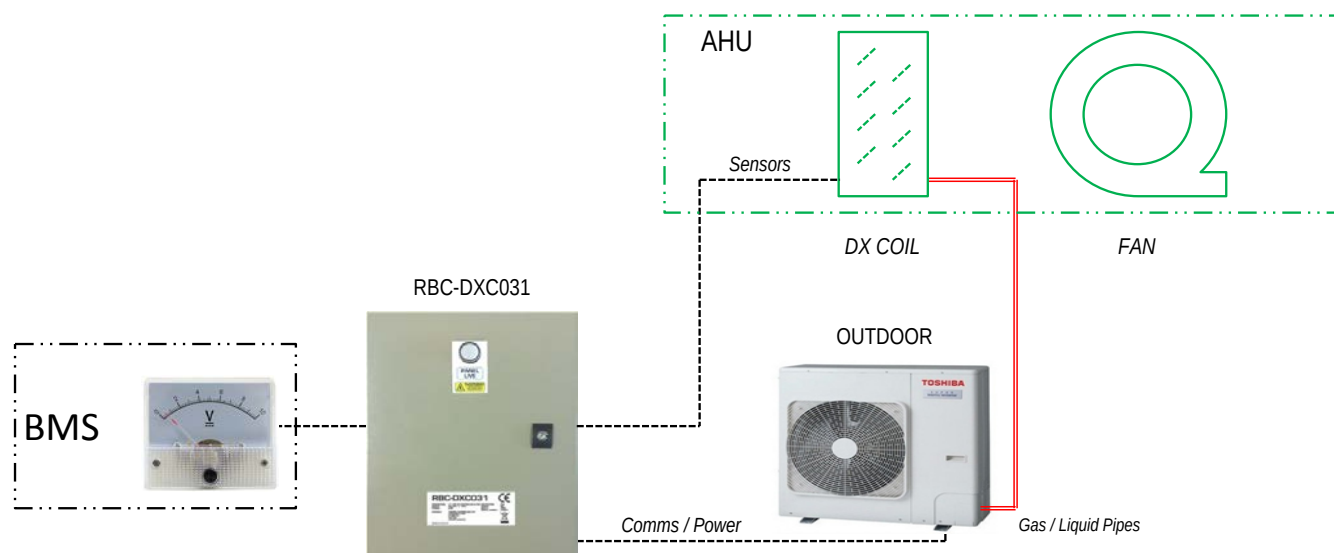


Toshiba New Product Summary

LC / VRF 0-10V AHU DX INTERFACE

RBC-DXC031
MM-DXV141
MM-DXV281

LC / VRF 0-10V DX CONTROLLER
VRF DX PMV (16.0kW)
VRF DX PMV (22.4kW, 28.0kW)



Contents

1. Introduction
2. New LC / VRF 0-10V AHU DX INTERFACE
3. Specification of the new accessory PCB
4. Example AHU application
5. Specification / Outdoor unit matching

1.0 Introduction

- The existing LC & VRF DX Interfaces use TA set-point control (via Remote Controller) to maintain Room Air (or Return Air) temperature. In response to Customer requests we have developed a new DX interface with can directly control capacity, operation and mode from a BMS system
- The new LC / VRF 0-10V DX Interface enables BMS capacity control of Toshiba Outdoor units connected to a DX Coil (within an AHU). It is compatible with either a Toshiba LC system (DI /SDI / DI-Big) or a Toshiba VRF system (SMMS-*i*)
- Following additional development the TA sensor is still used on the 0~10V AHU DX Interface for improved capacity control by increasing the capacity range of the system. The effect of this is improved customer comfort and reduced system running costs
- The interface includes a common DX Controller (RBC-DXC031) for both LC & VRF systems. As default this is configured as a LC model (changed by DIP-SW for use with a VRF system).

1.1 Introduction

- The VRF 0-10V DX Interface is only compatible with SMMS-*i* 8 & 10HP outdoor units.
- Additionally for VRF systems an appropriately sized VRF DX PMV must be brazed to the DX Coil used in conjunction with the DX Controller.
- For LC systems the DX Controller is connected directly to the outdoor unit (no VRF DX PMV required).
- The Toshiba system must be connected 1:1 with a DX-Coil (up to 10HP).
- DX Coil's larger than 10HP need to be split into separate sections each with dedicated circuits (Distributors and Headers)
- Product Availability: Q2 2015
- *The existing TA control models will continue to be sold:-*

RAV-DXC010 / MM-DXC010 / MM-DXC012 / MM-DXV080 / MM-DXV140 / MM-DXV280

TOSHIBA AIRCONDITIONING

Advancing the **eco**-evolution

- New DX Controller

RBC-DXC031 LC / VRF 0-10V DX Controller



- New VRF DX PMV

MM-DXV141 VRF DX PMV [16.0kW]

MM-DXV281 VRF DX PMV [22.4kW-28.0kW]

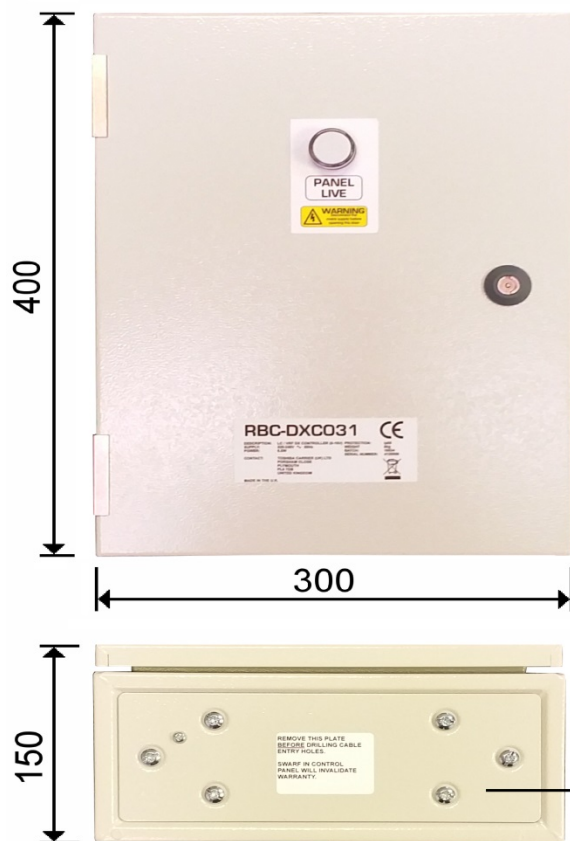


2.1 New LC / VRF 0-10V AHU DX Interface

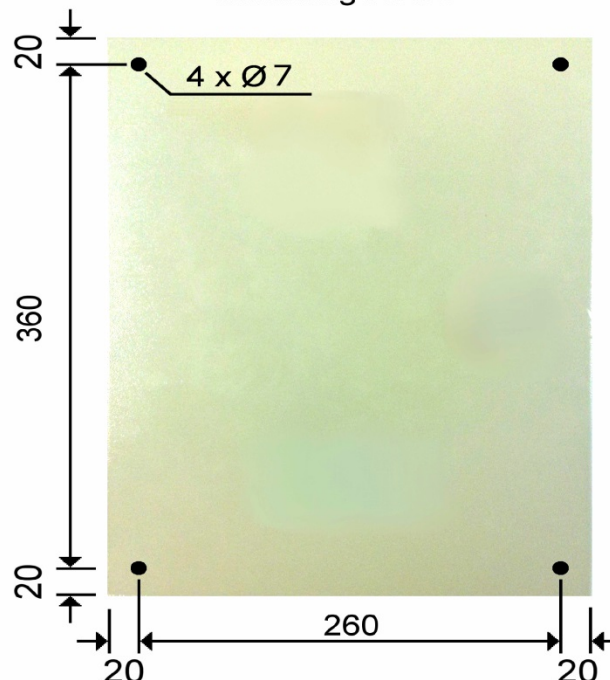
• DX COIL Interface (RBC-DXC031)

