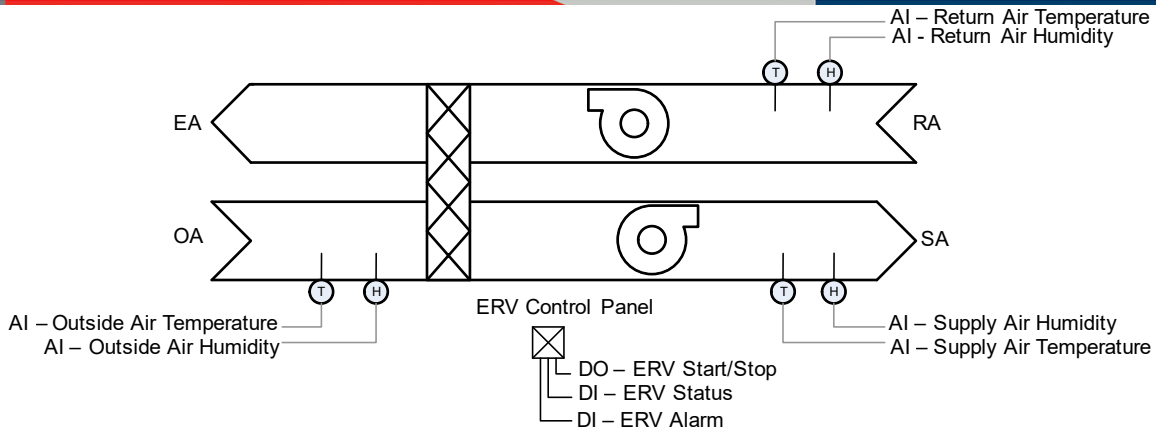# Application Note 3012

IO Sales Doc and ERV

EA – Exhaust Air; OA – Outside Air; RA – Return Air; SA – Supply Air
AI – Analog Input; DI – Digital Input; DO – Digital Output
Figure 1. Energy Recovery Ventilators (ERV) Control

Table 1. Controls network for ERV start/stop and alarm

Point Description	Hardware Points			Functions			Alarms		
	Digital Output	Digital Input	Analog Input	Schedule	Trend	Display	High Limit	Low Limit	Abnormality
ERV Start/Stop	X			X		X			
ERV Status		X				X			
ERV Alarm		X			X	X			X
Supply Air Temperature			X		X	X	X	X	X
Supply Air Humidity			X		X	X	X	X	X
Return Air Temperature			X		X	X	X	X	X
Return Air Humidity			X		X	X	X	X	X
Outside Air Temperature			X		X	X	X	X	X
Outside Air Humidity			X		X	X	X	X	X

Sequence of Operation

The Energy Recovery Ventilators (ERV) Control setup is shown in Figure 1. The CITY MULTI® Controls Network shall start/stop the ERV based on the owner's occupancy schedule. This schedule shall be adjustable via the AE-200/AE-50 Centralized Controller's display, the AE-200/AE-500/EW-50 Centralized Controller's Web Browser, or via the Initial Settings Tool. The user shall be able to manually start/stop the ERV by overriding the schedule from the Centralized Controllers, Web Browser or Initial Settings Tool. The next scheduled event from the Centralized Controller's schedule shall not be interrupted or altered. The outside air temperature, outside air humidity, supply air temperature, supply air humidity, return air temperature and return air humidity shall be monitored, displayed and trended via the AE-200, Web Browser, and Initial Settings Tool as shown in Table 1. If supply air humidity and/or supply air temperature exceeds the preset high and low limits (user defined) then an alarm shall be generated.

Required Equipment

The DIDO (Digital Input/Digital Output) Controller is used in conjunction with an AE-200/AE-50/EW-50, and the AI (Analog Input) Controller is used in conjunction AE-200/AE-500/EW-50 both can be used to monitor and/or control the ERV.

DIDO Controller
The DIDO controller has 2 channels. Each channel consists of 1 DO for start/stop control, 1 DI for status monitoring and 1 DI alarm input. Each channel will have 1 icon/graphic displayed on the AE-200/AE-50 Centralized Controller's display, the AE-200/AE-50/EW-50 Centralized Controller's Web Browser, or via Initial Settings Tool.

<div align="center">

Channel (2 per DIDO Controller)
DO – Start/Stop
DI – Status
DI – Alarm

</div>

The DIDO Controller requires a 24 VDC power supply (PAC-SC51KUA).   A 24 VDC interposing relay (RIBMU2C-KIT Dual 24 VDC Relay) is also required.

AI Controller
The AI controller has 2 inputs for monitoring and trending temperature and/or humidity. Each input can have user defined high and low limits to allow for alarms to be generated should the temperature or humidity exceed these limits. Each analog input requires a 0-10 VDC, 4-20 mA or 1-5 VDC signal from a
field-supplied temperature or humidity sensor. Historical measurement data can be displayed on the AE-200/AE-50/EW-50 Centralized Controller's Web Browser or Initial Settings Tool.

Trending of the temperature and/or humidity can be done via the AE-200/AE-50/EW-50 Web Browser or via Initial Settings Tool.

The AI Controller requires a 24 VDC power supply (PAC-SC51KUA)
Notes:
1. Not all inputs and outputs listed may be available on third-party equipment.
2. Additional field supplied devices may be required to provide inputs and outputs listed.
3. DIDO and AI controllers are not available for fire and life safety control.
4. DIDO and AI controllers are not supported by the BACnet™ and LonWorks® interfaces.
5. The AI Controller is not supported by the TC-24.