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ecoAZUR®
DEMAND-CONTROLLED KITCHEN VENTILATION
SPECS SHEETS

Index

1 - Introduction

1.1 - FOREWORD

Thank you for choosing the award-winning* **ecoAZUR**® DCKV (Demand-Controlled Kitchen Ventilation) system.

ENERGY STAR 2015
Emerging Technology Award

When properly setup, the **ecoAZUR**® DCKV system is a powerful tool that will help you get the lowest energy bill possible while maintaining comfort in the kitchen.

The present document is intended as a reference document containing information **ecoAZUR**® components.

- For a quick overview of how to operate the system, please refer to the "ecoAZUR® User Guide".
- For step-by-step instructions on how to clear a fault or a malfunction, please refer to the "ecoAZUR® Troubleshooting Guide".
- For in-depth information about programming the system, please refer to the "ecoAZUR® Programming Guide"

Please keep in mind at all time that electrical maintenance must always be done by qualified technicians only. INTELLINOX TECHNOLOGIES will not be held accountable for problems due to failure to comply to the present guide, or to any applicable national or local codes and laws (ie: NEC, NFPA70 and NFPA96 for North America).

Finally, the specifications included in this document apply to components marked as "***powered by Intellinox***TM", or as "***Intellinox***TM", regardless of the main trademark displayed on cases. Some examples of possible main trademarks are :

ECOAZUR®, **CONCEPT AZUR**®, or any other custom trademark.

* the U.S. Environmental Protection Agency's 2015 ENERGY STAR Emerging Technology Award applies to the complete **ecoAZUR**® system with the **MPS** PLC option.

1.2 - ECOAZUR® V4 DCKV PRODUCT FAMILY

The present document refers to V4 DCKV product family as **ecoAZUR®**. The following is a list of components comprising **ecoAZUR®**:

Category	Catalog number	Description
CT	V4CT1	Wall mount user interface
CT	V4CT2	Surface mount user interface
CU	V4CU1	Main processor unit
IB	V4IB1	Optical sensor
IB	V4IB-CS	Compression seal - Optical sensor accessory
IB	V4IB-EMT	EMT enclosure - Optical sensor accessory
IB	V4IB-PC	Pass through - Optical sensor accessory
IB	V4IB-QP	Quick patch - Optical sensor accessory
IB	V4IB-SIB30	28mm support bracket - Optical sensor accessory
IB	V4IB-SIB70	70mm support bracket - Optical sensor accessory
IB	V4IB-TIB15	150mm mounting tube - Optical sensor accessory
IB	V4IB-TIB30	300mm mounting tube - Optical sensor accessory
IB	V4IB-TIB90	900mm mounting tube - Optical sensor accessory
MD	V4MD1	Modulating Damper kit w/o blade (30s, spring return)
MD	V4MD2	Modulating Damper kit w/o blade (4s, EFS)
MD	V4MD-BLC1	MD Damper circular blade kit - MD accessory
MD	V4MD-BLR1	MD Damper rectangular blade kit 1SQF - MD accessory
MD	V4MD-BLR2	MD Damper rectangular blade kit 2SQF - MD accessory
MD	V4MD-BLR3	MD Damper rectangular blade kit 3SQF - MD accessory
MD	V4MD-PT10	MD Damper Static Pressure Kit, 10"W.C. - MD accessory
MD	V4MD-PT2	MD Damper Static Pressure Kit, 2"W.C. - MD accessory
NE	V4NE1	Sensor network hub, din-rail mount
NE	V4NE2	Sensor network hub, EMT enclosure
NF	V4NF1	1FT Network cable
NF	V4NF3	3FT Network cable
NF	V4NF5	5FT Network cable
NF	V4NF10	10FT Network cable
NF	V4NF15	15FT Network cable
NF	V4NF25	25FT Network cable
NF	V4NF50	50FT Network cable
NF	V4NF75	75FT Network cable
NF	V4NF100	100FT Network cable
NF	V4NF150	150FT Network cable
NF	V4NF200	200FT Network cable
TC	V4TC1	4 Channel output module
TT	V4TT1	Temperature sensor - tubular enclosure
TT	V4TT2	Temperature sensor - EMT enclosure
PP	V4PPLT	ecoAZUR LITE processor panel
PP	V4PP04STD1	ecoAZUR Standard 4 channel processor panel
PP	V4PP08STD1	ecoAZUR Standard 8 channel processor panel - compact
PP	V4PP08STD2	ecoAZUR Standard 8 channel processor panel
PP	V4PP04PLUS1	ecoAZUR Plus 4 channel processor panel
PP	V4PP08PLUS1	ecoAZUR Plus 8 channel processor panel
PP	V4PP12PLUS1	ecoAZUR Plus 12 channel processor panel
PP	V4PP16PLUS1	ecoAZUR Plus 16 channel processor panel
PP	V4PP20PLUS1	ecoAZUR Plus 20 channel processor panel
PP	V4PP-HL	Hood light relay kit - V4PP STD/PLUS accessory
PP	V4PP-MUAR	MUA 120V run signal relay kit - V4PP STD/PLUS accessory

1.3 - CERTIFICATIONS

The **ecoAZUR**® system conforms to ANSI/UL Std. 1978, 2017, 508A and is certified to CAN/CSA Standards C22.2 No. 205 and C22.2 No.14. It is NSF-2 listed and compliant with FCC 15 part B.

Additionally, official ETL laboratory tests reports support that **ecoAZUR**® system have been evaluated and found to reply with the component requirements for:

- UL 710 Issued: 2012/09/13 Ed: 6 Rev: 2013/11/05 Exhaust Hoods for Commercial Cooking Equipment
- ULC S646 Issued: 2010/07/01 Ed:3 Standard for Exhaust Hoods and Related Controls for Commercial and Institutional Kitchens.