The DX Coil Interface **MUST NOT** be installed outside. To maintain waterproof integrity IP65 glands must be used through the gland plate (To avoid damage; when making holes for cables glands, please first remove the Gland Plate from the DX Coil Controller).

Dimensions



Mounting Holes



Note:
In areas where there is a risk of dew condensation insulation (locally sourced) should be fitted to the DX controller enclosure

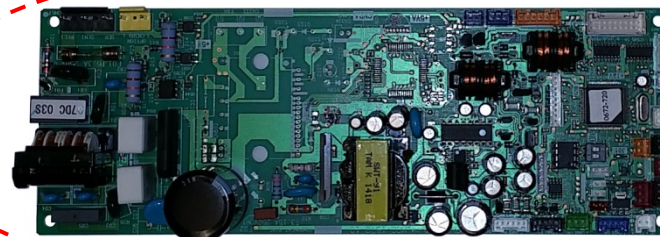
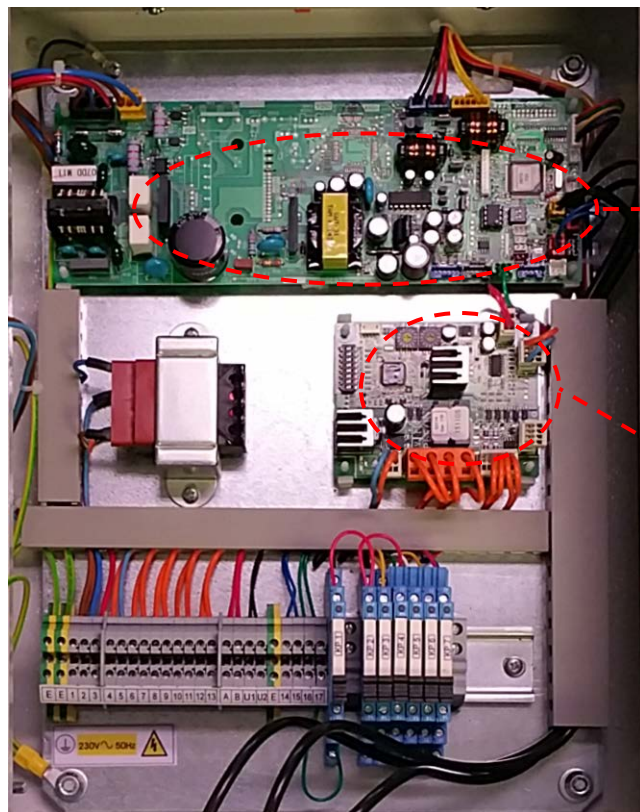
Units: mm
Weight: 8.0kg

Gland Plate

2.2 New LC / VRF 0-10V AHU DX Interface

RBC-DXC031

Software and Hardware modified MCC-1570 PCB dedicated for the DX Interface (0-10V)



New 0-10V PCB developed by Toshiba for the DX Interface (0-10V)



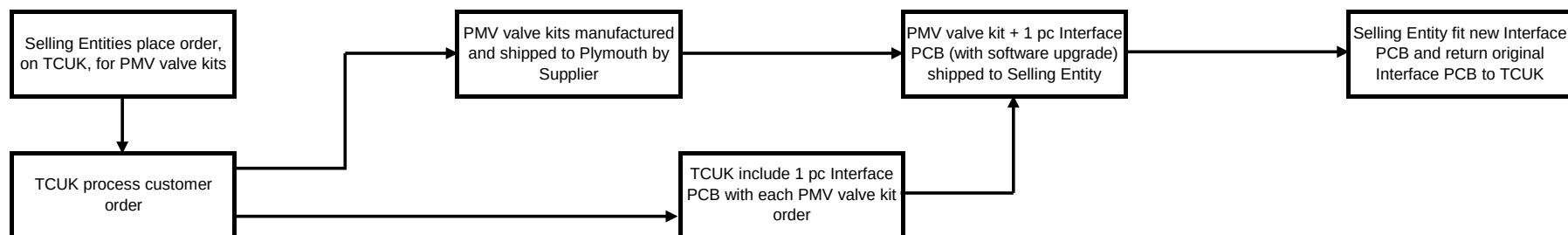
VRF: Updated software on SMMSi Outdoor unit (to be managed by the TCUK Logistics Dept.)

