



neptronic®

Evaporative Cooler

SKVF Series

Installation Instructions and User Manual



READ AND SAVE THESE INSTRUCTIONS





Foreword

Neptronic Company Overview

Founded in 1976, we're a private corporation that designs, manufactures and distributes products for the HVAC industry. Our product line includes intelligent controllers, electronic actuators, actuated valves, humidifiers and electric heaters.

Our products are designed and manufactured by over 250 dedicated employees in our 7,500 m² (80,000 ft²) state-of-the-art facility located in Montreal, Canada. Using a vertical integration model, our entire manufacturing chain is under one roof from software and hardware development to SMT circuit board assembly, to sheet metal fabrication, to product testing ensuring that our products are engineered to last.

We currently hold several national and international patents and with our continued commitment to research and development, we provide innovative products and technologies for the ever-evolving challenges of the HVAC industry. Exporting over 75% of our sales, we have an exclusive distribution network around the globe that provides comprehensive solutions to our worldwide customers.

About the Manual

These installation and operation instructions have been developed to facilitate the installation of the SKVF evaporative cooler.

- The strict application of these instructions will ensure conformity of your installation and operation as per the manufacturer's recommendations.
- The application of these instructions is one of the conditions for the application of the warranty.
- The application of these instructions does not ensure, at any time conformity to procedures, regulation or local codes, regarding electric installation and connection to local water supply.

This product has been declared to conform to the applicable Canadian and American safety standards and directives and bear the ETL (c) & (us) mark. The Certificate of Conformity for ETL is available, upon request with the manufacturer.

This product has been declared to conform to applicable European safety and electromagnetic compatibility standards and directives and bear the CE mark. The certificate of conformity CE is available upon request to the manufacturer.

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General Warranty

This product is subject to the terms and conditions described at www.neptronic.com/Sales-Conditions.aspx



Health and Safety Instructions

General

This manual has been written to ensure correct, safe and sustainable operation of the SKVF evaporative cooler and is intended for use by engineers and technical personnel trained by Neptronic or their official agents. This manual must be read thoroughly before specifying, designing, installing or operating an SKVF. Please retain for reference and contact Neptronic for any questions.

Electrical Warning Message



WARNING:

Risk of electric shock. Do not access. Disconnect the SKVF prior to opening the access door.

All work concerned with electrical installation **MUST** only be performed by skilled and qualified technical personnel such as an electrician or a technician with appropriate training. The customer is always responsible for ensuring the suitability of the technical personnel.

Please observe local regulations concerning the provision of electrical installations.

Health & Safety

Installation, maintenance, repair work or de-commissioning must only be carried out by appropriately qualified and properly trained technical personnel. Any risks or hazards relating to the system, including during installation and maintenance, must be identified by a competent Health & Safety representative who shall be responsible for introducing effective control measures as necessary. The customer is responsible for ensuring that the installation of the equipment complies with all local regulations.



CAUTION: Maintenance personnel must be trained by Neptronic or their official agent and it is the customer's responsibility to ensure their suitability. Failure to use properly trained personnel may lead to a hazardous operating condition.



WARNING: Danger of electrocution! Danger of contact with live parts when the unit is open. Always isolate all water and electrical supplies to the system before commencing any maintenance or repair. Isolate power and water immediately if there are any sign of water leaking from the unit.



WARNING: This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children must be supervised to ensure that they do not play with the appliance.

Protective Equipment

Please refer to the Health and Safety Executive for recommendations with regard to Personal Protective Equipment and for information on the Control of Substances Hazardous to Health COSHH.



Hygiene

IMPORTANT:

Refer to local Health and Safety regulation and codes on the control of Legionellosis in water systems. In the absence of such, ASHREA guideline 12-2000 does provide recommendations.

If not adequately maintained, water systems can support the growth of micro-organisms including the bacterium that causes Legionnaires' disease.

The SKVF has been designed to reduce as much as possible any possible risk of legionellosis growth. Users also share the responsibility in reducing the risk of legionellosis; users are required to:

- Conduct a risk assessment of the complete water system.
- Implement proper control of the water system.
- Connect to a clean and chlorinated water supply main.
- Avoid stagnant water.
- Avoid water temperatures that increase risk of Legionella growth.
- Clean and disinfect the system regularly, refer to service section of the present Installation Instructions and User Manual.



WARNING: Risk of Legionnaires' disease which can be fatal. The SKVF evaporative cooler must be installed, operated and serviced in accordance with this Installation Instructions and User Manual.



WARNING: In the event that the SKVF is turned off for prolonged periods (more than 24 hours), ensure that any water storage tanks and pipe-work supplying the unit are drained, unless they supply other systems which ensure a regular renewal of water in the system. Failure to do so may result in stagnation of the water and contamination that might cause Legionnaires' disease, which can be fatal.

It is the responsibility of the person on whom the statutory responsibility falls to determine all control and preventative measures outlined in this manual.

Correct Use

Neptronic systems and its products are designed only for cooling and humidification use. Any other application is not considered appropriate for the intended purpose. The manufacturer cannot be made liable for any damage resulting from incorrect use.



Handling and Packaging

Handling

Always handle the SKVF evaporative cooler with care and keep within its original packaging for as long as possible, prior to installation. It must be stored under cover and protected from any possible damage, from dust, rain or frost.

Correct Lifting Method

Lifting or handling must only be carried out by trained and qualified personnel. Ensure that the lifting operation has been properly planned, risk assessed and that all equipment has been checked by a skilled and competent Health & Safety representative and that effective control measures are put in place.

WARNING: It is the customer's responsibility to ensure that operators are trained in handling heavy goods and to enforce the relevant lifting regulations.



WARNING: The SKVF must always be handled and lifted with care and remain in its original packaging for as long as possible, prior to installation.

WARNING: The SKVF package may be carried using a forklift from the underside. Exercise caution before lifting to ensure that the load is balanced.

Refer to dimensions and weights as indicated on page 9.

Inspection

Upon receipt, and once packaging material has been removed, an inspection must be carried out to ensure that no damage occurred during transit. Any damage must be reported with no delay to your Neptronic representative.



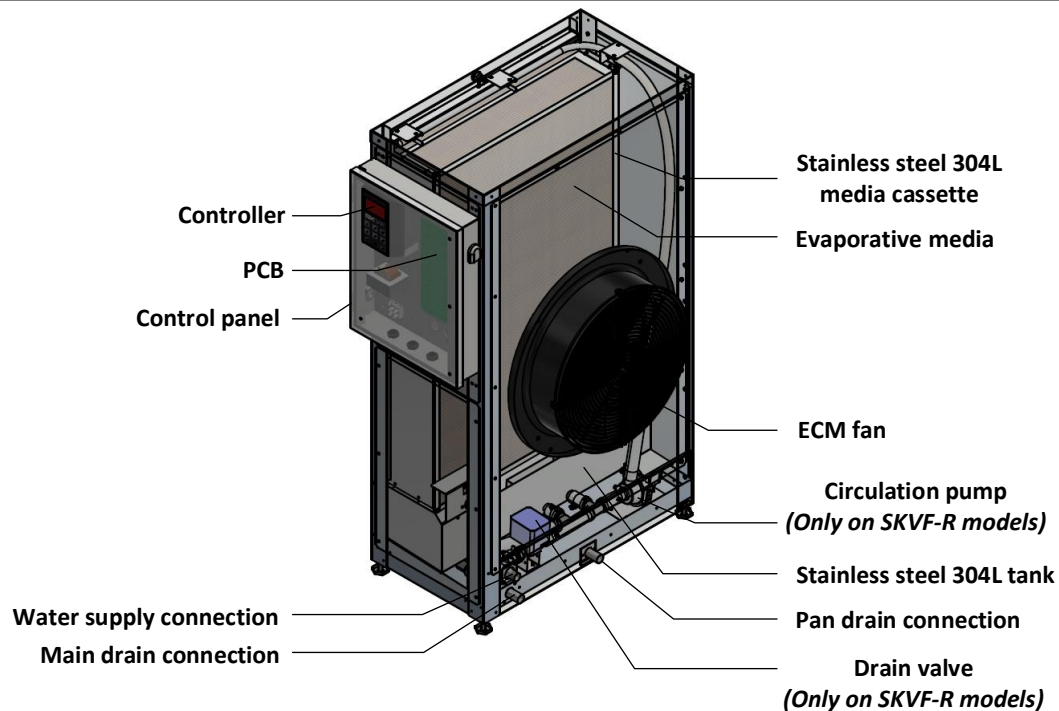
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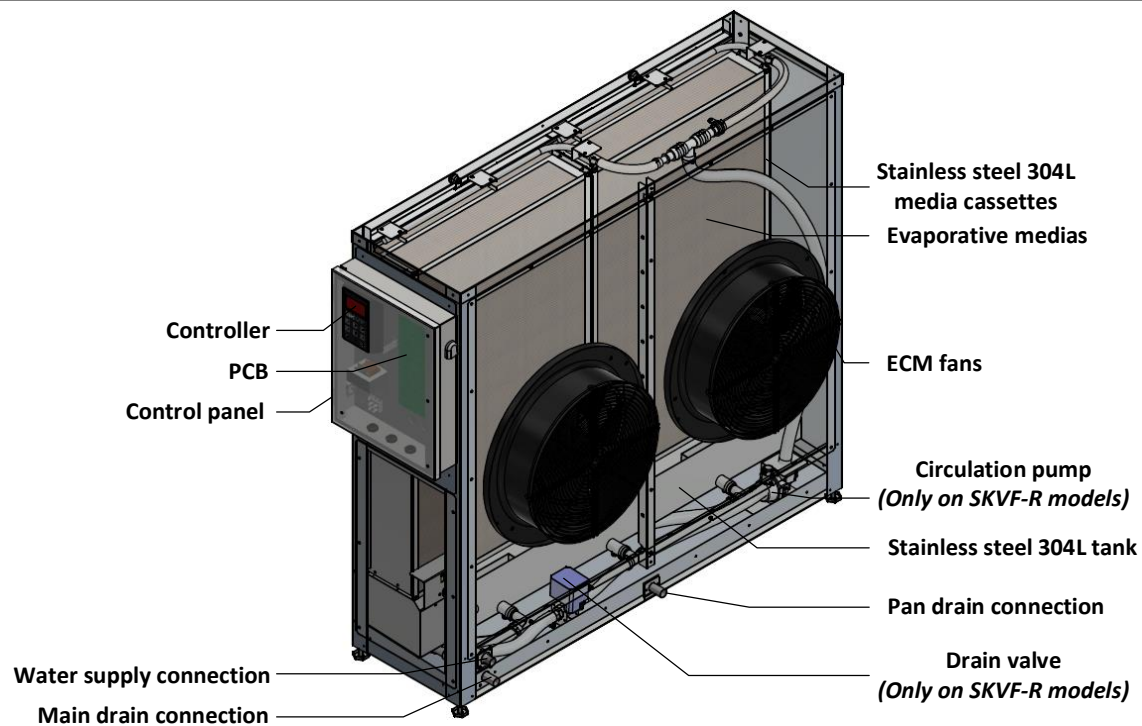


Overview

Visual Overview



SKVF-x15 to x30 Models



SKVF-x60 Models

Illustration 1 - Overview of SKVF Evaporative Cooler



Nomenclature

SKVF	-	R	60	-	85	B	C	S
		Type: R = Recirculation D = Direct Feed	CFM*: 15 = 1500 CFM 30 = 3000 CFM 60 = 6000 CFM		Evaporation Factor†: 85 = 85%	Fan Position: B = Back L = Left R = Right	Voltage§: A = 120Vac/1ph B = 208Vac/1ph C = 230-240Vac/1ph	Control Panel: S = Standard

* 120Vac/1ph models operate at 80% of maximum capacity and therefore output 80% of the nominal CFM.