1.4 - DEFINITIONS

ecoAZUR® DCKV system includes a number of concepts that are related to specific terms. Following is a short list of some of those terms, along with their definitions.

1.4.1 - OPERATING MODE

Operating Modes modify the behavior of all **ecoAZUR**® controlled ventilation airflows.

ecoAZUR® has 4 operating modes:
- *AUTO Mode*: Fan speed/damper position is determined automatically. Best energy efficiency.
- *MAX Mode*: Maximum fan speed. No energy savings. *MAX mode* can be timed or not.
- *STOP Mode*: Ventilation stops (0% fan speed, dampers fully closed).
- *FIRE Mode*: Exhaust fans and exhaust dampers at max speed/position, and make-up air units and intake dampers stopped/close position. *FIRE Mode* can not be selected using **CT** buttons. (see section "2 - CU Processor unit" for more information).

When in *Normal Display Mode*, *Operating Modes* are usually selected by the user using the **CT** buttons (except *FIRE Mode*).

Access to some modes can be locked (Parameters CT 02-10, 02-11, and 02-12).

Third-party controllers can force *Operating Modes* using digital signals (see section "2 - CU Processor unit" for more information).

There are 6 possible types of *Physical Devices* :
- The **CU** processor unit (always only 1 per system) supplies power to the complete networks,
- The **NE** network hub extends the input capabilities of the **CU** processor unit,
- The **CT** keypad is the main user interface, (may have more than one per system)
- The **IB** optical sensor generates demand (in %) based on optical detection.
- The **TT** temperature sensor generates demand (in %) based on temperature detection.
- And the **TC** output module translates demand (in %) into analog and digital signals.

1.4.2 - NETWORKS

The **ecoAZUR**® **network** consists of two different sub-networks, both originating from the unique **CU** processor unit :

1.4.3 - PHYSICAL DEVICES

In this document, a *Physical Device* describes an intelligent **ecoAZUR**® **networks** component. **NF** cables, fittings, and even **MD** modulating dampers are not considered *Physical Devices* since their are not intelligent, and variable frequency drives or third-party controller are not considered *Physical Devices* since they are not part of the **ecoAZUR**® **networks**.

- The **sensors network** comprises the following *Physical Devices* : **CU**, **IB**, **TT**, **NE**, **CT**.
  It originates from the 6 **CI#** ports of the **CU** processor unit.
  It features a tree topology that can be expanded using **NE** network hubs (1 **NE** occupies 1 port, but offers 6 additional ports). **NE** can be nested into one another.
  It must respect the following limits :
  - An overall maximum of 5 **CT** keypads per **CU**.

- A maximum of 20 *Physical Devices* on any given **CU** CI# port.
- A maximum of 3 **NE** on any given **CU** CI# port.

- The **output network** regroups the **TC** output modules.
  It originates from the single **CO** port of the **CU** processor unit.
  It features a linear topology that can support a maximum of 5 **TC** output modules per **CU**.
  Since each **TC** includes 4 dual outputs channels (a 0-10V analog output + a dry contact digital output), the maximum value of supported output channels is 20 for a single **ecoAZUR®** system. Each output channel can control a ventilation equipment such as a variable frequency drive, an **ecoAZUR®** modulating damper, third-party PLC, or other.

Finally, the combined size of both networks must not exceed a total of 60 *Physical Devices.*

For more information about networks, please refer to the document "ecoAZUR® Programming Guide" section "3.5 – Topology And Addressing".

1.4.4 - VENTILATION APPLIANCES

In this document, *Ventilation Appliances* describe software objects used by the **ecoAZUR®** system to send analog signals to ventilation equipment (such as variable frequency drives, physical dampers, third-party PLC, etc.) via a **TC** output module**.**
Ventilation Appliances fall into two categories :
- **exhaust appliances**, such as exhaust fans, who drive air outside the kitchen/building, and thus contribute to lower the ambiant air pressure,
- and **intake appliances**, such as make-up air units, who drive air inside the kitchen/building, and thus contribute to raise the ambiant air pressure.

The **ecoAZUR®** system will always try to balance the signals sent to **exhaust** and **intake appliances** to keep the ambiant air pressure at a comfortable level.
Exhaust appliances will usually be controlled **ecoAZUR®** sensors detection. Sometimes, one or more sensors may also need to control a specific **intake appliance**.
For that purpose, *Ventilation Appliances* usually regroup one or more demand-generating *Physical Devices* (can be sensors like **IB** and **TT**, or a **NE** containing sensors), and may also regroup other *Ventilation Appliances*.

The operating sequence goes as follow :
1. At all time, each *Ventilation Appliance* monitors the highest demand from all *Physical Devices* and *Ventilation Appliances* included in its group.
2. That demand gets then converted into a setpoint value in %, depending on *Operating Mode*, digital signals states, and other user defined limits or thresholds.
3. Finally, any **TC** linked to that *Ventilation Appliance* translates the setpoint into both an analog signal (in volts) and a digital signal (dry contact).

Each defined *Ventilation Appliance* is unique, and has a unique ID comprised of 1 letter and 1 number. There are 4 possible types of *Ventilation Appliances* :
- exhaust fans, named E1 to E8, are **exhaust appliances**.
- make-up air units, named M1 to M4, are **intake appliances**.
- dampers, named D1 to D20, (a damper can be connected to an exhaust fan, thus considered as an **exhaust appliance**, or a make-up air unit, thus considered as an **intake appliance**)
- or undefined (named NONE).

For more information about *Ventilations Appliances* and how to customize them, please refer to the document "ecoAZUR® Programming Guide" section "3.3 – System Menus".

1.4.5 - MENUS AND PARAMETERS

The **ecoAZUR®** *Setup Mode* contains a lot of information, structured inside *Menus* and *Parameters*.

