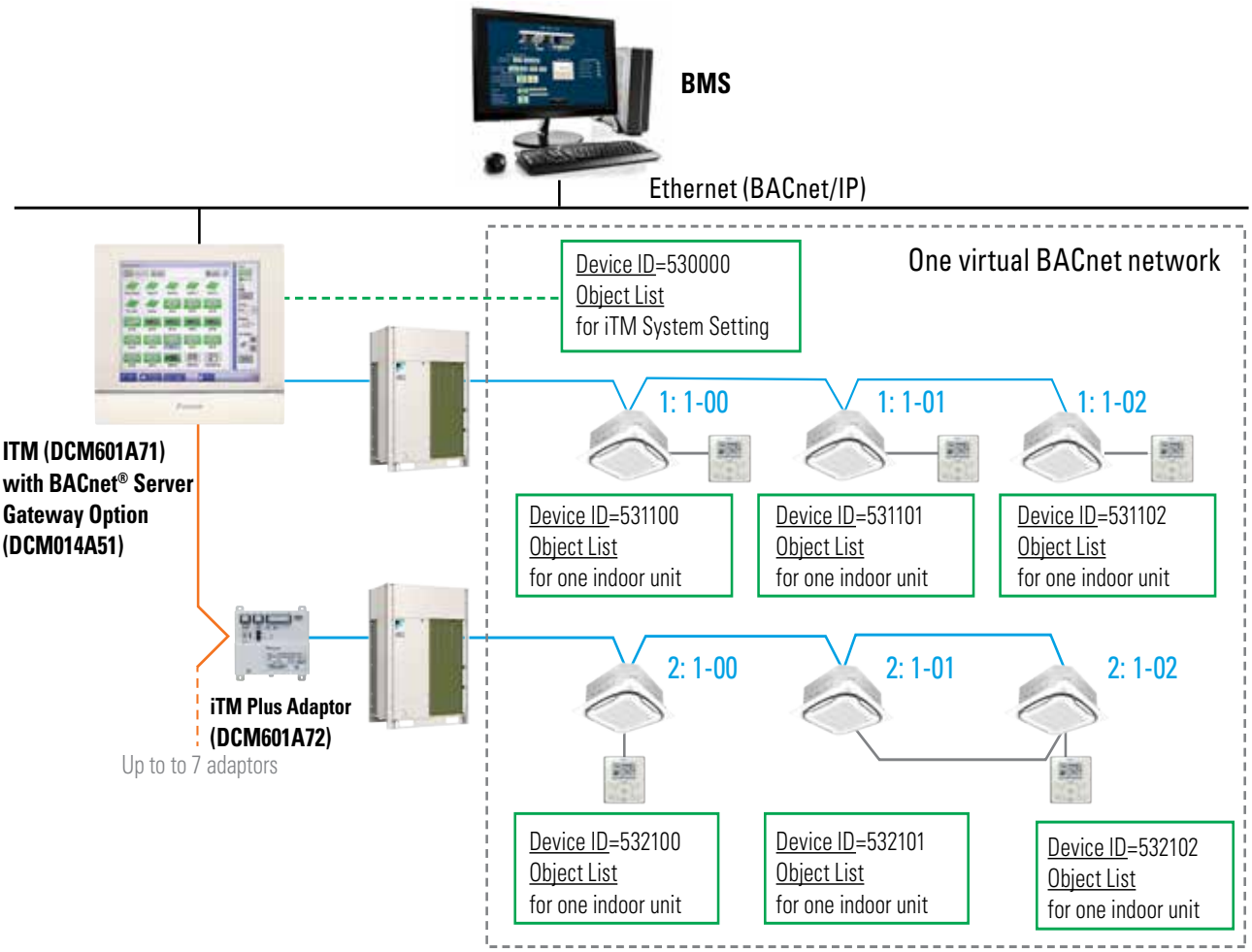
Advanced BMS Integration Solution with the BACnet® Server Gateway Option

DCM014A51 - iTM BACnet® Server Gateway Option

The intelligent Touch Manager is now capable of serving as a BACnet interface for Building Management System (BMS) integration. The iTM BACnet Server Gateway Option (DCM014A51) will provide BMS integrators with the ability to monitor and control the VRV indoor units via the BACnet/IP protocol. The iTM BACnet Server Gateway Option, eliminates the need for an additional hardware interface for the BMS to monitor and control VRV system. The iTM BACnet Server Gateway Option will provide seamless control logic integration between the iTM and BMS. With the BACnet Server Gateway Option, up to 128 indoor units management groups can be controlled and monitored by BMS.