† Option of 65 or 75% evaporation factor is also available upon request to the factory.

§ Only 230-240Vac/1ph models are available with CE certification.

Available Options

The following options are available when purchasing a SKVF evaporative cooler:

- Air filter
- Air deflector
- BACnet and Modbus network communication board
- Ethernet (IP) board
- 5 microns pre-filter and silver ion dosing anti-bacterial cartridges
- UV light

Technical Specifications

Table 1 - Technical Specifications

Model	Frequency (Hz)	Rated voltage (V)	Rated power (W)	Rated current (A)	Max air flow (CFM) [m³/h]
SKVF-x15	50/60	120	364	3.0	1250 (2124)
		208	364	1.8	1500 (2549)
		240	364	1.5	
SKVF-x30	50/60	120	700	5.8	2500 (4248)
		208	700	3.4	3000 (5097)
		240	700	2.9	
SKVF-x60	50/60	120	1300	10.8	5000 (8495)
		208	1300	6.3	6000 (10194)
		240	1300	5.4	



Output Specifications

Table 2 - Output Specifications (120V models)

72°F (22°C) Entering temperature	Entering RH:	10%RH		20%RH		30%RH		40%RH	
	CFM (m³/h)	Humidification	Cooling	Humidification	Cooling	Humidification	Cooling	Humidification	Cooling
		lbs/h (kg/h)	kBTU/h (kW)	lbs/h (kg/h)	kBTU/h (kW)	lbs/h (kg/h)	kBTU/h (kW)	lbs/h (kg/h)	kBTU/h (kW)
	1250 (2124)	26.5 (12)	28.2 (8.3)	22.7 (10.3)	24.1 (7.1)	19.3 (8.8)	20.4 (6)	15.9 (7.2)	16.8 (4.7)
	2500 (4248)	52.9 (24)	56.3 (16.5)	45.3 (20.5)	48.2 (14.1)	38.5 (17.5)	40.9 (12)	31.8 (14.4)	33.8 (9.3)
	5000 (8495)	104.9 (47.6)	112.6 (33)	90.6 (41.1)	96.3 (28.2)	77.1 (35)	81.8 (24)	63.6 (28.8)	67.4 (18.6)
Leaving condition:		78%RH	52°F (11°C)	82%RH	54°F (12°C)	85%RH	57°F (14°C)	88%RH	60°F (16°C)

85°F (29°C) Entering temperature	Entering RH:	10%RH		20%RH		30%RH		40%RH		
	CFM (m³/h)	Humidification	Cooling	Humidification	Cooling	Humidification	Cooling	Humidification	Cooling	
		lbs/h (kg/h)	kBTU/h (kW)	lbs/h (kg/h)	kBTU/h (kW)	lbs/h (kg/h)	kBTU/h (kW)	lbs/h (kg/h)	kBTU/h (kW)	
		1250 (2124)	32.3 (14.7)	34.2 (10)	27.2 (12.3)	28.8 (8.4)	22.9 (10.4)	24.2 (7.1)	18.8 (8.5)	19.8 (5.8)
		2500 (4248)	64.5 (29.3)	68.3 (20)	54.3 (24.6)	57.5 (16.9)	45.8 (20.8)	48.4 (14.2)	37.4 (17)	39.4 (11.5)
5000 (8495)	128.9 (58.5)	136.7 (40.1)	108.7 (49.3)	115 (33.7)	91.7 (41.6)	96.8 (28.4)	74.8 (33.9)	78.9 (23.1)		
Leaving condition:		76%RH	60°F (16°C)	80%RH	64°F (18°C)	85%RH	67°F (19°C)	87%RH	70°F (21°C)	



Note: Humidity output for high RH entering conditions may be less than the above values calculated with an evaporation factor for air at 50%RH.

Table 3 - Output Specifications (208 to 240V models)

72°F (22°C) Entering temperature	Entering RH:	10%RH		20%RH		30%RH		40%RH	
	CFM (m³/h)	Humidification	Cooling	Humidification	Cooling	Humidification	Cooling	Humidification	Cooling
		lbs/h (kg/h)	kBTU/h (kW)	lbs/h (kg/h)	kBTU/h (kW)	lbs/h (kg/h)	kBTU/h (kW)	lbs/h (kg/h)	kBTU/h (kW)
	1500 (2549)	31.8 (14.4)	33.8 (9.9)	27.2 (12.3)	28.9 (8.5)	23.1 (10.5)	24.5 (7.2)	19.1 (8.7)	20.2 (5.9)
	3000 (5097)	63.5 (28.8)	67.6 (19.8)	54.4 (24.7)	57.8 (16.9)	46.2 (21)	49.1 (14.4)	38.2 (17.3)	40.5 (11.9)
	6000 (10194)	125.9 (57.6)	135.1 (39.6)	108.7 (49.3)	115.5 (33.8)	92.5 (42)	98.1 (28.8)	76.3 (34.6)	80.9 (23.7)
Leaving condition:		78%RH	52°F (11°C)	82%RH	54°F (12°C)	85%RH	57°F (14°C)	88%RH	60°F (16°C)

85°F (29°C) Entering temperature	Entering RH:	10%RH		20%RH		30%RH		40%RH	
	CFM (m³/h)	Humidification	Cooling	Humidification	Cooling	Humidification	Cooling	Humidification	Cooling
		lbs/h (kg/h)	kBTU/h (kW)	lbs/h (kg/h)	kBTU/h (kW)	lbs/h (kg/h)	kBTU/h (kW)	lbs/h (kg/h)	kBTU/h (kW)
	1500 (2549)	38.7 (17.6)	41 (12)	32.6 (14.8)	34.5 (10.1)	27.5 (12.5)	29 (8.5)	22.5 (10.2)	23.7 (6.9)
	3000 (5097)	77.4 (44.6)	82 (24)	65.2 (29.6)	69 (20.2)	55 (24.9)	58.1 (17)	44.9 (20.4)	47.3 (13.9)
	6000 (10194)	154.7 (70.2)	164 (48.1)	130.5 (59.2)	138 (40.4)	110 (49.9)	116.2 (34)	89.8 (40.7)	94.7 (27.8)
Leaving condition:		76%RH	60°F (16°C)	80%RH	64°F (18°C)	85%RH	67°F (19°C)	87%RH	70°F (21°C)



Note: Humidity output for high RH entering conditions may be less than the above values calculated with an evaporation factor for air at 50%RH.



Dimensions and Weight

SKVF-x15 to x30 Models

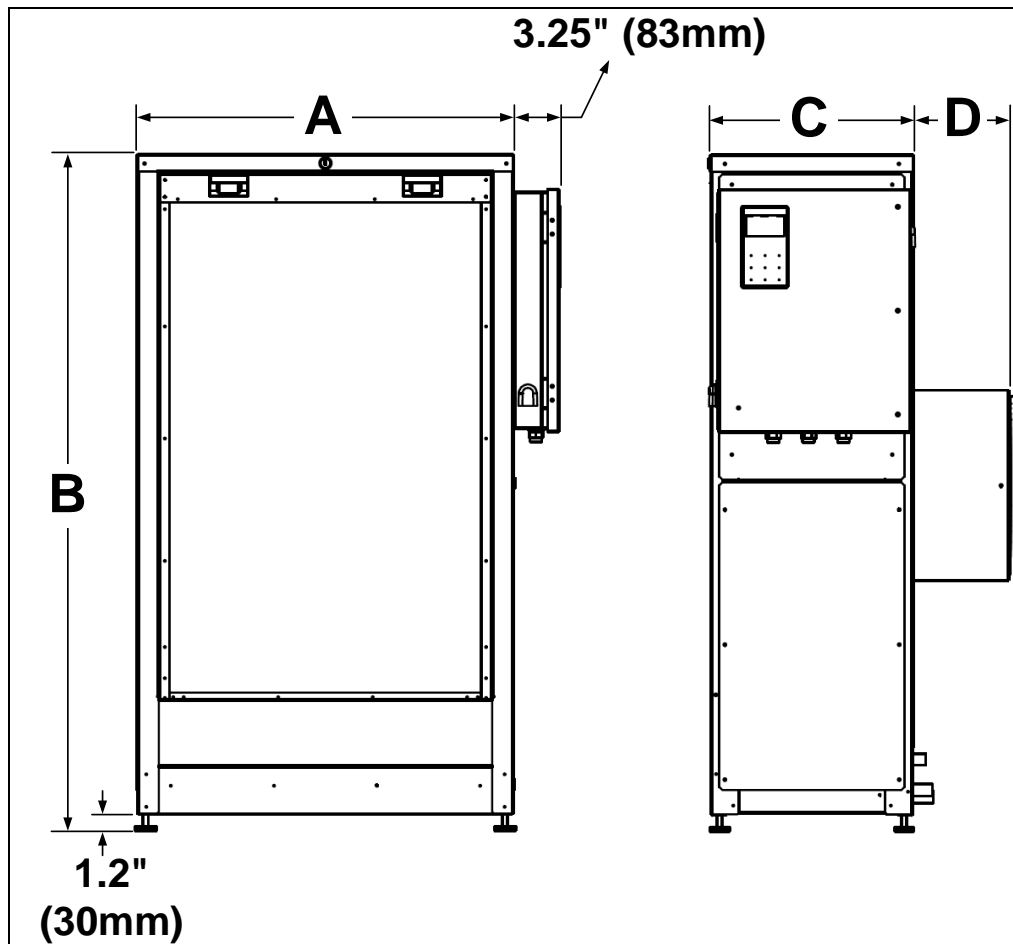


Illustration 2 - Dimensions (SKVF-x15 to x30 Models)