TOSHIBA AIRCONDITIONING

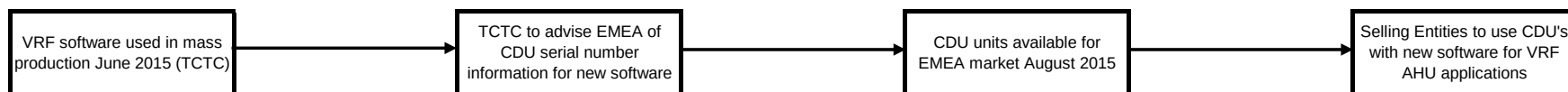
Advancing the **eco**-evolution

2.3 New LC / VRF 0-10V AHU DX Interface

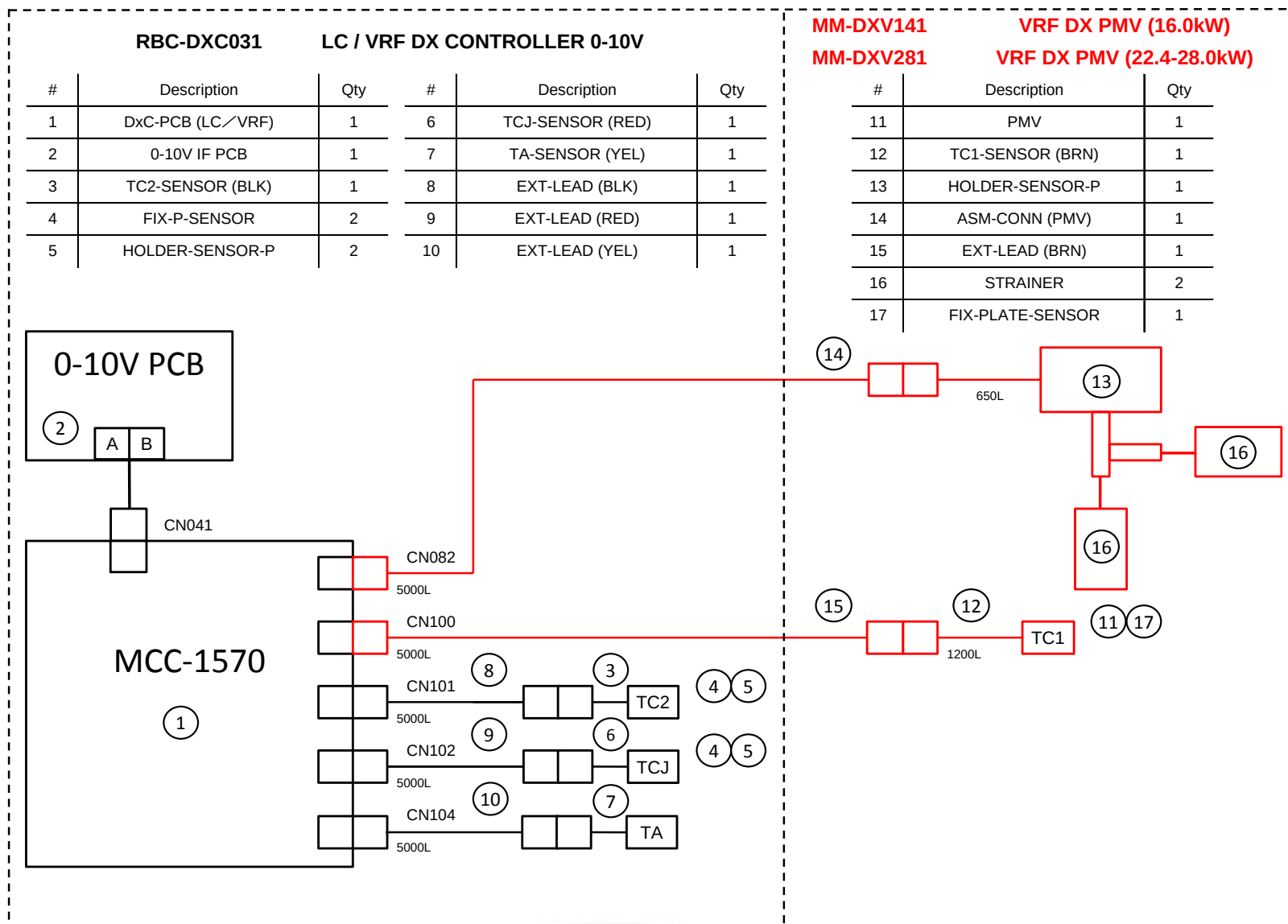
• SMMS-*i* CDU software management – Interim Solution



• SMMS-*i* CDU software management – Final Solution



2.4 New LC / VRF 0-10V AHU DX Interface



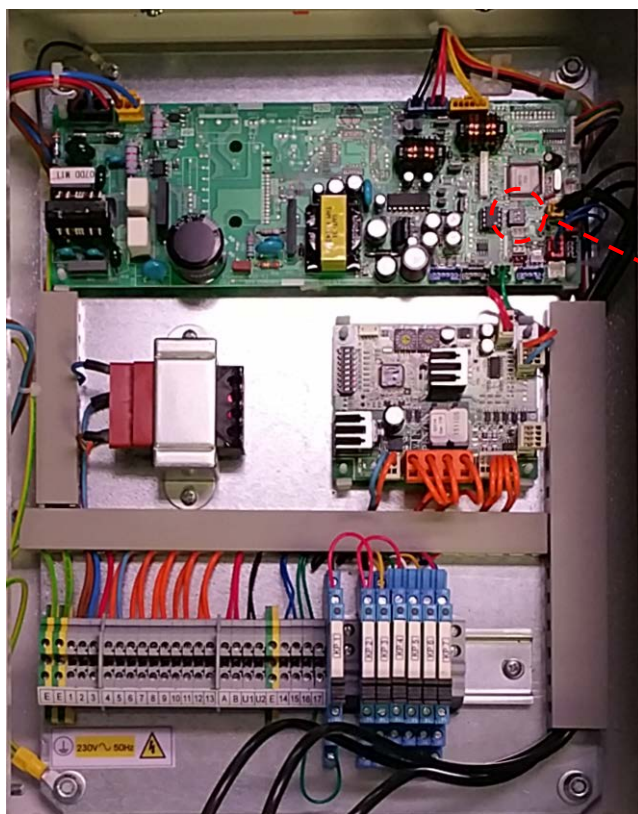
2.5 New LC / VRF 0-10V AHU DX Interface

Inputs & Outputs	Type
LC Outdoor interconnect	230 VAC
VRF Power Supply	230 VAC
Capacity Demand Input	AI (0-10V)
ON / OFF	DI
Mode (Heat / Cool) Input	DI
Capacity lower than Capacity Demand	DO
Capacity higher than Capacity Demand	DO
VRF Cooling Oil Recovery / Heating refrigerant recovery control	DO
Heating Mode Active	DO
Cooling Mode Active	DO
Sub-Bus (AB)	Serial
VRF / Central Control (U1/U2)	Serial
Safety contact input (P10)	DI (NC)
Fan error input (L30)	DI
Fan Operation (Contact Rating: 250VAC 6A)	DO
Alarm output (Contact Rating: 250VAC 6A)	DO
Defrost output (Contact Rating: 250VAC 6A)	DO
VRF Start-up Control (Contact Rating: 250VAC 6A)	DO
VRF Pre-Defrost Active (Contact Rating: 250VAC 6A)	DO
Heat (NC) / Cool (NO) (Contact Rating: 250VAC 6A)	DO

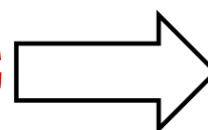
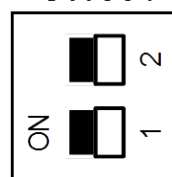
2.6 New LC / VRF 0-10V AHU DX Interface

LC / VRF Configuration

- The interface includes a common DX Controller (RBC-DXC031) for both LC & VRF systems
- As default this is configured as a LC model (changed by DIP-SW501 on MCC-1570 for use with a VRF system)



SW501



System	VRF	LC
SW501_2	OFF	OFF
SW501_1	ON	OFF

2.7 New LC / VRF 0-10V AHU DX Interface

Device Type / Capacity DN Code setting (Requires wired Remote Controller)

- The interface uses a new Device Type DN Code 10_55. This is set at the factory.
- The installer must be set DN Code 11. As default this is configured as a 10HP model at the factory (23).