Features

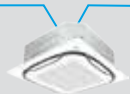
- Direct connection on iTM using the BACnet/IP Protocol
- **BACnet virtual router** function implemented:
  - **Individual BACnet device** ID assigned to each indoor unit group address
  - Indoor unit group names created in the iTM are visible on the BMS
- Easy commissioning using CSV file
  - Available objects can be configured for each indoor unit
- Support Change of Value (COV) notifications to BMS
- Configurable as a BACnet foreign device if BBMD exist on different subnet within BACnet network
- **Independent heating and cooling setpoints** for occupied and unoccupied periods
- Individual min/max **Setpoint Range Limitation** for heat and cool modes
- The iTM's **auto changeover, setpoint range limitation, setback, dual setpoint** logic and **schedule** can be accessed by the BMS



Current Solution with BACnet® Gateway (DMS502B71)

One Device instance number for all indoor units (Configurable)

Device ID = 123456



1: 1-00

1: 1-01

Different Object instance number for each indoor unit point

StartStopCommand = BO 1 (1:1-00)
StartStopStatus = BI 2 (1:1-00)

BO 257 (1:1-01)
BI 258 (1:1-01)

Required Programming from BMS:

- Auto changeover
- Dual setpoint
- Setpoint range limitation
- Setback Control
- Schedule

Better Solution and Easy integration with iTM BACnet Server Gateway Option

1: 1-00

1: 1-01

Individual Device instance number for each indoor unit (Configurable)

Device ID (1:1-00) = 531100

Device ID (1:1-01) = 531101

Object instance number repeated for every indoor unit point

Occupancy Mode = MO 1 (All indoor units)
Unit On Off Status = BI 2 (All indoor units)

Advanced iTM BACnet Server Gateway Points

BMS

iTM System Settings	Enable/disable iTM schedule operation	**Schedule**	iTM Control Logic
	Enable/disable iTM auto changeover operation	**Auto Changeover**	
	Timed override minutes	**Timer Extension Minutes**	
	System forced off	**Emergency Stop**	
Indoor Unit Operation and Monitoring	Occupancy mode (occ, unocc, standby)	**On/Off**	
	Occupied cooling and heating setpoint	**Occupied Dual Setpoint**	
	Unoccupied cooling and heating setpoint	**Setback Setpoints**	
	Maximum and minimum cooling setpoint	**Setpoint Range Limitation**	
	Maximum and minimum heating setpoint		
	Minimum cooling and heating setpoint differential	**Min. Cool/Heat SP Differential**	
	Cooling and heating setpoint tracking mode	**Setpoint Tracking Mode**	
	Remote control prohibit	**Remote Controller Prohibit**	
	Timed override operation	**Timer Extension**	
	Current unit operation (off, normal, override, setback)	**And more basic functions...**	
	Forced indoor unit thermo-off	**Advanced Indoor Unit Operation**	
	Indoor unit changeover option availability		
	Indoor fan status		
	and more basic operation and monitoring points...		

Specifications

		INTELLIGENT TOUCH MANAGER (ITM)	ITM PLUS ADAPTER
Model		DCM601A71	DCM601A72
Power supply		AC 24V 60Hz	AC 24V 60Hz
Power consumption		23W maximum	23W maximum
Operating conditions	Surrounding temperature	32 °F to 104 °F	14 °F to 122 °F
	Humidity	15% to 85% RH (non condensing)	15% to 85% RH (non condensing)
Dimensions	H x W x D (inch)	9.57 x 11.42 x 1.97	5.87 x 6.30 x 2.41
Capacity	Max. number of indoor unit	64 addressed indoor unit groups (maximum 128 indoor units)	64 addressed indoor unit groups (maximum 128 indoor units)
	Max. number of outdoor unit	10	10
Interface	F1F2 (Daikin DIII-NET communication)	1	1
	100Base-TX (Ethernet communication)	1 (RJ-45)	-
	USB port (for flash memory drive)	1 (2 to 32 GB)	-
	RS-485 (for iTM Plus Adapter connection)	1 (2-wire polarity sensitive)	1 (2-wire polarity sensitive)
Input terminals	Di (Digital input for forced shutdown)	1	-
	Di/Pi (Digital/Pulse input)*	3	4
EMC certification		FCC Part 15 Class B	FCC Part 15 Class B

* Pulse input from KWh meter requirements: 1 pulse to 1KWh or 10KWh. Pulse width must be between 40-400 msec. Non voltage, normally open semi-conductor type.