Table 4 - Dimensions and Weight (SKVF-x15 to x30 Models)

Model	Dimensions (inch) [mm]				Weight (lb) [kg]	
	A	B	C	D	Empty	Full
SKVF-x15-xxB	27 (686)	48 (1219)	14.5 (368)	6.8 (173)	124 (56)	164 (74)
SKVF-x15-xxL SKVF-x15-xxR	27 (686)	48 (1219)	23.8 (605)	6.8 (173)	132 (60)	172 (78)
SKVF-x30-xxB	27 (686)	48 (1219)	14.5 (368)	5 (127)	133 (60)	173 (79)
SKVF-x30-xxL SKVF-x30-xxR	27 (686)	48 (1219)	30.8 (782)	5 (127)	152 (69)	191 (87)



SKVF-x60 Models

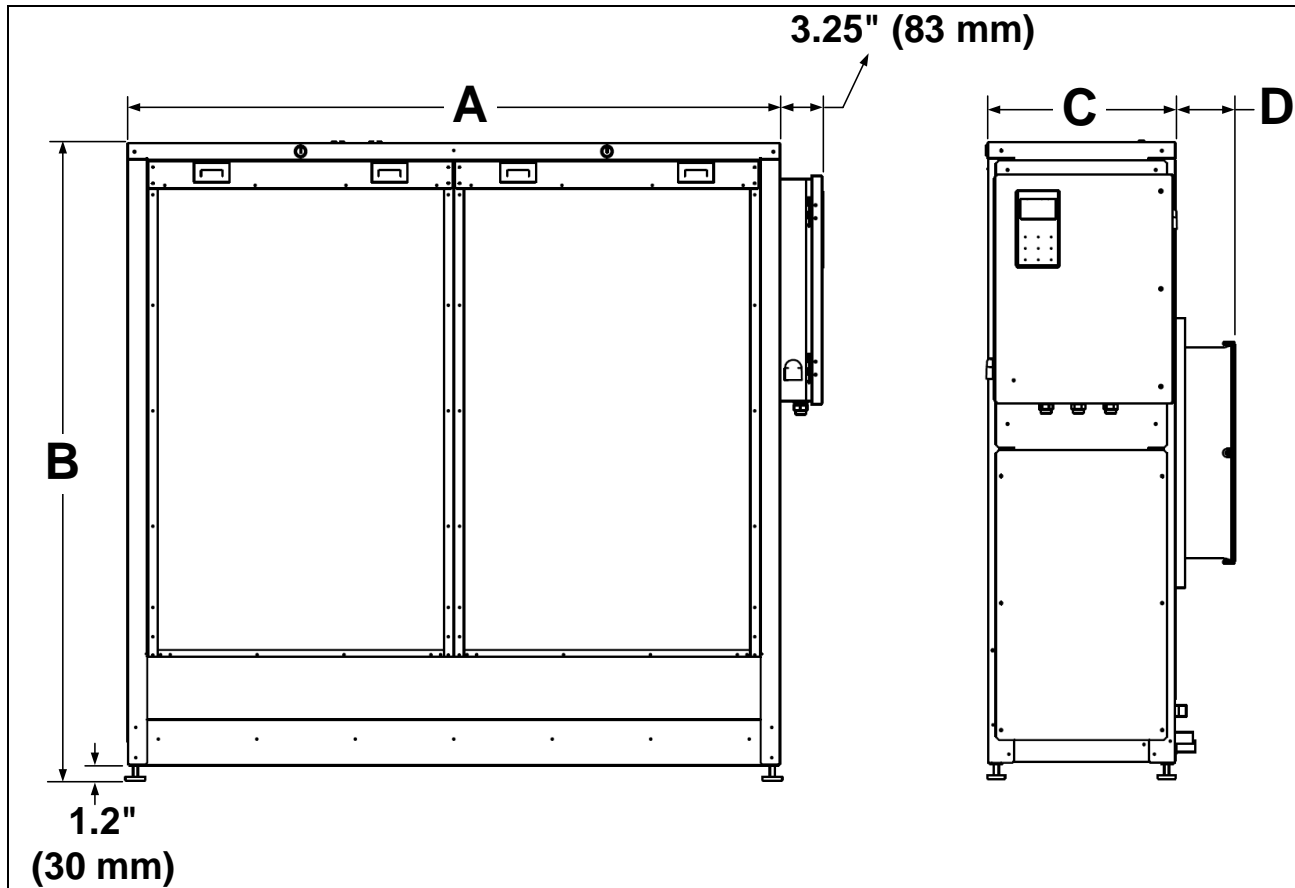


Illustration 3 - Dimensions (SKVF-x60 Models)

Table 5 - Dimensions and Weight (SKVF-x60 Models)

Model	Dimensions (inch) [mm]				Weight (lb) [kg]	
	A	B	C	D	Empty	Full
SKVF-x60-xxB	50.8 (1290)	48 (1219)	14.5 (368)	5 (127)	192 (87)	269 (125)



Mechanical Installation

General Recommendations



WARNING: Failure to observe manufacturer's installation recommendations will invalidate the manufacturer's warranty.
Installation must conform to Local and National Codes.

Location

Consider the following points before deciding the location for the SKVF evaporative cooler:

- Plan a location that is easy to access and permits an easy inspection and servicing of the SKVF.
- Do not install the SKVF where failure of the appliance could cause damage to the building structure or to other expensive equipment.
- Ensure that the ambient temperature is less than 104°F (40°C).
- Construct the drainpipe in such a way that there is no water accumulation and stagnation.

Positioning

- Ensure that the humid airstream of the fan(s) is not located close to a surface on which condensation can easily build-up.
- Ensure that the control panel, fan(s), evaporative media and plumbing connections are accessible in order to permit servicing.
- Leave the following minimum clearances around the evaporative cooler:
 - **Front of the unit where the evaporative media is located:** 14" (356 mm) minimum
(it is recommended to leave 24" (610 mm) of clearance when more frequent access is required for servicing)
 - **Control panel:** 24" (610 mm) minimum from the control panel

Note: Above minimum clearances are indicated for inspection and servicing access.

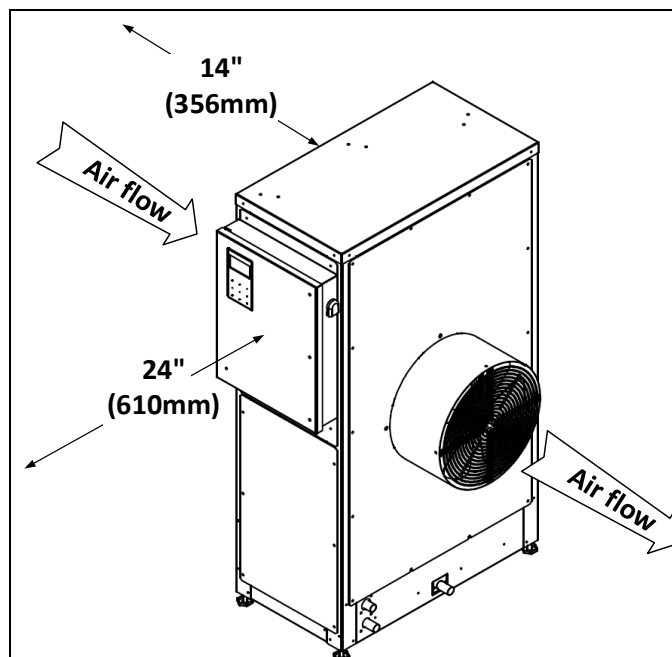


Illustration 4 - Evaporative Cooler Positioning



Floor Installation

- The SKVF evaporative cooler is provided with adjustable feet in order to ensure a proper level when installed directly on the floor.
- Ensure that the SKVF is installed at a level of $\pm 1^\circ$ in all directions.
- Provide a level, solid foundation for the evaporative cooler and ensure that the floor beneath the evaporative cooler is waterproof to withstand any water spillage during servicing or in the event of a problem.

Ceiling Installation

- The SKVF can be hung by the ceiling using an appropriate support platform (by others). Consult local codes and regulations for minimum structural requirements for such platforms.
- Ensure to use platforms that allow for level adjustment in order to keep the SKVF at a level of $\pm 1^\circ$ in all directions.
- Ensure to unscrew the legs of the SKVF and keep the 4x $\frac{3}{8}$ "-16 screws.
- The SKVF must be attached to the platform by the use of 4x $\frac{3}{8}$ "-16 screws fixed at the designated locations on the bottom of the unit, as per the image below.
- The screws must not be inserted into the SKVF at a depth of more than $\frac{3}{4}$ " (20mm).