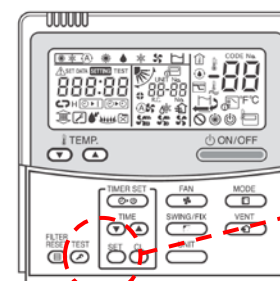
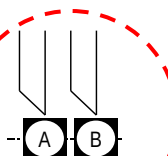
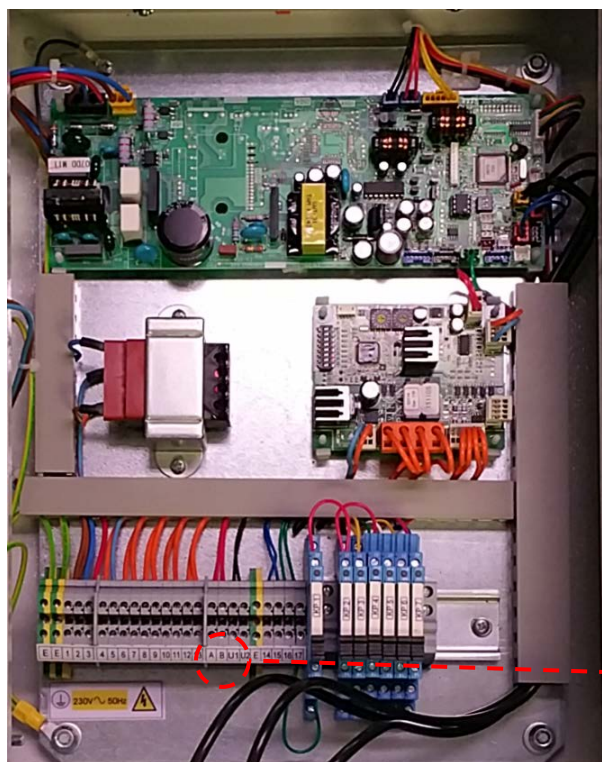
Capacity (HP)	1	1.5	2	3	4	5	6*	8	10
Capacity Code (DN 11)	3	6	9	12	15	17	18	21	23
Cool Capacity (kW)	2.5	3.6	5.6	8.0	11.2	14.0	16.0	22.4	28.0
Heat Capacity (kW)	3.4	4.0	6.3	9.0	12.5	16.0	18.0	25.0	31.5
LC Air-Volume (max m ³ /hr)	660	690	1080	1580	1600	1920	3360	4320	5040
VRF Air-Volume (max m ³ /hr)	-	-	-	-	-	-	3960	5160	6000
LC	●	●	●	●	●	●	●	●	●
VRF (MM-DXV***)	-	-	-	-	-	-	141	281	281

- VRF AHU 6HP possible with 75% Diversity (8HP SMMSi)

Nominal Capacity stated at standard Conditions (VRF & LC Capacity vary see Outdoor unit matching slide):-

Cooling: indoor air 27° CDB / 19° CWB, outdoor air 35° CDB

Heating: indoor air 20° CDB, outdoor air 7° CDB / 6° CWB

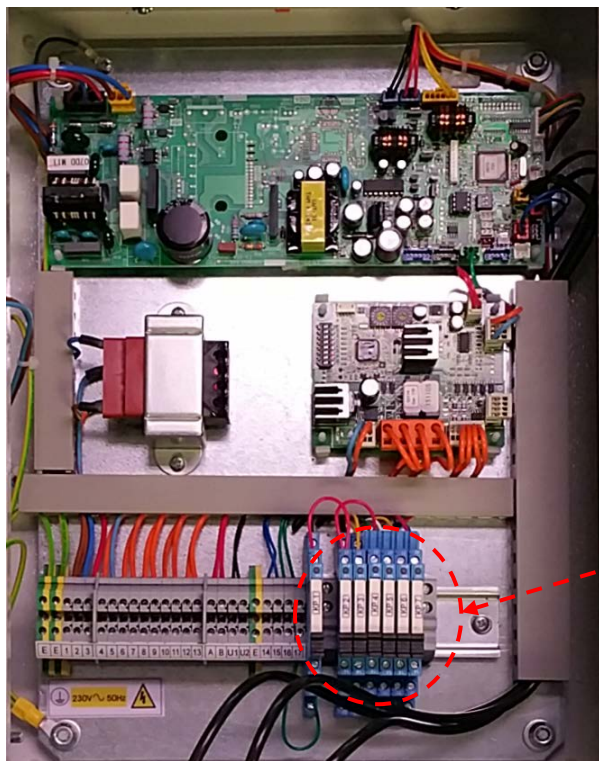


Push    buttons simultaneously for at least 4 seconds to enter DN setting mode.

2.8 New LC / VRF 0-10V AHU DX Interface

CN60 – Output Functionality for AHU Application

- New output functions are available from the CN60 connector on the MCC-1570 PCB in the DX interface
- For ease of installation connection to the CN60 outputs are made on the relays included in the DX interface



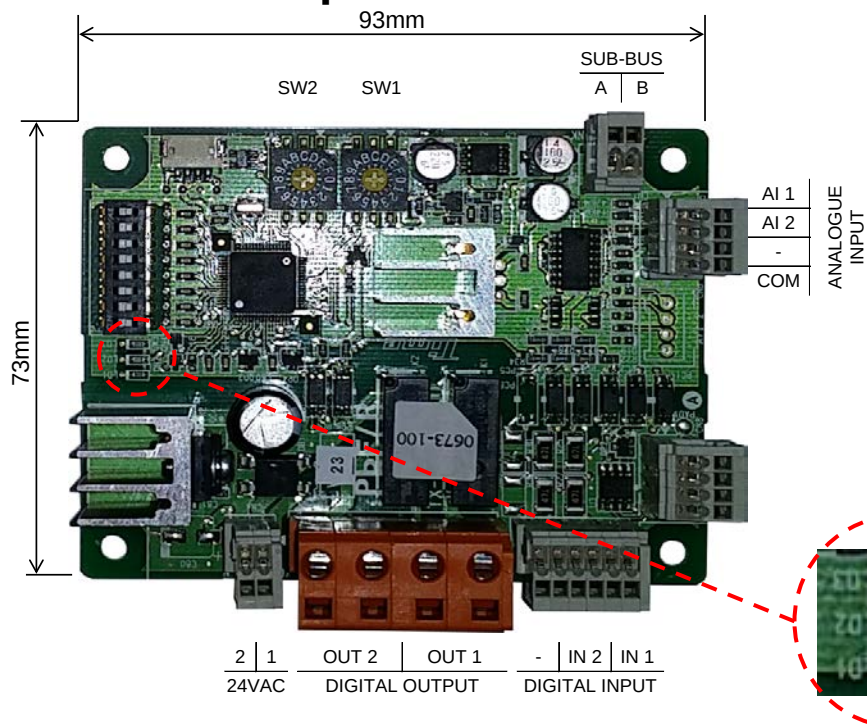
CN60 Output	Output Function	DX IF Relay Number
CN60.1+2	Defrost output	KP4
CN60.1+3	Cooling / Heating start up control	KP5
CN60.1+4	Pre-defrost output (static or pulse*)	KP6
CN60.1+5	Cooling / Heating mode	KP7
CN60.1+6	Fan operation	KP2