Menus fall into two categories :

- *System Menus*, whose scope extends to the entire **ecoAZUR®** system.

There are 3 unique System Menus in total : *VENTILATION SYSTEM*, *PHYS DEVICES* and *WARNINGS*. Since they contain either *Physical Devices* or *Ventilation Appliance*, they are mainly used for navigation purposes. These *Menus* are dynamic, so no exhaustive table exists for them. For a complete description about *System Menus*, please refer to the document "ecoAZUR® Programming Guide" section "3.3 – System Menus".

- *Sub-menus* belong to either a *Physical Device* or a *Ventilation Appliance*.
  Sub-menus contain *Read-only* and *Editable Parameters*, and are used for setup, debugging, and monitoring among other things. These *Menus* are static but vary depending on the component type they belong to. Tables of all possible *Sub-menus* are provided in the document "ecoAZUR® Programming Guide" section "4 – Sub-menu Trees".

Parameters all have a name and a value (that can be a number, a binary state, or a character string). They also fall into two categories :

- *Read-only Parameters*, mainly for informative and debugging purposes. Most *Read-only Parameters* describe the current state of the system, and vary in real-time.

- *Editable Parameters*, such as limits and thresholds for instance, used to change the systems behavior. *Editable Parameters* are identified by a * preceding their value.

2 - CU Processor Unit

2.1 - FUNCTIONAL DESCRIPTION

Any **ecoAZUR®** DCKV system contains one and only one **CU** processor unit. It is the central node of the system. It is typically supplied already mounted in a UL-approved control panel. It is the root of both the **sensors network**, through its ports **CI1** to **CI6**, and the **output network** through its **CO** port.

The **CU** processor provides current protected power (24VDC) to all **ecoAZUR®** *Physical Devices.*

5 user programmable digital inputs allow for interfacing external signal such as fire alarm or *Operating Mode* override (MAX—OFF—AUTO).

3 user programmable digital outputs may provide *Operating Mode* feedback, control a 24V hood light relay or provide alarm status.

2.2 - MECHANICAL SPECIFICATIONS

V4CU1:

Material	
housing	Stainless steel
DIN-rail mount support	Plastic
Dimensions	
CU	150mm L x 80mm W x 42mm H (6" L x 3"1/8 W x 1"5/8 H)
Additional clearance required for **NF** cable connections:	Approx. 65mm (2"1/2)
Mounting	Adapted for TH35 and G32 DIN-rails, enclosed in processor panel.

2.3 - ELECTRICAL SPECIFICATIONS

2.3.1 - POWER CONSUMPTION

complete **ecoAZUR®** system:	75W maximum – CU Internally fused 3A
CU processor:	2.5W

2.3.2 - RJ45 COMMUNICATION PORTS CI1 TO CI6, CO

WARNING!
• ONLY use **ecoAZUR® NF** cables for connections with **communication ports**.
• ONLY connect to listed *Physical Devices* on **communication ports** to prevent damage.
• All wiring connections described in following table are to be used in **Class 2 circuits**.

CO (Communication Output):	May connect to **TC CI** port. Current protection: **CO** port is fused 250mA (replaceable fuse). Use ONLY Bel fuse model 5MF 250-R.
CI# (Communication Inputs):	May connect to **TT** temperature sensors. May connect to **IB** optical sensors pairs (an **IB** pair on **CI1** + **CI2**, and another pair on **CI3** + **CI4** only) May connect to **CT** keypads. May connect to **NE CO** port**.** Current protection: **CI#** ports are individually fused 1.25A. A lit green LED on RJ45 port indicates that the fuse is OK.

2.3.3 - I/O TERMINALS

WARNING!
• ONLY wire terminals with 16-20AWG, stranded or solid core, copper conductors.
• All wiring connections described in following table are to be used in **Class 2 circuits**.

Power IN:		
	[1] +24	24VDC voltage supply. Use of external fast acting fuse of 3A recommended. **Warning!** Use a 24VDC Class 2 power source ONLY. Power supply common must be referenced to ground.
	[2] COM	**ecoAZUR®** system common.
	[3, 4] GND	Connect to panel ground. Allows for draining **NF** cable shields, referencing **ecoAZUR®** common to earth, as well as protecting **CU** Stainless steel housing from accidental wire contact.
DI# (Digital Inputs): [10, 11] DI1, [12, 13] DI2, [14, 15] DI3, [16, 17] DI4, [18,19] DI5		Dry contact digital inputs. User programmable (see **CU** *Parameters* 02-04 to 02-13).
DO# (Digital Inputs): [22, 23] DO1, [24, 25] DO2, [26, 27] DO3		Optocoupler digital outputs. User programmable (see **CU** *Parameters* 02-14 to 02-19).
COMM. OUT (Communication Output): [30, 31, 32, 33] +C, -C, +24, COM		May be used instead of RJ45 **CO** port to connect to **TC** [1, 2, 3, 4] terminals. Use 18 AWG 4-wire shielded cable. Connect to appropriate **TC** terminals.

2.4 - OPERATIONAL SPECIFICATIONS

Operating Temperature	5 to 50°C (40 -120°F)

Fault diagnostic	The warning message "CHECK COMP. COUNT" will occur whenever the total of detected *Physical Devices* doesn't match **CU** *Parameter* 02-01.
	
	This warning aims to inform the user when a *Physical Devices* fails, and stops communicating with the **CU**.
	
	RJ45 communication ports LEDs may help identify where communication fails :
	
	    Green LED – port power status
	    Orange LED – port communication status
	
	please refer to the document "ecoAZUR® Troubleshooting Guide" for more information regarding faults and warnings.