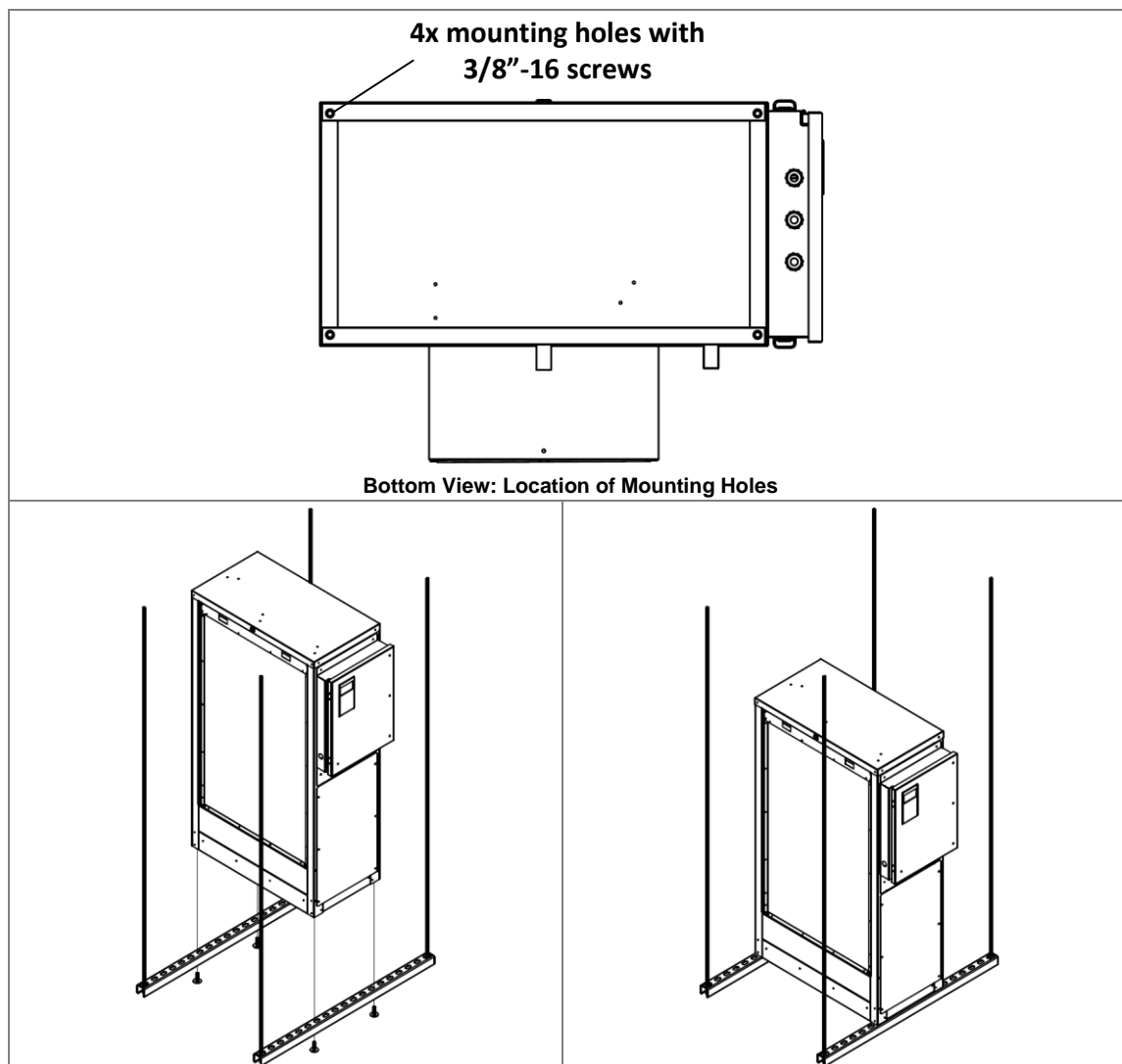


Illustration 5 - Ceiling Installation



Air Filter Installation (Option)

1. Using 14x stainless steel self-tapping #8-18 x ½" screws, secure the bottom bracket assembly onto the SKVF media panel.
2. Slide the air filter into the bottom bracket assembly.
3. Using 4x stainless steel self-tapping #8-18 x ½" screws, secure the top bracket onto the SKVF media panel.
4. Using 2x stainless steel self-tapping #8-18 x ½" screws, secure the top bracket to the bottom bracket assembly.

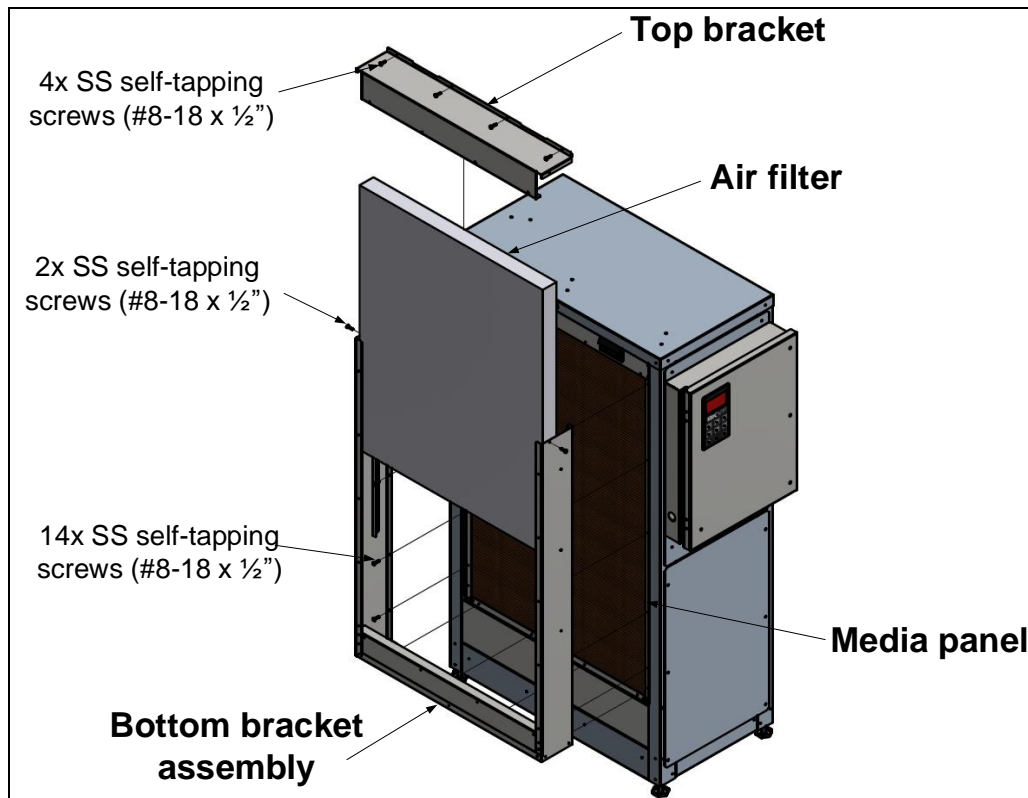


Illustration 6 - Air Filter Installation



Plumbing Connections



Plumbing Installation must conform to Local and National Codes.

Any installation work must be carried out by suitably qualified personnel.

Water Quality Guide

For normal operation of the SKVF evaporative cooler, Neptronic recommends connecting the SKVF to a clean and potable source of water supply. Reverse osmosis (RO) water may be used for areas using hard water in order to minimise scale build-up.

Reverse Osmosis Water

For SKVF evaporative coolers using RO water, Neptronic recommends operating the system within the following parameters:

SKVF Type	Conductivity
Type R: Recirculation pump	> 100 µS/cm at 68°F (20°C)
Type D: Direct feed	> 150 µS/cm at 68°F (20°C)

The use of tanks and reservoirs using RO water is only permitted as part of a properly managed and hygiene monitored water system and must be included as part of a water system risk assessment.

Controlled Substances

The supply water of the SKVF must be free of any toxic, carcinogenic and flammable substances, in order to avoid contamination of the air passing through the media.

Refer to the table below for a list of substances that must not be found in the SKVF system.

Acrylamide	Chromium	Mercury
Antimony	Clostridium perfringens (including spores)	Nickel
Arsenic	Cyanide	Pesticides
Benzene	1,2-dichloroethane	Polycyclic aromatic hydrocarbons
Benzo(a)pyrene	Epichlorohydrin	Selenium
Boron	Fluoride	Tetrachloroethene and Trichloroethene
Bromate	Lead	Trihalomethanes
Cadmium		Vinyl chloride

Water Monitoring

The water supply of the SKVF evaporative cooler must be monitored for hygiene as part of the maintenance program. Refer to the Servicing and Maintenance section for further guidance.



Water Supply Installation

Connect the evaporative cooler to a clean drinking water supply.

- The SKVF evaporative cooler is capable of operating with tap and reverse osmosis (RO).
- If the evaporative cooler is connected to hard water, it will result in scale build-up on the evaporative module and will require frequent cleaning and replacement.
- If the supplied water is treated with reverse osmosis filtration, control the total dissolved solid contents in the water, otherwise the water will react as a solvent agent resulting in rapid evaporation and media degradation.
- Water conductivity must be between 100 and 550 $\mu\text{S}/\text{cm}$ at 68°F (20°C).
- For direct feed models, water conductivity must not be lower than 150 $\mu\text{S}/\text{cm}$ at 68°F (20°C). If it is lower, mix the treated water with tap water to achieve the recommended conductivity. Alternatively, install an SKVF with recirculation (SKVF-R) and setup the dilution ratio accordingly by modifying the value of the *DilutionRatio* setting located in the *Installation* menu (see page 34).
- It is recommended to install a standard water strainer in the water supply line.
- It is recommended to install a water hammer arrestor, in order to absorb hydraulic shock and minimize water hammer when the fill valve closes.

Water Inlet Specifications

- Minimum water supply pressure: 25 psi (170 kPa)
- Maximum water supply pressure: 70 psi (480 kPa)
- Maximum water supply temperature: 68°F (20°C)

Water Supply Line Installation

- Connect a ½" NPT (DN15) water supply braided hose (by others) to the water supply connection.
- To facilitate servicing, a shut off valve (not supplied) must be installed in the water line, within 40" (1m) of the evaporative cooler.

Models	Water Inlet Connection Size
SKVF	Ø1/2" NPT (DN15) connection

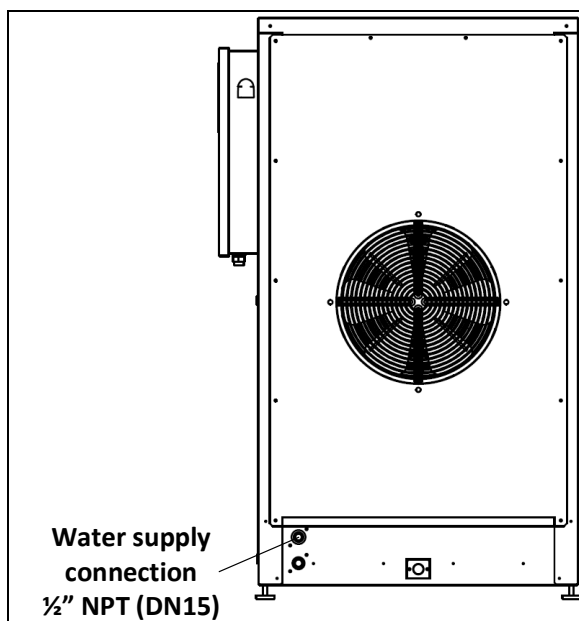


Illustration 7 - Water Supply Connection



Water Drain Connections



Any installation work must be carried out by suitably qualified personnel.



Risk of flooding. Never connect drains to a closed pipe work. Always install a tundish to provide a suitable air gap.