* Set by DN Code (CB)

00	Static	Default
01	100ms Pulse (02=200ms / 03=300ms.....10=1sec)	

3.0 0~10V PCB Specifications

0~10V PCB Specification

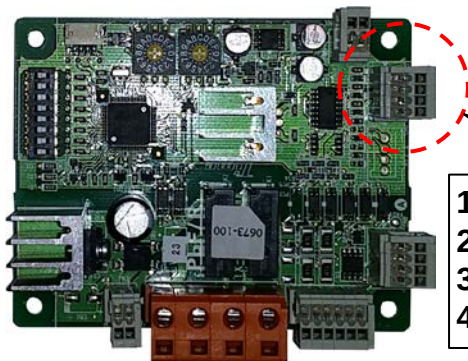


Function	Description
Operating temp / humidity	0 ~ 40° C / 10 ~ 90% RH
Storage temp	-20 ~ 60° C
Power supply	- Sub bus connection (AB): 15V ~ 24VDC 24VAC (supplied from new DX controller)
LED display	LD1 (GRN ON): Power Supply OK LD3 (RED FLASH): Communication Error LD3 (RED ON): Alarm Active

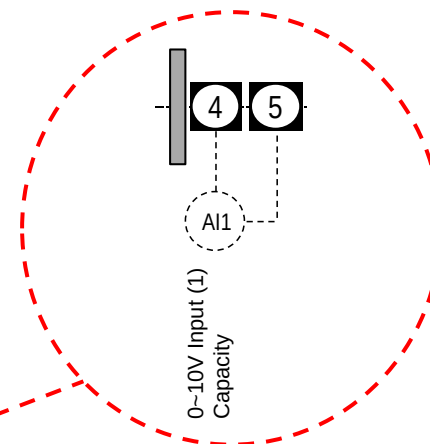
Function	Max. Cable Length (m)	Cable Specification
Analogue input	200	Screened cable: 0.5 ~ 1.0mm ²
Digital input	100	Non screened cable: 0.5 ~ 1.0mm ²
Digital output	500	Non screened cable: 0.5 ~ 1.0mm ²
TCC link (sub bus AB)	500	Non screened cable: 0.5mm ²

3.1 0~10V PCB Specifications

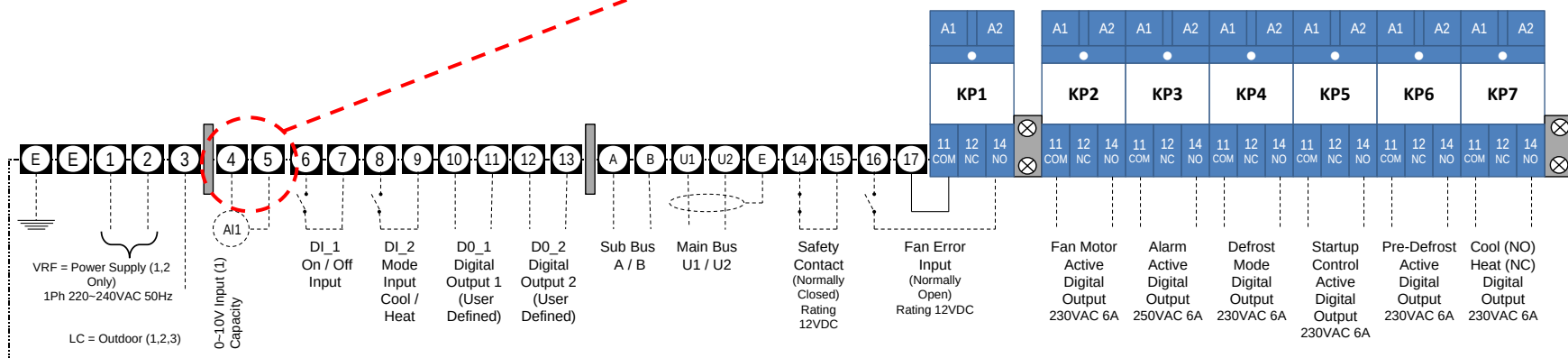
0~10V PCB Specification: Analogue Inputs



- 1: AI 1 = Capacity control
 2: - = Not Used
 3: - = Not Used
 4: COM = Common



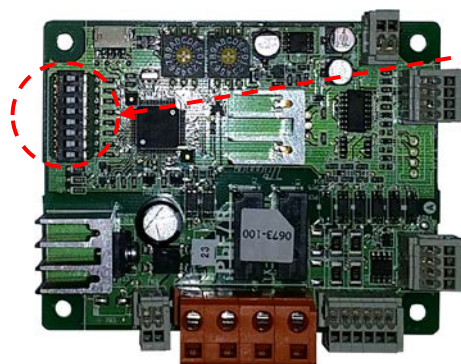
* Be sure NOT to input more than DC10V in analogue input terminal



3.2 0~10V PCB Specifications

0~10V PCB Specification: Analogue Inputs

- To ease the integration of the DX interface with the AHU DDC the capacity control is able to operate with a STEPPED or LINEAR function from the analogue input
- To select either a STEPPED or LINEAR response, from the analogue input, use DPSW03 located on the 0~10V IF PCB

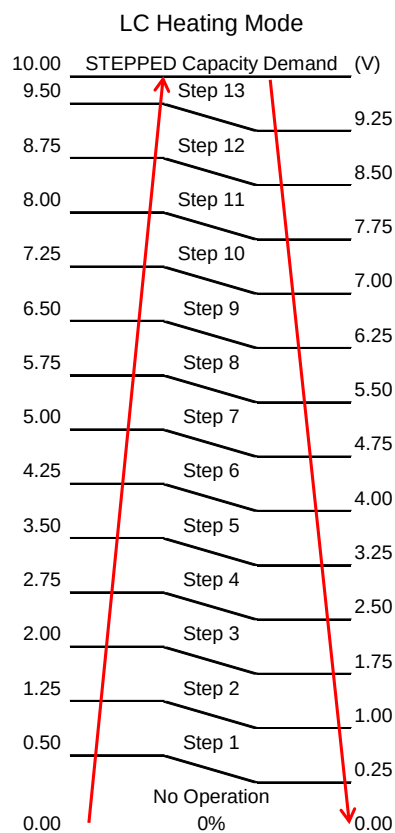
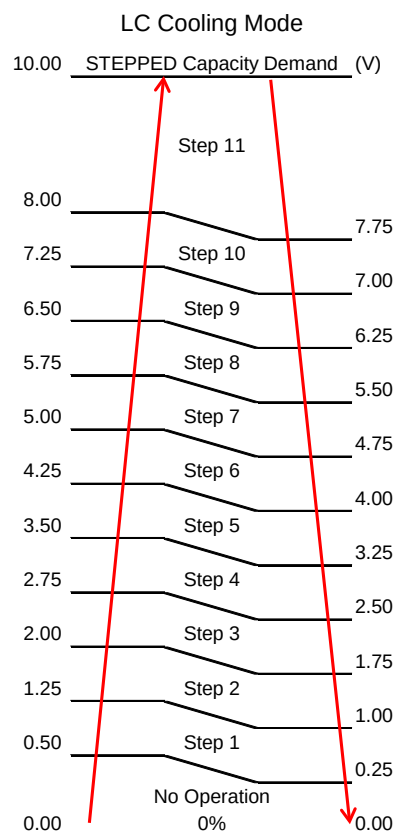