3 - NE Network Hub

3.1 - FUNCTIONAL DESCRIPTION

NE hood network hub expands network capabilities to match the exact needs of a given hood configuration. Any CI1..CI6 RJ45 network ports of a given CU processor or NE hub may be split into six RJ45 network ports.

NE hubs are DIN rail mount and are typically located in a panel located close to hood sensors to minimize cable length and installation costs.

3.2 - MECHANICAL SPECIFICATIONS

V4NE1:

Material	
housing	Stainless steel
DIN-rail mount support	Plastic
Dimensions	
CU	131mm L x 82mm W x 42mm H (5"1/8 L x 3"1/4 W x 1"5/8 H)
Additional clearance required for **NF** cable connections:	Approx. 65mm (2"1/2)
Mounting	Adapted for TH35 and G32 DIN-rails, enclosed in panel or lying above a hood.

3.3 - ELECTRICAL SPECIFICATIONS

3.3.1 - POWER

Input voltage	24VDC
power consumption	0.8W (with no connected *Physical Devices*)

3.3.2 - RJ45 COMMUNICATION PORTS CI1 TO CI6, CO

WARNING!
- ONLY use **ecoAZUR® NF** cables for connections with **communication ports**.
- ONLY connect to listed *Physical Devices* on **communication ports** to prevent damage.
- All wiring connections described in following table are to be used in **Class 2 circuits**.

CO (Communication Output):	May connect to a **CU CI#** port or a **NE CI#** port. When connecting to another **NE**, the maximum of 3 **NE** on any given **CU CI#** channel must be respected.
CI# (Communication Inputs):	May connect to **TT** temperature sensors. May connect to **IB** optical sensors pairs (an **IB** pair on **CI1** + **CI2**, and another pair on **CI3** + **CI4** only) May connect to **CT** keypads. May connect to **NE CO** port**.**

3.4 - OPERATIONAL SPECIFICATIONS

Operating Temperature	5 to 50°C (40 -120°F)

4 - IB Optical Sensor

4.1 - FUNCTIONAL DESCRIPTION

IB hybrid optical sensors operate in pair, and act both as a light emitter or receiver.

Their blue light is particularly adapted to grease and cooking by-products detection.

Their auto-calibration algorithm continuously adjusts signal sensitivity when low light conditions occur, or when window becomes dirty or greasy.

IB sensors are installed inside a commercial kitchen hood (typically on opposite ends of a set of cooking appliances).

When **MD** dampers are used, a pair of **IB** may be installed for each hood collar to maximize savings.

The maximum distance between two **IB** of the same pair is 30'.

IB sensors are mounted using threaded stainless steel **TIBxx** tubes and UL-listed **QSIB** quick-seal fittings.

Optional **SIBxx** support brackets (shown on the right) may be installed to ensure **IB** remains firmly in place when long **TIBxx** are used.

4.2 - MECHANICAL SPECIFICATIONS

V4IB:

Material	Stainless steel
Dimensions	
IB	149mm H x 32mm D (5"7/8 H x 1"1/4 D)
TIB	**TIB15** : 150mm H x 25mm D (6"H x 1" D) **TIB30** : 300mm H x 25mm D (12"H x 1" D) **TIB90** : 900mm H x 25mm D (36"H x 1" D)
Mounting	**TIBxx** Stainless steel threaded mounting tube.

4.3 - ELECTRICAL SPECIFICATIONS

⚠️ **WARNING!**
- ONLY use **ecoAZUR® NF** cables for connections with **communication ports**.
- ONLY connect to listed *Physical Devices* on **communication ports** to prevent damage.
- All wiring connections described in following table are to be used in **Class 2 circuits**.

Input voltage	24VDC
power consumption	0.8W for a single **IB**
RJ45 Communication port	May connect to **NE** or **CU** **CI#** ports as follows : an **IB** pair to ports **CI1** and **CI2** an **IB** pair to ports **CI3** and **CI4**

4.4 - OPERATIONAL SPECIFICATIONS

Operating Temperature	5 to 75°C (40 -167°F)
Optical range	Maximum distance between two **IB** of the same pair: 9m (30') **Important** When connecting more than one **IB** pair under a hood : • Two **IB** pairs connected to the same **NE** or **CU** will not interfere if they "see" each other (share the same optical range). • Two (or more) **IB** pairs connected to different **NE** or **CU** will interfere and won't work properly if they share the same optical range.
Fault diagnostic	When the receiver of an **IB** pair cannot detect enough light from its emitter: • The warning message "IB MISALIGNED" will appear on the **CT**. • The receiver light will flash, indicating trouble • The appropriate *Ventilation Appliance* will receive a demand of 100% until fault is cleared. Other possible causes include : Emitter or receiver misalignmed, emitter or receiver lens dirty or greasy, or emitter or receiver defective. It is recommended to start by cleaning both IB from the pair, and then to check their alignment. Please refer to the document "ecoAZUR® Troubleshooting Guide" for more information regarding faults and warnings.

4.5 - MAINTENANCE

Cleaning of the **IB** lens is done with water and regular soap. It helps reduce grease accumulation and ensure optimal performance.

To be done regularly during hood maintenance cleaning procedure.

4.6 - ACCESSORIES

Mandatory accessories		
TIBxx	Threaded mounting tube (1 per **IB**). xx = length in cm : 15cm (6"), 30cm (12") or 90cm (36")	
CS	UL-liste Compression-Seal fitting (1 per **IB**)	

Optional accessories		
SIBxx	Support bracket (1 per **IB**) xx = distance between TIB center and hood wall, in mm: 30mm (1" 3/16), 70mm (2" 3/4)	
P	UL-listed pass-through fitting, to allow the use of one **IB** pair accross two adjacent hoods.	

5 - TT Temperature Sensor

5.1 - FUNCTIONAL DESCRIPTION

The **TT** detects cooking loads by measuring temperature at every hood collar and/or within the hood itself.
It includes a UL-listed Quick-Seal fitting for mounting.