Water Drain Specification

Model	Water Drain Outlets Connection Size
SKVF	Ø3/4" (DN20)

Water Drain Installation

- The water drain outlet connections must be connected to drain piping of sufficient size. It is recommended to use Ø3/4" (DN20) or bigger standard copper hydraulic pipes.
- Ensure that the slope of the drain line is no less than 10°.
- The maximum equivalent pipe length of the main drain must not exceed 20ft (6m) between the drain outlet of the evaporative cooler and the open drain. Otherwise, the drain pipe diameter must be increased to 1-1/2" (DN40).
- A minimum 1" (25mm) air gap must be kept between the connection of the SKVF drain pipes and the open drain line, in order to prevent any backflow to the SKVF evaporative cooler.
- The SKVF drain pipes must not have a drain trap installed and must be piped to an open drain.
- The open drain pipe must have a minimum diameter of 1-1/2" (DN40).
- The main drain and pan drain must not be piped together or to other appliances.

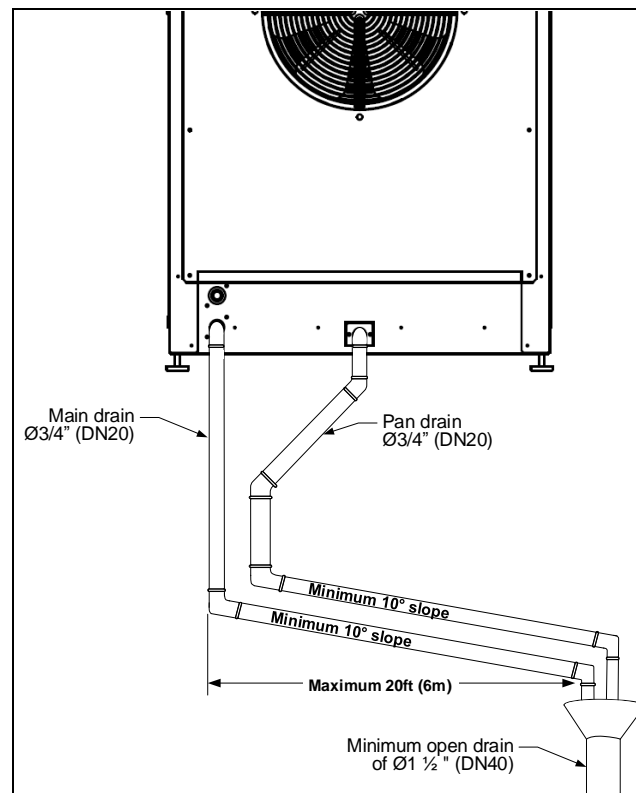


Illustration 8 - Water Drain Connections



Electrical Connections



All work concerned with electrical installation **MUST** only be performed by a qualified electrician and must conform to the procedure, regulation and local codes.



WARNING: Risk of electric shock. Isolate all power supplies before installation and maintenance of the SKVF Evaporative cooler.

- Use copper conductors only.
- All incoming power supplies must be externally fused for over current protection.
- The electrical supply must also be isolated for the purpose of emergency and servicing.
- The isolator must have a contact separation of at least 1/8" (3 mm).
- An external over current protection and disconnect circuit breaker must be installed on the supply, adjacent to the unit.
- Ensure that the size of the wire conductors is appropriate for the maximum current supplied.
- Ensure that the incoming power cable is secured via a suitably sized cable gland.
- Ensure that each terminal connection is secured firmly with a cable ferrule.
- The SKVF evaporative cooler cabinet has an uninterrupted or unbroken electrical ground. Do not use the unit's frame to connect to ground.

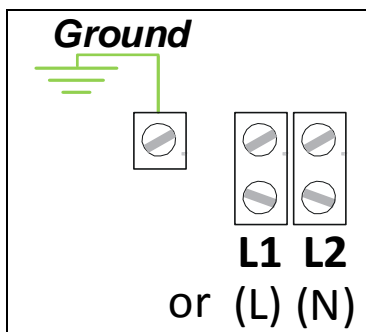


Illustration 9 - Power Supply Connections

Electrical Power Supply

Table 6 - SKVF Electrical Power Supply

Model	Voltage (V)	Current (A)
SKVF-x15	120 - 1ph	3.0
	208 - 1ph	1.8
	230 to 240 - 1ph	1.5
SKVF-x30	120 - 1ph	5.8
	208 - 1ph	3.4
	230 to 240 - 1ph	2.9
SKVF-x60	120 - 1ph	10.8
	208 - 1ph	6.3
	230 to 240 - 1ph	5.4



Printed Circuit Board

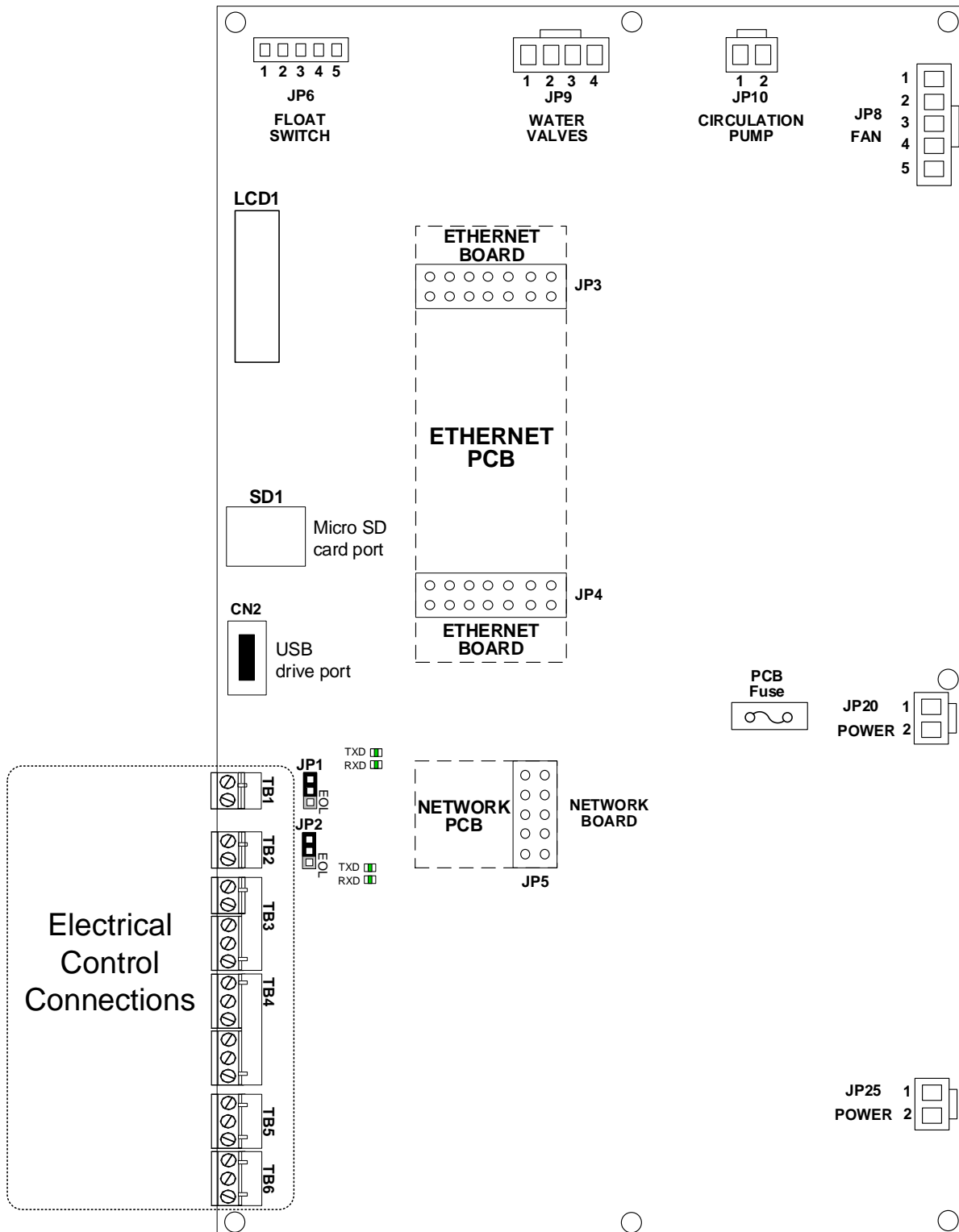


Illustration 10 - Printed Circuit Board Interface

The Printed Circuit Board (PCB) of the SKVF Evaporative Cooler is equipped with an advanced microprocessor, which controls all the functions of the evaporative cooler. All electrical control connections have been grouped alongside the bottom left corner of the PCB.

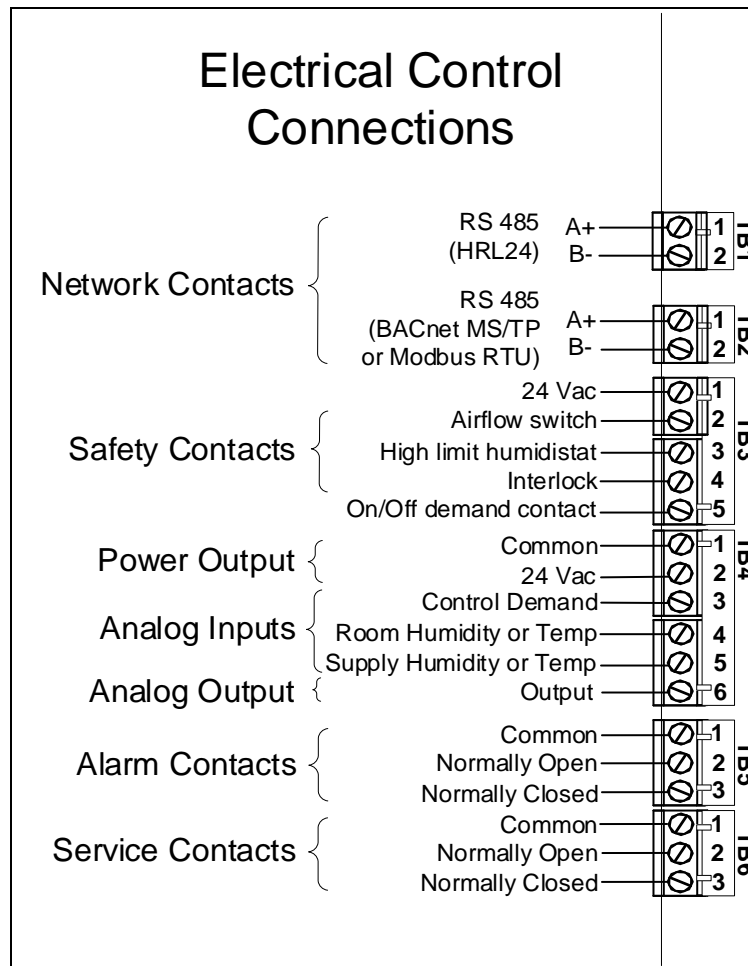


Illustration 11 - Electrical Control Connections

Safety Contacts

The **Airflow switch** contact must be wired between terminals TB3 1&2. If this contact opens, operation of the SKVF unit will stop. The unit will display the airflow switch as open, but will not generate an alarm. If an airflow switch is not used, install a jumper between terminals TB3 1&2.