DPSW03_2	Function
OFF	STEPPED response to analogue input
ON	Linear response to analogue input

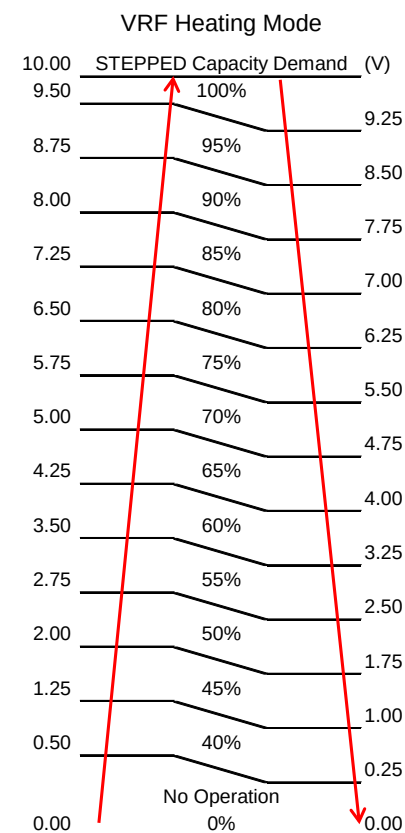
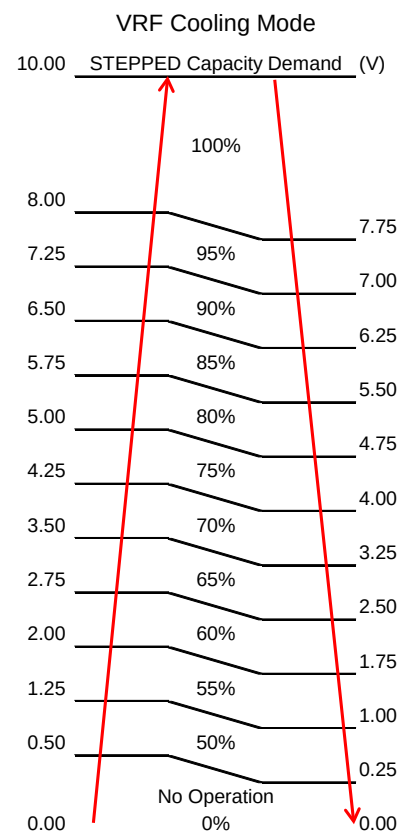
3.3 0~10V PCB Specifications

0~10V PCB Specification: AI 1 Demand 0~10V Stepped Control (DPSW3_2 OFF)

LC



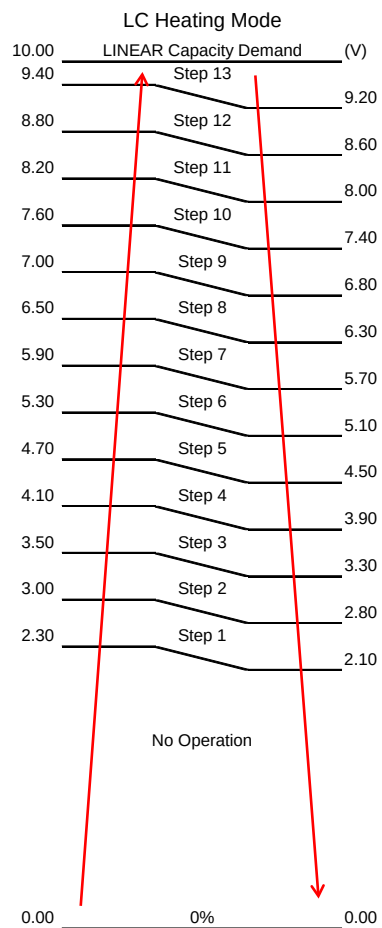
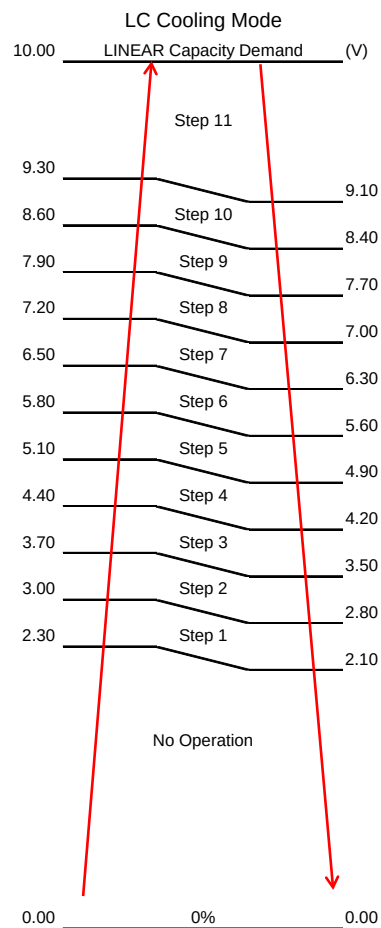
VRF



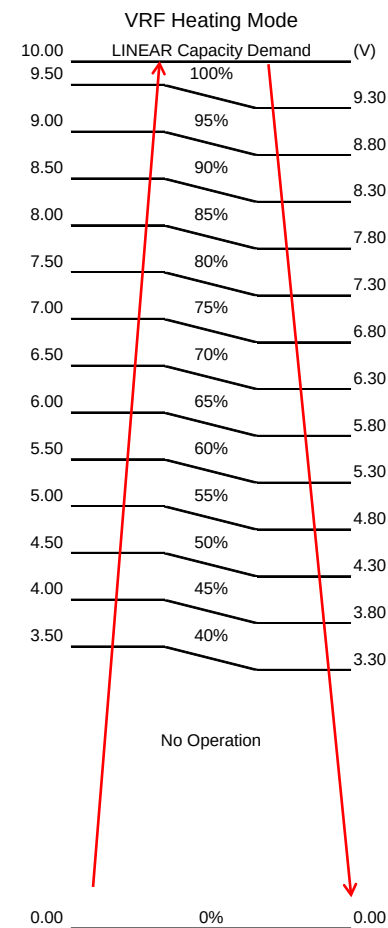
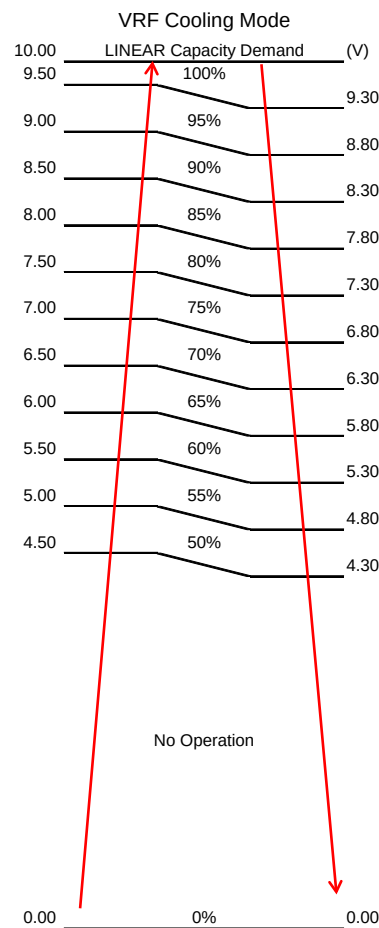
3.4 0~10V PCB Specifications