Minimum & maximum cooking load temperatures may be set by user to ensure appropriate ventilation according to custom needs. When needed, temperature threshold may also be set to start/stop ventilation.

Because the **TT** is not meant to detect smoke or vapor , its settings must include low temperature thresholds (depending on cooking appliances), thus increasing its average demand, when it is the only type of sensors in a hood.

The best configuration regarding energy efficiency is to use a **TT** sensor in conjunction with an **IB** pair. In that case, higher temperature thresholds may be used for **TT**, thus reducing its average demand, because the **IB** pair handles smoke and cooking vapor detection.

5.2 - MECHANICAL SPECIFICATIONS

V4TT1:

Material	Stainless steel
Dimensions	166mm L x 25mm D (10"5/8 L x 1" D)
Mounting	UL-listed fitting

5.3 - ELECTRICAL SPECIFICATIONS

WARNING!

⚠ • ONLY use **ecoAZUR® NF** cables for connections with **communication ports**.

• ONLY connect to listed *Physical Devices* on **communication ports** to prevent damage.

• All wiring connections described in following table are to be used in **Class 2 circuits**.

Input voltage	24VDC
power consumption	0.5W
RJ45 Communication port	May connect to any **NE** or **CU** **CI#** ports

5.4 - OPERATIONAL SPECIFICATIONS

Operating Temperature		
Probe	-30 to 140°C (-22 to 284°F)	
Housing	5 to 75°C (40 to 167°F)	
Fault diagnostic	Whenever a **TT** is defective:	

Whenever a **TT** is defective:

- The warning message "DEFECTIVE TT" will appear on the **CT**.
- The appropriate *Ventilation Appliance* will receive a demand of 100% until fault is cleared.

Please refer to the document "ecoAZUR® Troubleshooting Guide" for more information regarding faults and warnings.

5.5 - MAINTENANCE

For optimal performance, clean the **TT** probe regularly during duct cleaning procedure.

6 - CT Keypad

6.1 - FUNCTIONAL DESCRIPTION

The **CT** is the main user interface. It includes a LCD display and 4 buttons.

It includes two *Display Modes :*

- the *Normal Display Mode*, designed to inform the user about current ventilation airflows in his system, to allow changing operating modes (AUTO, MAX and STOP), and to toggle hood lights (optional). It is the only *Display Mode* the average user will ever need to use.

- a more advanced interface called *Setup Mode* used for setup, debugging, and monitoring the entire **ecoAZUR®** system.

Both display modes are described in detail in the document "ecoAZUR® Programming Guide".

6.2 - MECHANICAL SPECIFICATIONS

V4CT1:

Material	Stainless steel
Dimensions	
Wall mount	125mm L x 125mm W x 40mm D (5" L x 5" W x 1"1/2 D)
Panel mount	120mm L x 120mm W x 58mm D (4"3/4 L x 4 3/4" W x 2"1/4 D)

6.3 - ELECTRICAL SPECIFICATIONS

⚠️ **WARNING!**
- ONLY use **ecoAZUR® NF** cables for connections with **communication ports**.
- ONLY connect to listed *Physical Devices* on **communication ports** to prevent damage.
- All wiring connections described in following table are to be used in **Class 2 circuits**.

Input voltage	24VDC
power consumption	1.2W
RJ45 Communication port	May connect to any **NE** or **CU** CI# ports
Terminal	For grounding **CT** stainless steel housing to earth (if required).

6.4 - OPERATIONAL SPECIFICATIONS

Operating Temperature	5 to 50°C (40 -120°)

7 - TC Output Module

7.1 - FUNCTIONAL DESCRIPTION

A **TC** is used to send analog and digital signals to up to 4 ventilation devices such as variable frequency drives, physical dampers, third-party PLC, etc.

A maximum of 5 **TC** can be used in any **ecoAZUR®** system.

To facilitate troubleshooting, a blue LED displays on/off state of digital signal, for each of the 4 dual outputs.

7.2 - MECHANICAL SPECIFICATIONS

V4TC1:

Material	
housing	Stainless steel
DIN-rail mount support	Plastic
Dimensions	
CU	150mm L x 80mm W x 42mm H
	(5"1/4 L x 3"1/8 W x 1"5/8 H)
Additional clearance required for **NF** cable connections:	Approx. 65mm (2"1/2)
Mounting	Adapted for TH35 and G32 DIN-rails, typically enclosed in processor panel.

7.3 - ELECTRICAL SPECIFICATIONS

7.3.1 - POWER

Input voltage	24VDC (fused on the **CU** at 250mA)
Power Consumption	1.2W when not providing any signal

7.3.2 - RJ45 COMMUNICATION PORTS CI1 TO CI6, CO

WARNING!
- ONLY use **ecoAZUR® NF** cables for connections with **communication ports**.
- ONLY connect to listed *Physical Devices* on **communication ports** to prevent damage.
- All wiring connections described in following table are to be used in **Class 2 circuits**.
- No more than 5 **TC** can be connected on any given system must be respected.

|	
CO (Communication Output):	May connect to **TC** **CI** port.
CI (Communication Inputs):	May connect to **TC** or **CU** **CO** port.

7.3.3 - I/O TERMINALS

WARNING!
- ONLY wire terminals with 16-20AWG, stranded or solid core, copper conductors.
- All wiring connections described in following table are to be used in **Class 2 circuits**.