The **High limit humidistat** contact must be wired between terminals TB3 1&3. If this contact opens, operation of the SKVF unit will stop and an **alarm** message will be displayed. If a high limit humidistat is not used, install a jumper between terminals TB3 1&3.

The **Interlock** must be wired between terminals TB3 1&4. If this contact opens, operation of the SKVF unit will stop. The unit will display the Interlock as open, but will not generate an alarm. If Interlock is not used, install a jumper between terminals TB3 1&4.

Dry Contacts

Two series of volt free contacts are provided: **Alarm Contacts** and **Service Contacts**.

- Each series has one Normally Closed contact and one Normally Open contact.
- These contacts are used to switch a low voltage, ideally **24V**, with a switching current of no more than **3 Amps**.
- It is recommended to use the Normally Closed contact, as this contact will open in the event of a fault.

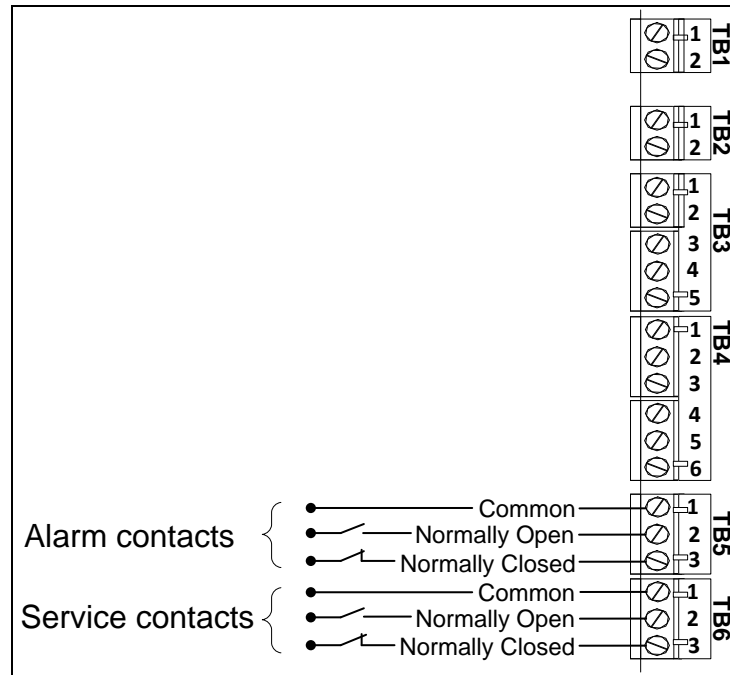


Illustration 12 - Alarm and Service Contact Wiring

ON/OFF Control

Connect the On/Off demand contact between TB3 1&5. If this contact opens, the SKVF unit will turn off. If this contact closes, the SKVF unit will operate.

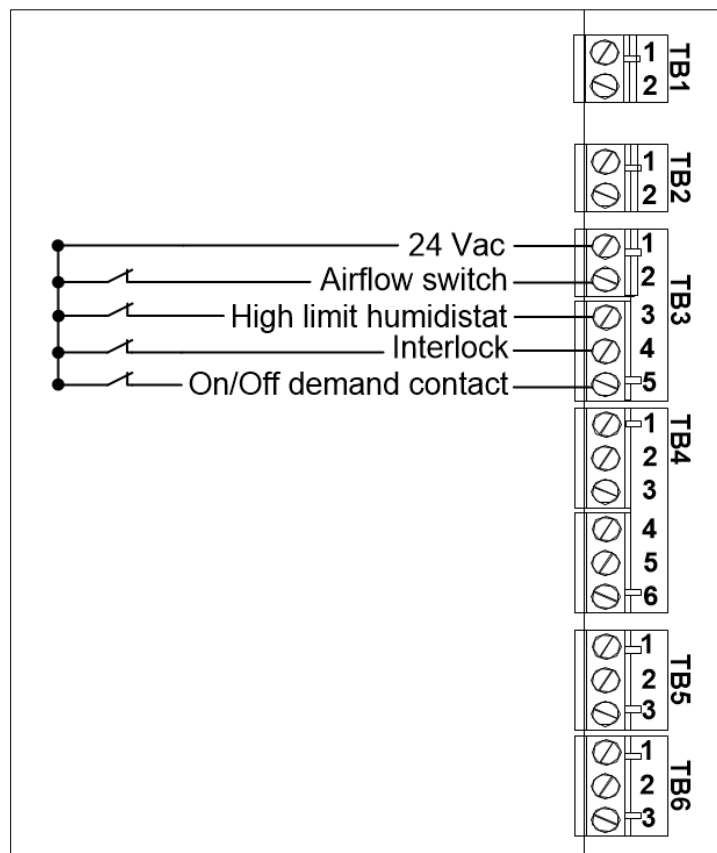


Illustration 13 - On/Off Control Typical Wiring



Modulating Control

Analog Signals

The analog signal(s) must be connected between terminals TB4 1 and TB4 3, 4 and/or 5. To configure the source of the signal(s), access the *Control* sub-menu located in the *Installation* menu (see page 34).

Control by Humidistat (External Mode)

External control, using HRO20 humidistat:

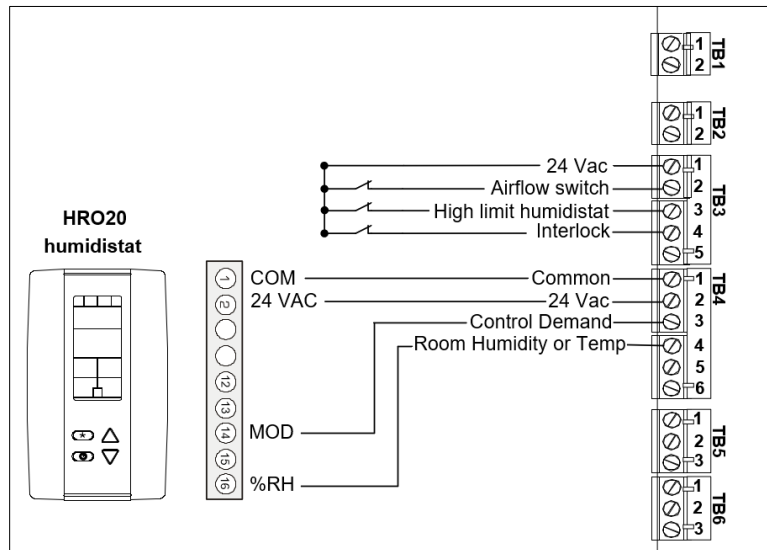


Illustration 14 - Control Signal from HRO20 Humidistat

External control, using HRO20 humidistat with SHR10 as room sensor:

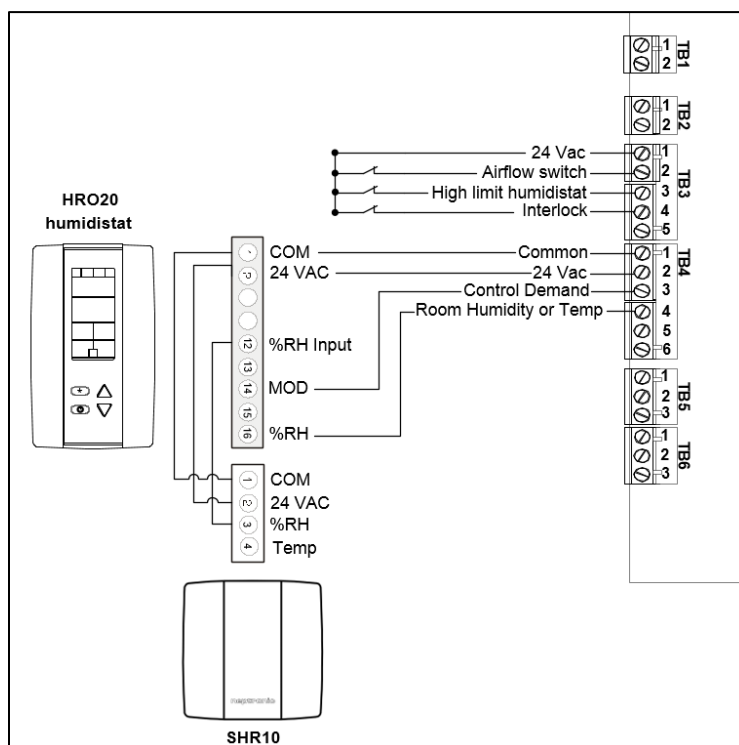


Illustration 15 - Control Signal from HRO20 Humidistat with Remote Sensor (SHR10)



Control by Evaporative Cooler (Internal Mode)

Humidity or temperature controlled internally, using a room sensor:

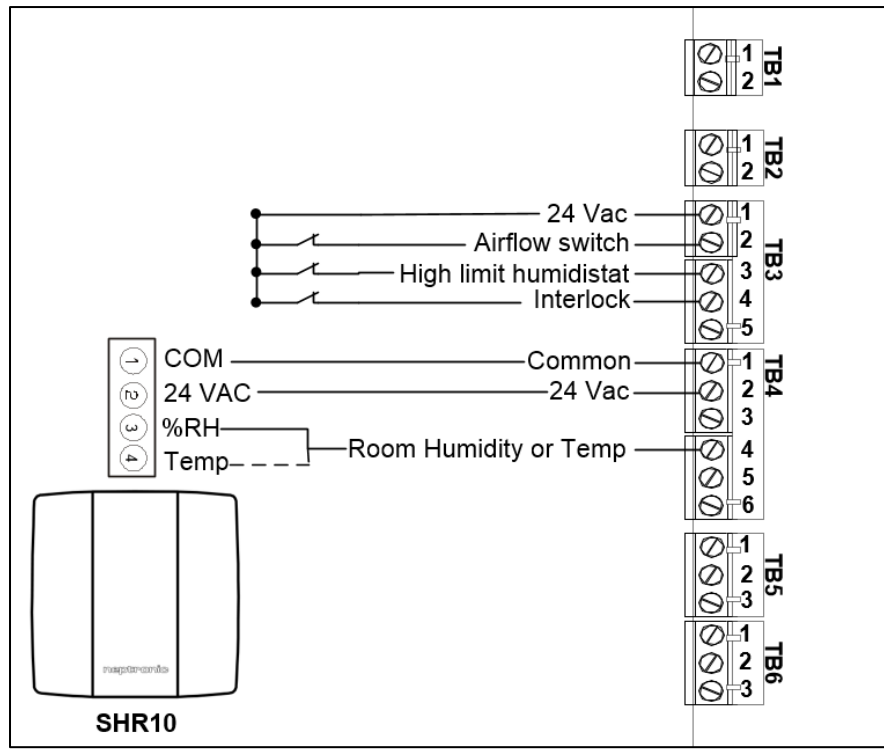


Illustration 16 - Control Signal from Remote Sensor (SHR10)