Summary of Functions

CATEGORY	FUNCTION		REMARKS
Basic Functions	iTM Plus Adaptor		Maximum number of adaptors:7
	Management points		Maximum number of management points:650
			Maximum number of indoor unit management points:512
	Areas		Maximum number of areas:650
			Maximum area levels:10
	Language		English
	Monitoring screens	Icon view	Icons show the operation status of equipment
		List view	Detailed information of each management point is displayed
		Layout view	Up to 60 screens can be created
Automatic Control	Schedule		Maximum number of programs:100
			Up to 20 actions/day can be set
	Weekly Schedule		7 day, 5+2,5+1+1,and Everyday weekly patterns can be set
	Yearly Calendar		Special days can be specified by specific date or floating date
			Automatic DST adjustment
	Optimum Start		Ensure the room temperature is reached at scheduled start time
	Interlock		Maximum number of programs:500
	Emergency Stop		Maximum number of Programs:31
	Auto changeover		Maximum number of changeover groups: 512
	Temperature Range Limitation		Independent cooling and heating setpoint range limitation
			Set between 60-90 °F
	Timer Extension		Selectable from 36,60,90,120, and 180 minutes
	Setback		Independent heating and cooling setback setpoint
			Setback recovery temperature range:2-10°F
Data Control	History		Up to 500,000 events are recorded in history including malfunctions, operations, automatic control, and system information
	Power proportional distribution		Up to 13 months of hourly power proportional distribution results are recorded
			CSV format data output are supported
Remote Access	Web access		Display the same type of screen as the iTM
			Up to 4 administrators and 60 general users can be registered
			Screens and operation accessible to general users can be restricted
	Email Alert		Up to 10 email addresses can be set
System	Automatic Registration		Indoor units are automatically detected, and icons for respective models are automatically registered
	Security		Screen lock function are available
			Access restriction can be set for each general user
	Screen saver		Screen saver time can be set from 1-60 mins
			3 patterns are available

Options for intelligent Touch Manager

ITEM	MODEL	DESCRIPTION
Optional Software	DCM002A71	Power Proportional Distribution (PPD)[1]
	DCM009A51	BACnet® IP Client Option[2]
	DCM014A51	BACnet Server Gateway Option[3]
Interface Adapters	KRP928BB2S	For connection to Daikin Mini-Split system (connect to Indoor Unit)
Digital input (DI) unit	DEC101A51-US2	8 sets of operation status input and alarm input
Digital input/output (DIO) unit	DEC102A51-US2	4 sets of control output, operation status input and alarm input

[1] The power proportional distribution (PPD) feature supplies the user with a reasonably calculated apportionment of the total power consumption by the Daikin VRV system. Because input to the PPD includes measured pulses in the refrigerant system and because the VRV system includes a number of variables, including the operating temperatures and pressures, piping lengths, heat exchange rates, and so forth, no meter-type apportionment of individual user consumption can be made. However, the PPD feature provides an apportionment methodology that uses highly advanced technology and is applied to the many variables in the VRV system.

[2] BACnet IP Client Option can not be activated at the same time with BACnet Server Gateway Option.

[3] iTM PPD option and iTM BACnet Client option are not compatible with the iTM BACnet Server Gateway Option.

WAGO I/O System

MODULE		PART NUMBER	DESCRIPTION
Basic Kit		51291052	Bus Coupler, Connector, 24 VDC Power Supply, and End Module
Digital Input	2 Channel DI	750-400	2 Channel Digital Input Module, 24 VDC
	4 Channel DI	750-432	4 Channel Digital Input Module, 24 VDC
	8 Channel DI	750-430	8 Channel Digital Input Module, 24 VDC
Digital Output	2 Channel DO	750-513/000-001	2 Channel Digital Output Module, without power jumper
	4 Channel DO	750-504	4 Channel Digital Output Module, 24 VDC
Analog Input	2 Channel AI	750-454	2 Channel Analog Input Module, 4-20 mA, Differential Inputs
		750-479	2 Channel Analog Input Module, ± 10 VDC, Differential Measurement Input
		750-461/020-000	2 Channel Analog Input Module, NTC 20k Ohm
	4 Channel AI	750-455	4 Channel Analog Input Module, 4-20 mA, single-ended
		750-459	4 C hannel Analog Input Module, 0-10 VDC, single-ended
		750-464/020-000	4 Channel Analog Input Module, NTC 20k Ohm/ NTC 10k Ohm, configurable
Analog Output	2 Channel AO	750-554	2 Channel Analog Output Module, 4-20 mA
		750-550	2 Channel Analog Output Module, 0-10 VDC
	4 Channel AO	750-555	4 Channel Analog Output Module, 4-20 mA
		750-559	4 Channel Analog Output Module, 0-10 VDC
Internal System Power Supply		750-613	24 VDC Bus Power Supply Module, Required for use after every 32 contact points connected in a node
Passive Power Supply		750-602	24 VDC Power Supply Module, passive

About Daikin:

Daikin Industries, Ltd. (DIL) is a global Fortune 1000 company which celebrated its 90th anniversary in May 2014. The company is recognized as one of the largest HVAC (Heating, Ventilating, Air Conditioning) manufacturers in the world. DIL is primarily engaged in developing indoor comfort products, systems and refrigeration products for residential, commercial and industrial applications. Its consistent success is derived, in part, from a focus on innovative, energy-efficient and premium quality indoor climate and comfort management solutions.