0~10V PCB Specification: AI 1 Demand 0~10V Linear Control (DPSW3_2 ON)

LC

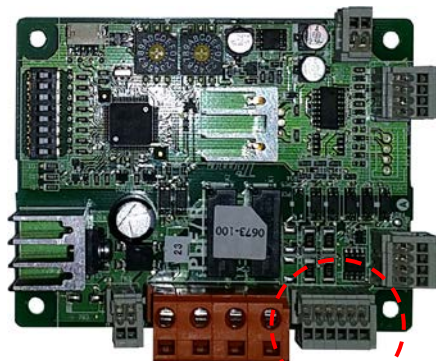


VRF



3.5 0~10V PCB Specifications

0~10V PCB Specification: Digital Inputs

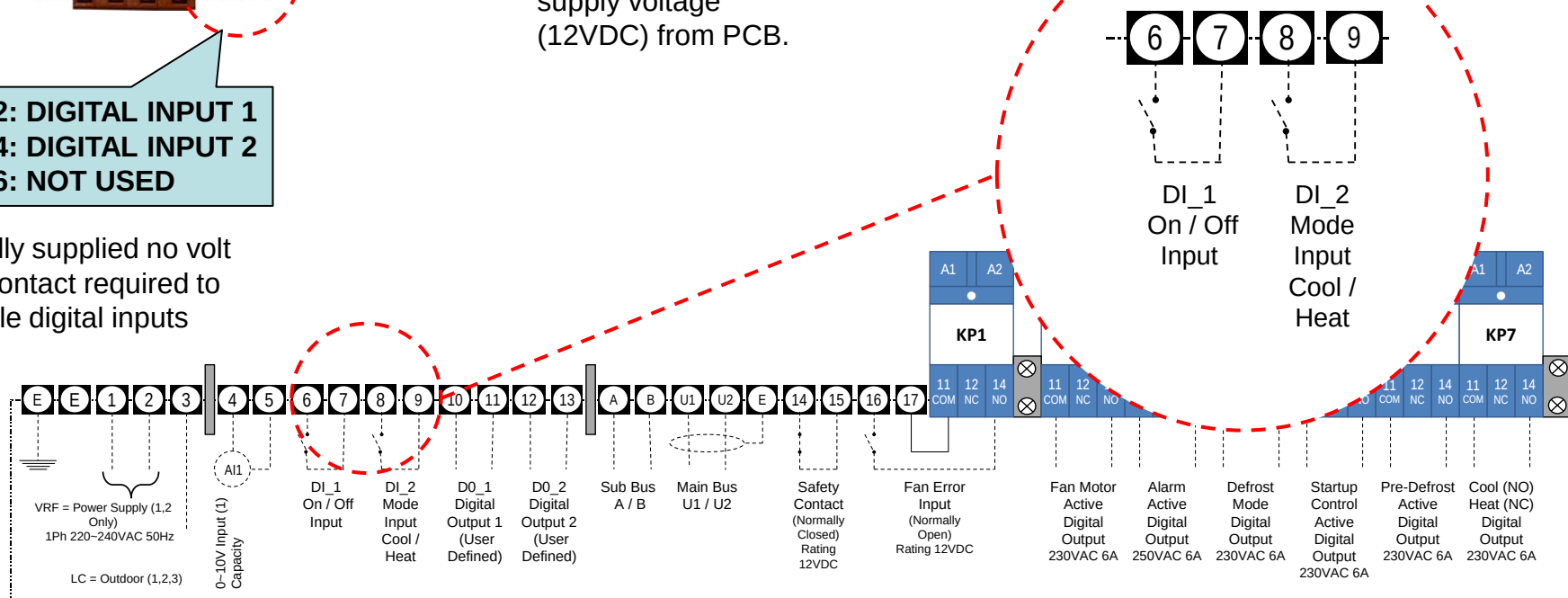


1 & 2: DIGITAL INPUT 1
3 & 4: DIGITAL INPUT 2
5 & 6: NOT USED

Locally supplied no volt
 dry contact required to
 enable digital inputs

Function	DI OPEN	DI SHORT
<i>DI1</i>	<i>Operation OFF</i>	<i>Operation ON</i>
<i>DI2</i>	<i>Cool mode active</i>	<i>Heat mode active</i>

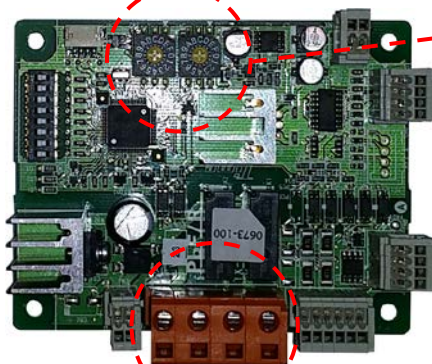
- Digital Input terminal
supply voltage
(12VDC) from PCB.



3.6 0~10V PCB Specifications

0~10V PCB Specification: Digital Outputs

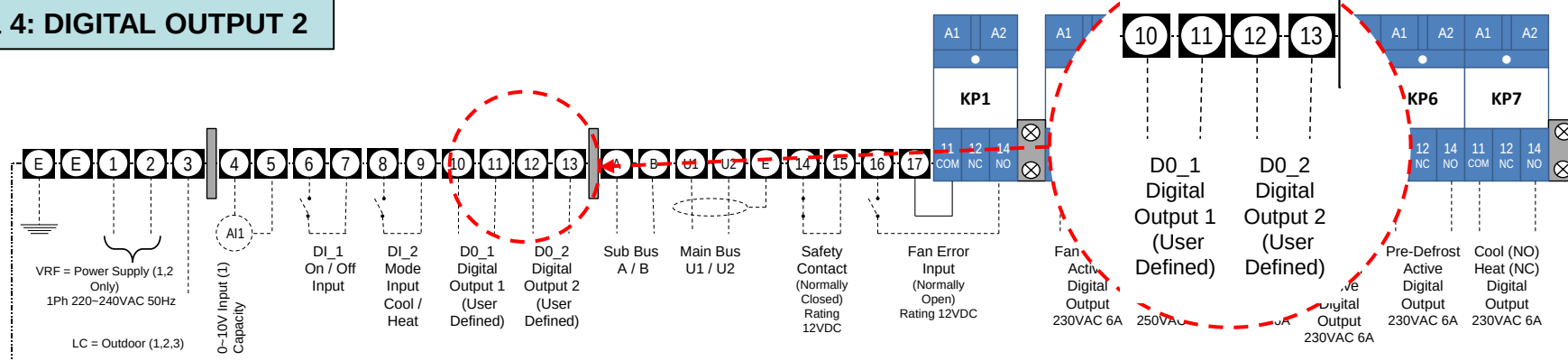
SW1: DIGITAL OUTPUT 1
SW2: DIGITAL OUTPUT 2