CI		
	[1, 2, 3, 4]	May be used instead of RJ45 **CI** port to connect to **TC** [7, 8, 9, 10] terminals, or **CU** [30, 31, 32, 33] terminals . Use 18 AWG 4-wire shielded cable. Connect to appropriate **TC** terminals.
GND		
	[5, 6]	Connect to panel ground. Allows for draining **NF** cable shields, referencing AO1, AO2, AO3, AO4 common to earth, as well as protecting stainless steel housing from accidental wire contact.
CO		
	[7, 8, 9, 10]	May be used instead of RJ45 **CO** port to connect to next **TC** [1, 2, 3, 4] terminals. Use 18 AWG 4-wire shielded cable. Connect to appropriate **TC** terminals.
OUT1		
	[11, 12] DO1	Optocoupler digital relay outputs: max 24VAC/DC, 120mA.
	[13, 14] AO1	User programmable analog output 0 to 10V (min and max customizable)
OUT2		
	[15, 16] DO2	Optocoupler digital relay outputs: max 24VAC/DC, 120mA.
	[17, 18] AO2	User programmable analog output 0 to 10V (min and max customizable)
OUT3		
	[19, 20] DO3	Optocoupler digital relay outputs: max 24VAC/DC, 120mA.
	[21, 22] AO3	User programmable analog output 0 to 10V (min and max customizable)
OUT4		
	[23, 24] DO4	Optocoupler digital relay outputs: max 24VAC/DC, 120mA.
	[25, 26] AO4	User programmable analog output 0 to 10V (min and max customizable)

7.4 - OPERATIONAL SPECIFICATIONS

Operating Temperature	5 to 50°C (40 -120°)

8 - MD Modulating Damper
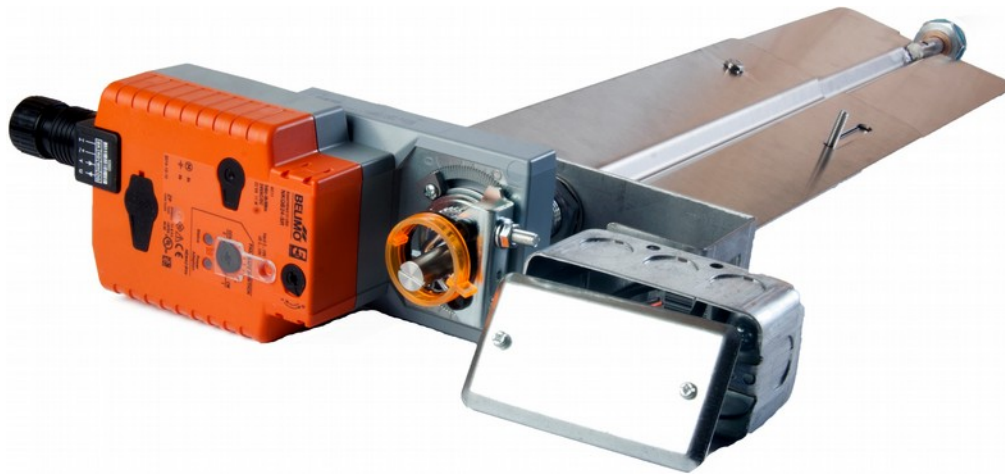
8.1 - FUNCTIONAL DESCRIPTION

MD modulating dampers are installed in exhaust ducts (near an access door), or hood collars. They allow ventilating independently different hoods, or hood sections, thus increasing potential savings. Fast acting damper actuators (4s) are used for maximum ventilation performance as well as for fire-safety precautions. **MD** modulating damper are UL-listed for Type 1 and Type 2 commercial kitchen hoods.

Their unique patent-pending design drastically reduce installation cost, especially for retrofit applications. **MD** damper shaft is mounted through two specially designed UL-listed Quick-Seals. Damper blades are adjustable and may be installed from within the hood (when convenient) thus preventing the need of cutting and welding the exhaust duct.

Linking **ecoAZUR®** processor to the hood fire suppression system is mandatory; should a fire occur, **MD** dampers will open in a 4s delay in order that the hood fire suppression operate freely.

Commissioning **MD** modulating dampers require additional attention. As **MD** dampers position themselves according to their individual cooking loads, complex hood networks require controlling exhaust VFD speed according to duct static pressure real time readings (this may require the use of a PLC). Simpler installations may be characterized during commissioning (static pressure Vs exhaust flow and damper positions), allowing **ecoAZUR®** to manage directly **MD** dampers even without a real time static pressure reading.

8.2 - MECHANICAL SPECIFICATIONS

V4MD2:

Material	
blade and shaft	Stainless steel
Dimensions	
blade	Custom built, depends on duct section dimensions.
actuator mounting bracket	202mm H x 50mm W x 50mm D (8" L x 2" W x 2" D)
actuator	254mm H x 102mm W x 76.2mm D (10" L x 4" W x 3"D)
Torque	6 Nm (54 in-lb)

8.3 - ACTUATOR ELECTRICAL SPECIFICATIONS

! **WARNING!**
• ONLY wire terminals with 16-18AWG, stranded or solid core, copper conductors, plenum rated.
• All wiring connections described in following table are to be used in **Class 2 circuits**.

M/N	NKQB24-SR, Belimo
Housing	UL Type 2
Fail-safe	Electronic fail-safe, set to open position (adjustable with dial)
Rotation direction	2V = fully open position. 10V = fully closed position.
Supply voltage	24VAC/DC – Not supplied by **TC** nor **CU**. Use a Class 2 power source ONLY. Common must be referenced to ground, and must be linked torespective **TC** analog output 'COM'.
Power consumption	11W when charging, else 3W. Initial charge 15s. 22VA transformer sizing required.
Wiring (red) +	+HOT (24VAC/DC). Not powered by **TC**, use another class 2 power source.
(black) -	COMMON. Connects to external power source common, as well as **TC** module COM (must have same reference).
(white) Y	2-10V input (position control signal). Connects to **TC** module analog outputs.
(orange) U	2-10V output (position feedback signal). Not used by **ecoAZUR**®.