1 & 2: DIGITAL OUTPUT 1
3 & 4: DIGITAL OUTPUT 2

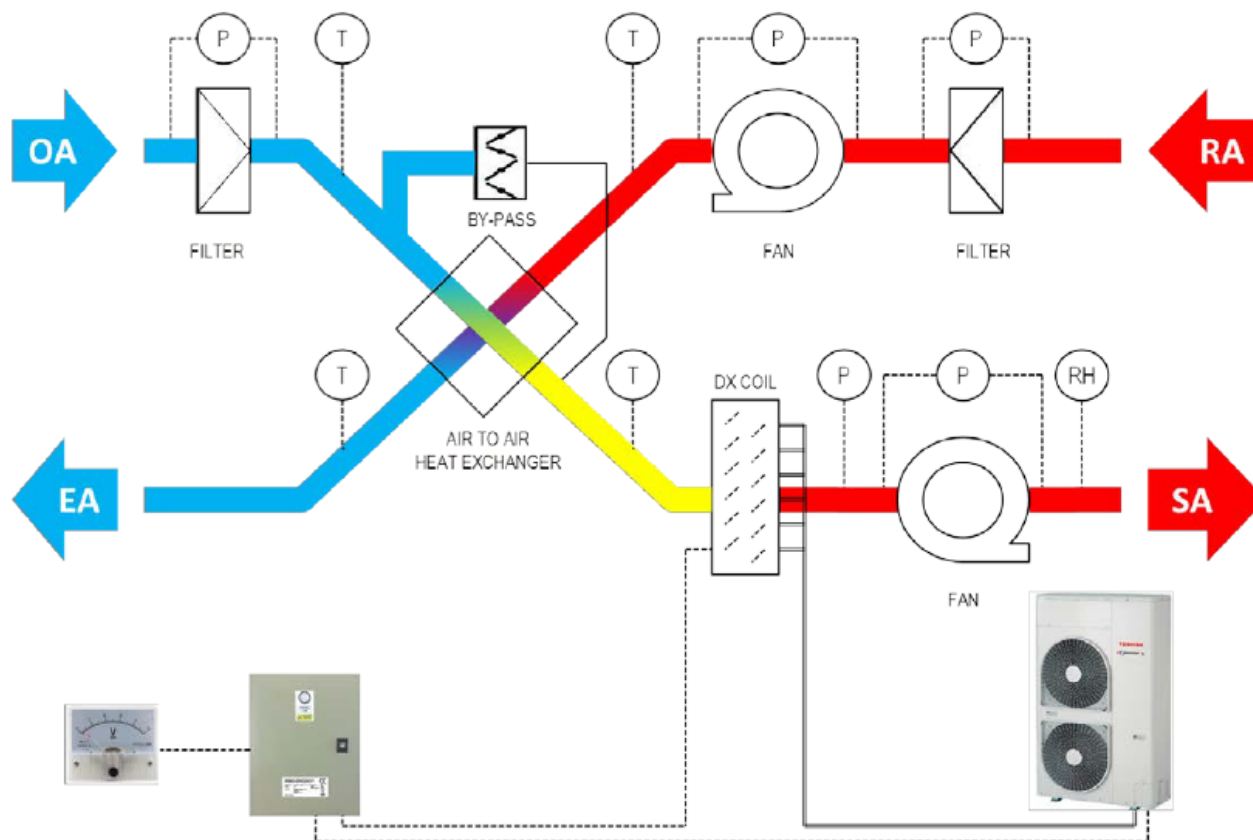
Rotary Sw. Pos.	Output Function
0	Lower than capacity command
1	Higher than capacity command
2	Cooling oil recovery control / heating refrigerant recovery control
3	Cooling output
4	Heating output
5	Thermal ON
Relay contact rating	277VAC: 1A (max) 30VDC: 1A (max)

- Output function selected using rotary switches on PCB



4.0 AHU Application

AHU installation example (1:1 Connection using DI-Big Outdoor Unit)



5.0 Specification / Outdoor Unit Matching

System Operating Parameters:

- System diversity: 75% ~100% (of specified CDU capacity)
- Cooling mode DX coil “air on” operating range:
Min: 15° CWB ~ Max: 24° CWB (18° CDB ~ 32° CDB)
- Heating mode DX coil “air on” operating range:
Min: 12° CDB* ~ Max: 28° CDB (*pull down = 7° C)

0~10V DX Interface is compatible with the following Outdoor units:

Model Code	Type	Cooling	Heating	HP
MMY-MAP0804HT8-E	SMMSi	22.4	25.0	8.0
MMY-MAP1004HT8-E	SMMSi	28.0	31.5	10.0
RAV-SM304ATP-E	DI	2.5	3.4	1.0
RAV-SM404ATP-E	DI	3.6	4.0	1.5
RAV-SM564ATP-E	DI	5.0	5.3	2.0
RAV-SM804ATP-E	DI	6.7	7.7	3.0
RAV-SM1104ATP-E	DI	10.0	11.2	4.0
RAV-SM1404ATP-E	DI	12.1	12.8	5.0
RAV-SM1603AT-E	DI	14.0	16.0	6.0
RAV-SM2224AT8-E	DI-Big	20.0	22.4	8.0
RAV-SM2804AT8-E	DI-Big	23.0	27.0	10.0

Model Code	Type	Cooling	Heating	HP
RAV-SP404TP-E	SDI	3.6	4.0	1.5
RAV-SP564ATP-E	SDI	5.0	5.6	2.0
RAV-SP804ATP-E	SDI	7.1	8.0	3.0
RAV-SP1104AT-E	SDI	10.0	11.2	4.0
RAV-SP1104AT8-E	SDI	10.0	11.2	4.0
RAV-SP1404AT-E	SDI	12.5	14.0	5.0
RAV-SP1404AT8-E	SDI	12.5	14.0	5.0
RAV-SP1604AT8-E	SDI	14.0	16.0	6.0

Nominal Capacity stated at standard Conditions:-

Cooling: indoor air 27° CDB / 19° CWB, outdoor air 35° CDB

Heating: indoor air 20° CDB, outdoor air 7° CDB / 6° CWB