8.4 - OPERATIONAL SPECIFICATIONS

Operating Temperature	-30 to 50°C (-22 to 122°F)
Fault diagnostic	Actuator LED status indicator lights sequence: Yellow off / Green on: operation ok, no faults Yellow off / Green blinking: fail-safe mechanism is active Yellow on / Green off: fault is detected Yellow off / Green off: not in operation / capacitors charging Yellow on / Green on: adaption running For further information about alarms, please refer to NKQB24-SR user guide.

8.5 - MAINTENANCE

Dampers are to be cleaned during regular hood/duct cleaning schedules.

9 - NF Network Cable

9.1 - FUNCTIONAL DESCRIPTION

NF network cables are RJ45 terminated Plenum rated F/UTP network cables and must be considered as UL Class 2 circuits in the context of the **ecoAZUR**® design. **NF** network cables are used to interconnect *Physical Devices* in the complete **ecoAZUR**® network. **NF** are specially designed for **ecoAZUR**® DCKV application. To ensure system performance and safety, only use **NF** cables to connect **ecoAZUR**® *Physical Devices*.

NF cables are available in the following lengths:

NF1	0.31m (1')
NF3	0.91m (3')
NF5	1.52m (5')
NF10	3.05m (10')
NF15	4.57m (15')
NF25	7.62m (25')
NF50	15.24m (50')
NF75	22.86m (75')
NF100	30.48m (100')
NF150	45.72m (150')
NF200	60.96m (200')

9.2 - CABLE SPECIFICATIONS

Cable	CAT5E. 4 twisted pairs, 8 stranded 24AWG copper conductors.
Shield	Al Foil, drain wire
Jacket	CMP PVC, Orange
Outer diameter	5.2mm
Termination	RJ45, slimline
Temperature rating	75°C
Flame test rating	UL CMP(Plenum), CSA FT-6

10 - V4PPLT "ecoAZUR-LITE" Series Processor Panel

10.1 - FUNCTIONAL DESCRIPTION

ecoAZUR® V4PPLT, also called **ecoAZUR-LITE** is designed to provide a low cost and simplified DCKV solution with reduced installation and start-up time for smaller applications.

ecoAZUR-LITE processor panel comes pre-wired, but has limited capabilities:

- No support for **MD** modulating dampers.
- No support for hoods lights (or any other external relay) control.
- Non expandable network (No support for **NE** network hubs). Overall maximum of 5 sensors (**TT** or **IB**)
- **CT** pre-mounted on processor panel door.
- Supports only 1 **TC** output module.

V4PPLT Series system apabilities

Model	Maximum Output Channels	Maximum MD Dampers	Maximum sensors in network
V4PPLT	4	0	5

10.2 - MECHANICAL SPECIFICATIONS

Material	Steel
Dimensions	254mm x 203mm x 152mm (10" x 8" x 6")
Enclosure type	Type 3R, 4, and 12 UL 508 , CSA, NEMA

10.3 - ELECTRICAL SPECIFICATIONS

WARNING!
• ONLY use **ecoAZUR® NF** cables for connections with **communication ports**.
• ONLY connect to listed *Physical Devices* on **communication ports** to prevent damage.

Supply voltage	120Vac/1PH/60Hz, 2.5A (300W) Use a dedicated 15A circuit breaker.
power consumption	300W
Class 2 circuit connections (low power 24VDC)	Connections to **CU** processor (24VDC): • **NF** Network cables to ecoAZUR sensors. Plenum rated (CMP, FT6). Use only **NF** Cables. Connections to **TC** output module (24VDC): • 18AWG, 4cond., shielded to each VFDs or third party device. Run low voltage (24Vdc) cabling separately from higher voltage.

11 - V4PP*xx*STD "ecoAZUR Standard" Series Processor Panel

11.1 - FUNCTIONAL DESCRIPTION

ecoAZUR® DCKV is a modular system designed to match complex kitchen ventilation applications as well as simpler installations. The **V4PP** Series reflects this reality by offering 7 processor panel models with different system capabilities.

ecoAZUR® **V4PPxxSTD** is intended to provide a standard solution for DCKV system of various size and complexity. Since **V4PPxxSTD** is not intended to support **MD** modulating dampers, the typical amount of controlled ventilation equipment pieces is usually lower than 8. For that reason, the main options do not exceed 2 **TC** output modules per panel (since each **TC** includes 4 output channels, this amount to 8 separate channels).

Custom options are always available, but do not figure in the following tables.

V4PPxxSTD Series system capabilities

Model	Maximum Output Channels	Maximum MD Dampers	Maximum *Physical Devices* in network
V4PP04STD1	4	0	60
V4PP08STD1	8	0	60
V4PP08STD2	8	0	60

If integrator wishes to include individual **ecoAZUR**® components directly in his own panel design, special attention must be given to applicable code and regulations.

In particular, class 2 circuits (low voltage) must be grounded using a low noise earth ground, and be segregated from 120VAC (or higher) wiring.

11.2 - AVAILABLE OPTIONS

The following options are available

- **V4PP-HL** - Hood light relay kit, mounted within the **V4PPxxSTD** Processor Panel. This option allows controlling hood lights from the **CT** user interface (with appropriate programming). Maximum load ratings: 120VAC, 16A maximum, provide external current protection on line side.

- **V4PP-MUAR** – **TC** output module 120VAC relay interface kit. Mounted within the **V4PPxxSTD** Processor Panel. This option allows a **TC** digitial output to interlock a 120VAC control signal through a 24VDC relay, to control a make-up air unit for example. Relay is factory installed and wired to the first **TC** module digital output.

- **V4PP-MUATX** – 100VA Class 2 transformer kit providing 24VAC supply voltage, to power an external device such as a make-up air unit. 24VAC power must be interlocked with MUA power disconnect switch (use auxiliary contact).

11.3 - MECHANICAL SPECIFICATIONS

Material	Steel
Dimensions	
	V4PPxxSTD1: 406mm x 356mm x 152mm (16" x 14" x 6")
	V4PPxxSTD1: 406mm x 356mm x 152mm (16" x 14" x 6")
	V4PPxxSTD2: 508mm x 406mm x 152mm (16" x 14" x 6")
Enclosure type	Type 3R, 4, and 12 UL 508 , CSA, NEMA

11.4 - ELECTRICAL SPECIFICATIONS

⚠️ **WARNING!**
- ONLY use **ecoAZUR® NF** cables for connections with **communication ports**.
- ONLY connect to listed *Physical Devices* on **communication ports** to prevent damage.

Supply voltage connections	Input 1: Processor power supply, terminals L-N 120Vac/1PH/60Hz, 2.5A (300W) Provide dedicated 15A circuit breaker. Input 2: Hood lights (optional), terminals HL1-HL2 120Vac/1PH/60Hz, 16A max. (1920W max.) Provide adequate circuit breaker
Output voltage connections	Output 1: N/A Output 2: Hood lights (optional), terminals HL3-HL4 120Vac/1PH/60Hz, 16A max. load (1920W max.)
Class 2 circuit connections (24VDC)	Connections to **CU** processor (24VDC): • **NF** Network cables to ecoAZUR sensors. Plenum rated (CMP, FT6). Use only **NF** Cables. Connections to **TC** output module (24VDC): • 18AWG, 4cond., shielded to each VFDs or third party device. Run low voltage (24Vdc) cabling separately from 120Vac cables.

12 - V4PPxxPLUS "ecoAZUR Plus" Series Processor Panel

12.1 - FUNCTIONAL DESCRIPTION

ecoAZUR® V4PPxxPLUS is an advanced DCKV solution designed to facilitate the integration of **MD** modulating dampers. This series is suitable for various kitchen sizes and benefit from all **V4PPxxSTD** Processor panel capabilities. **V4PPxxPLUS** is offered in different panel sizes depending on the number of required **TC** output modules, modulating dampers and options.

V4PPxxPlus Series

Model	Maximum Output Channels	Maximum MD Dampers	Maximum *Physical Devices* in network
V4PP04PLUS1	4	4	60
V4PP08PLUS1	8	8	50
V4PP12PLUS1	12	12	60
V4PP16PLUS1	16	16	60
V4PP20PLUS1	20	20	60

If integrator wishes to include individual **ecoAZUR®** components directly in his own panel design, special attention must be given to applicable code and regulations.

In particular, class 2 circuits (low voltage) must be grounded using a low noise earth ground, and be segregated from 120VAC (or higher) wiring.

12.2 - AVAILABLE OPTIONS

The following options are available

- **V4PP-HL** - Hood light relay kit, mounted within the **V4PPxxSTD** Processor Panel. This option allows controlling hood lights from the **CT** user interface (with appropriate programming). Maximum load ratings: 120VAC, 16A maximum, provide external current protection on line side.
- **V4PP-MUAR** – **TC** output module 120VAC relay interface kit. Mounted within the **V4PPxxSTD** Processor Panel. This option allows a **TC** digital output to interlock a 120VAC control signal through a 24VDC relay, to control a make-up air unit for example. Relay is factory installed and wired to the first **TC** module digital output.
- **V4PP-MUATX** – 100VA Class 2 transformer kit providing 24VAC supply voltage, to power an external device such as a make-up air unit. 24VAC power must be interlocked with MUA power disconnect switch (use auxiliary contact).

12.3 - MECHANICAL SPECIFICATIONS

Material	Steel
Dimensions	
	V4PP04PLUS1 508mm x 406mm x 152mm (20" x 16" x 6")
	V4PP08PLUS1 610mm x 508mm x 152mm (24" x 20" x 6")
	V4PP12PLUS1 508mm x 508mm x 152mm (24" x 24" x 6")
	V4PP16PLUS1 762mm x 609mm x 152mm (30" x 24" x 6")
	V4PP20PLUS1 762mm x 609mm x 152mm (30" x 24" x 6")
Enclosure type	Type 3R, 4, and 12 UL 508 , CSA, NEMA

12.4 - ELECTRICAL SPECIFICATIONS

⚠️ **WARNING!**
- ONLY use **ecoAZUR® NF** cables for connections with **communication ports**.
- ONLY connect to listed *Physical Devices* on **communication ports** to prevent damage.

Supply voltage connections	<u>Input 1: Processor power supply and MD damper 120/24 transformers terminals L-N</u> V4PP04PLUS1: 120Vac/1PH/60Hz, 5A (600W) V4PP08PLUS1: 120Vac/1PH/60Hz, 5A (600W) V4PP12PLUS1: 120Vac/1PH/60Hz, 7.5A (900W) V4PP16PLUS1: 120Vac/1PH/60Hz, 7.5A (900W) V4PP20PLUS1: 120Vac/1PH/60Hz, 10A (1200W) Provide dedicated 15A circuit breaker. <u>Input 2: Hood lights (optional), terminals HL1-HL2</u> 120Vac/1PH/60Hz, 16A max. (1920W max.) Provide adequate circuit breaker
Output voltage connections	<u>Output 1: N/A</u> <u>Output 2: Hood lights (optional), terminals HL3-HL4</u> 120Vac/1PH/60Hz, 16A max. (1920W max.)
Class 2 circuit connections (24VDC)	Connections to **CU** processor (24VDC): • **NF** Network cables to ecoAZUR sensors. Plenum rated (CMP, FT6). Use only **NF** Cables. Connections to **TC** output module (24VDC): • 18AWG, 4cond., shielded to each VFDs or third party device. Run low voltage (24VDC) cabling separately from 120V cables.