Control by External Signal

Humidity or temperature controlled externally, using an external signal source:

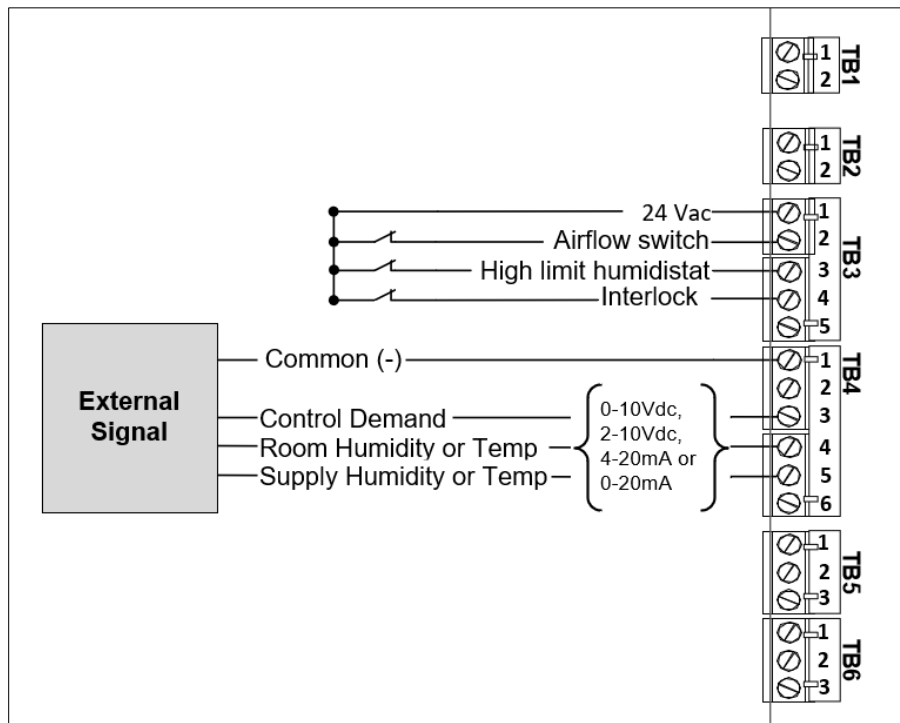


Illustration 17 - Control Signal from External Device

Network Communication

If the control signal is from a BACnet MS/TP or Modbus RTU network, connect terminals TB2 1&2 to the network (RS485 A+ & B-).

If the control signal is from a HRL24, connect terminals TB1 1&2 to the network (RS485 A+ & B-).

The network control signal(s) must be selected by accessing the *Control* sub-menu located in the *Installation* menu (see page 34). To setup the communication parameters, access the *Integration* menu (see page 39).



Note: BACnet MS/TP is configured by default. To change the communication interface to Modbus RTU, access the NtwrkOption setting located in the Network sub-menu of the Integration menu (see page 39).

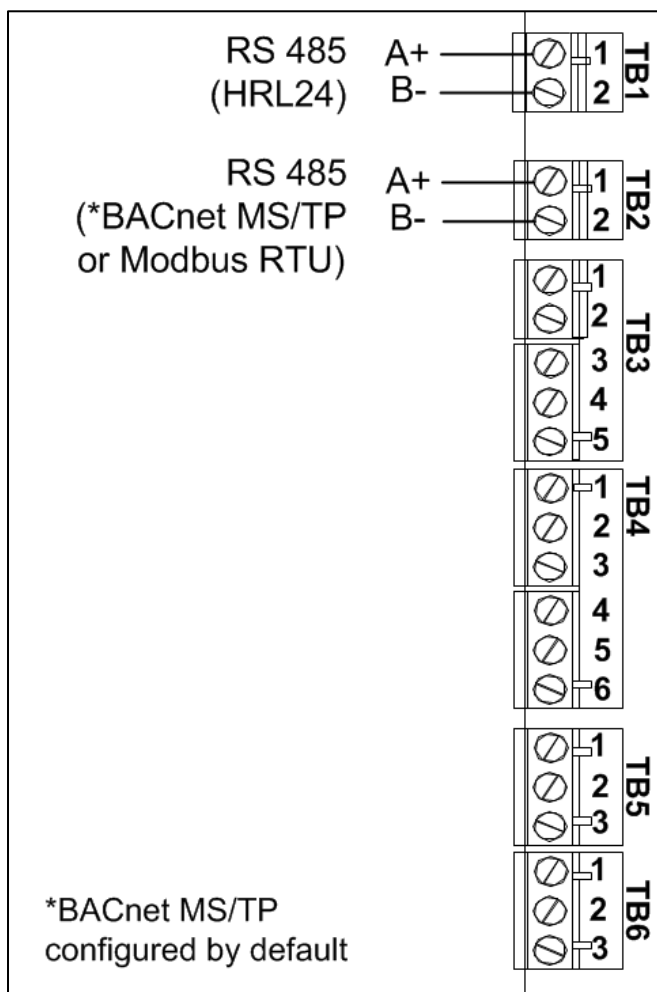


Illustration 18 - Network Communication Connections



HRL24 Control

The SKVF can be controlled remotely to monitor and control the humidity and temperature levels in a given room using the HRL24 room humidistat/thermostat.

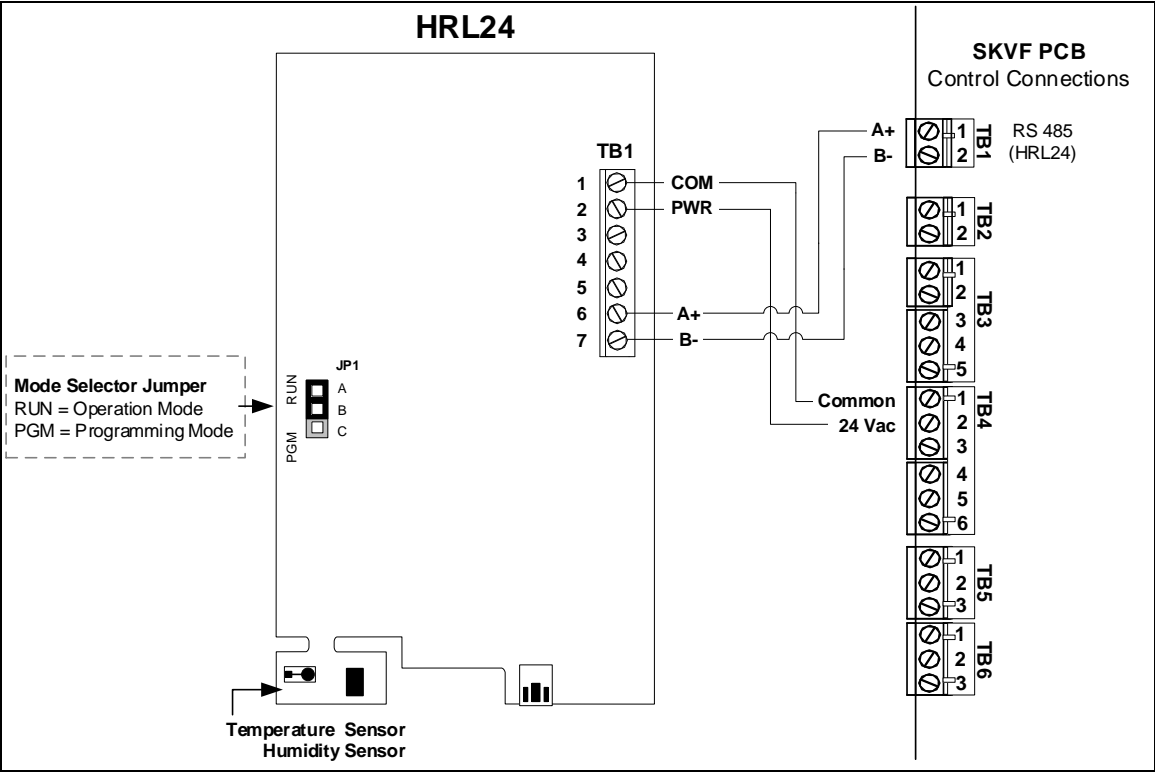


Illustration 19 - HRL24 Wiring

Mode Selection (JP1)

<p>JP1</p> <p><input checked="" type="checkbox"/> RUN</p> <p><input type="checkbox"/> PGM</p>	<p>RUN: HRL24 is in <u>Operation Mode</u>. The HRL24 must be set in this mode to operate properly. If not locked, setpoint can be modified by the end user.</p>
<p>JP1</p> <p><input type="checkbox"/> RUN</p> <p><input checked="" type="checkbox"/> PGM</p>	<p>PGM: HRL24 is set in <u>Programming Mode</u>.</p>



Controller Configuration

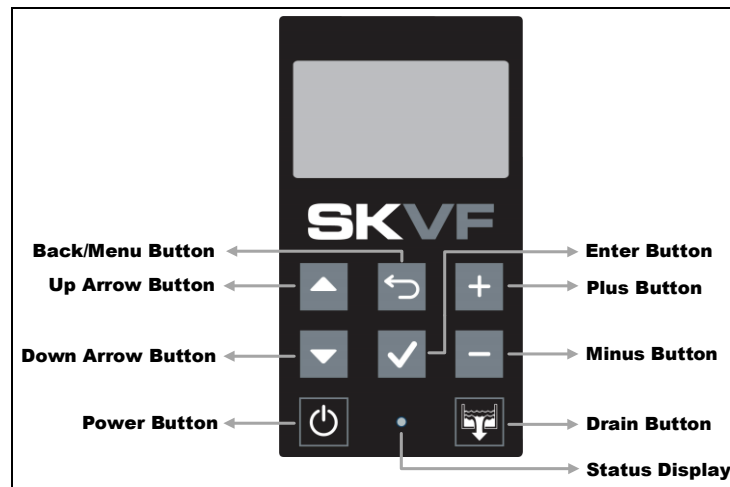













Illustration 20 - SKVF Controller

Controller Features

The following are the features of the Controller and their description:

Table 7 - Evaporative Cooler Controller Description

Feature		Description
Status Display	 (Blue)	Indicates that the evaporative cooler is turned on. The LED will begin blinking as the system is initializing.
	 (Red)	Indicates that the evaporative cooler is issuing an alarm or warning and that the system must be verified.
	 (Off)	Indicates that the evaporative cooler is turned off.
Power Button		The power button is used to turn the evaporative cooler on or off. Must be pressed and held for 3 seconds to perform the related action, in order to prevent accidental activation. Even when the evaporative cooler is powered off, the controller remains operational.
Drain Button		The drain button is used to manually activate the drain cycle. Must be pressed and held for 3 seconds to perform the related action, in order to prevent accidental activation. Even when the evaporative cooler is powered off, a manual drain cycle may be initiated. <i>Once the manual drain cycle is completed, the system will automatically be powered off. To turn the evaporative cooler back on, press and hold the power button.</i>
Up and Down Arrow Buttons		The up arrow button is used to scroll to the next menu item or parameter.
		The down arrow button is used to scroll to the previous menu item or parameter.
Plus and Minus Buttons		The plus button is used to increase the value of the displayed parameter.
		The minus button is used to decrease the value of the displayed parameter.
Back/Menu Button		The back/menu button is used to go to previous menu or to access the Main Menu page from the Idle Screen.
Enter Button		The enter button is used to advance to the next sub-menu, to access selected option or to confirm set parameter value.



Idle Screen

When the controller is in operation, the unit displays the following information on the Idle Screen:

Table 8 - Idle Screen Display Description

Setting	Default	Range (* indicates no configuration; display only)	Description/Notes
Demand:	Current value	* (min: 0.00%, max: 100.00%)	Displays the demand value of the evaporative cooler.
State:	Current value	* (Off, LineRinse, Idle, Filling, Draining, Running, Alarm)	Displays the current state of operation of the evaporative cooler.
ControlState:	Current value	* (Off, Normal, LowLimit, HighLimit, NoAirFlow, Interlock)	Displays the current state of the safety control circuit and whether the circuit has been disconnected due to a safety switch.

Menu Access

- From the Idle Screen, the Main Menu can be accessed by pressing the Back/Menu button ↩, enabling access to the General menu.
- To view other menu options and perform configurations to the system, press Enter ✓ while on the Idle Screen to advance to the Login Screen, where a valid password must be entered.
- Four different passwords can be used, each granting access to an additional menu option depending on the access level assigned to the provided password.
- If a password of higher access is provided, all menu options accessible with the use of a lower level password will also be unlocked.

Table 9 - Access Levels

Access Level	Password	Menu Unlocked	Description/Notes
1	None	General	Grants access to General menu.
2	2222	User	Grants access to General and User menus.
3	3322	Service	Grants access to General, User and Service menus.
4	4433	Installation	Grants access to General, User, Service and Installation menus.
5	5544	Integration	Grants access to General, User, Service, Installation and Integration menus.



Note: To modify or retrieve lost passwords, please contact factory.



- A. After accessing the Login Screen, use the + or - buttons to increase or decrease the value of the number that is highlighted.
- B. Use the ▲, ▼ buttons to scroll to the next or previous number.
- C. Press Enter ✓ to confirm the password once completed. If you enter the wrong password, the controller displays a "Login Failed" message.
- D. The Back/Menu button ⏪ may also be used to return to the Idle Screen display.



Illustration 21 - Login Screen

Menu Navigation and Configuration

- A. Use the ▲, ▼ buttons to select the desired menu category and press Enter ✓ to advance to the next sub-menu.
- B. Use the + and - buttons to increase and decrease values. Use the ▲, ▼ buttons to scroll to the next or previous parameter. Values are saved as soon as a change is made.
- C. Press the Back/Menu button ⏪ to go back one menu. The current menu location is displayed at the top of the screen.
- D. To exit completely, press the Back/Menu button ⏪ until you return to the Idle Screen. After 5 minutes of inactivity, the controller will automatically return to the Idle Screen.

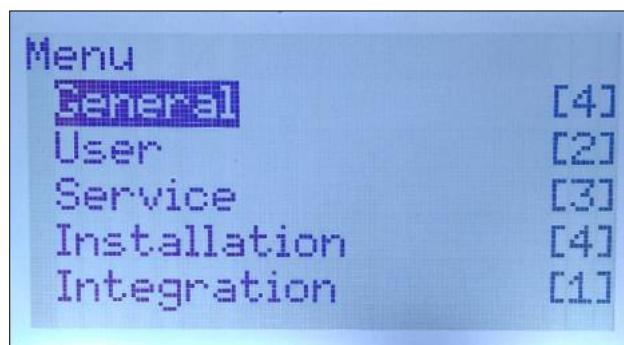


Illustration 22 - Main Menu Page



Note: Available settings and range selections may vary depending on current configuration. The tables in the following sections display all the possible selections. The Description/Notes column indicates the conditions required for the associated setting to appear.

Menu - General [Level 1 - No password required]

Press the back/menu button from the Idle Screen to access the General menu.

Sub-Menu	Setting	Default	Range (* indicates no configuration; display only)	Description/Notes
Status	AirFlow:	Closed	* (Closed, Open)	Displays the status of the airflow switch. If <i>Open</i> is displayed, it indicates that the airflow is not detected by the air pressure switch.
	SupplyHighLimit:	Closed	* (Closed, Open)	Displays the status of the high limit contact. If <i>Open</i> is displayed, it indicates that the humidity level has exceeded the setpoint on the high limit humidistat.
	Interlock:	Closed	* (Closed, Open)	Displays the status of the interlock. If <i>Open</i> is displayed, it indicates that the evaporative cooler is stopped as a result of the interlock safety being open.
	BinExtDemand	<i>Current value</i>	* (0%, 100%)	Displays the demand value when in On/Off control mode. (Only appears if <i>BinDemandSrc</i> is set to <i>BinaryExtDemand</i>.)
	Demand:	<i>Current value</i>	* (min: 0%, max: 100%)	Displays the demand value of the evaporative cooler.
	WtrServiceDue:	No	* (No, Yes)	Displays whether the 5µm pre-filter and silver ion cartridges are due for replacement.
	ServiceDue:	No	* (No, Yes)	Displays whether the evaporative cooler is due for servicing.
	State:	<i>Current value</i>	* (Off, Idle, LineRinse, Filling, Draining, Running, Alarm, Drying)	Displays the current state of operation of the evaporative cooler.
	OccupancyState:	Occupied	* (Occupied, Unoccupied, Vacant, Off)	Displays the current occupancy state.
	ControlState:	<i>Current value</i>	* (Off, Normal, LowLimit, HighLimit, NoAirFlow, Interlock)	Displays the current state of the safety control circuit and whether the circuit has been disconnected due to a safety switch.
Control	RoomRHDemand:	<i>Current value</i>	* (min: 0%, max: 100%)	Displays the room humidity demand value. (Only appears if <i>ControlProfile</i> is set to an internal humidity mode or <i>DemandSrc</i> is set to <i>HumRoomDemand</i>.)
	RoomTempDemand:	<i>Current value</i>	* (min: 0%, max: 100%)	Displays the room temperature demand value. (Only appears if <i>ControlProfile</i> is set to an internal cooling mode or <i>DemandSrc</i> is set to <i>TempRoomDemand</i>.)
	RHSupplyHLDemand:	<i>Current value</i>	* (min: 0%, max: 100%)	Displays the supply high limit humidity demand value. (Only appears if <i>ModHLProfile</i> is set to an internal humidity mode or <i>HighLimitSrc</i> is set to <i>SupplyHLDemand</i>.)
	TempSupplyHLDemand:	<i>Current value</i>	* (min: 0%, max: 100%)	Displays the supply high limit temperature demand value. (Only appears if <i>ModHLProfile</i> is set to an internal cooling mode or <i>HighLimitSrc</i> is set to <i>SupplyTempDemand</i>.)
Physical IO	AirFlow:	Closed	* (Closed, Open)	Displays the status of the airflow switch. If <i>Open</i> is displayed, it indicates that the airflow is not detected by the air pressure switch.
	SupplyHighLimit:	Closed	* (Closed, Open)	Displays the status of the high limit contact. If <i>Open</i> is displayed, it indicates that the humidity level has exceeded the setpoint on the high limit humidistat.



Sub-Menu	Setting	Default	Range (* indicates no configuration; display only)	Description/Notes
Physical IO	Interlock:	Closed	* (Closed, Open)	Displays the status of the interlock. If <i>Open</i> is displayed, it indicates that the evaporative cooler is stopped as a result of the interlock safety being open.
	BinExtDemand:	0%	* (0%, 100%)	Displays the demand value when in On/Off control mode. (Only appears if <i>BinDemandSrc</i> is set to <i>BinaryExtDemand</i>.)
	ControlInput:	Current value	* (min: 0%, max: 100%) or * (min: -40.0°F, max: 212.0°F) * [min: -40.0°C, max: 100.0°C] Units: C, F	Displays the current control input reading. (Does not appear if <i>ControlProfile</i> is set to <i>InternHumNetwork</i>, <i>InternCoolNetwork</i>, <i>HRL Hum</i> or <i>HRL Cool</i>.) (Values are displayed in °C or °F when <i>ControlProfile</i> is set to <i>InternCoolAnalog</i>.)
	RoomRH:	Current value	* (min: 0%, max: 100%)	Displays the room humidity reading value. (Only appears if <i>ControlProfile</i> is set to <i>InternAnalog</i> or <i>RHSrc</i> is set to <i>RoomRH</i>.)
	RoomTemp:	Current value	* (min: -40.0°F, max: 212.0°F) * [min: -40.0°C, max: 100.0°C] Units: C, F	Displays the room temperature reading value. (Only appears if <i>ControlProfile</i> is set to <i>InternCoolAnalog</i> or <i>TempSrc</i> is set to <i>RoomTemp</i>.)
	SupplyHLRH:	Current value	* (min: 0%, max: 100%)	Displays the supply high limit humidity reading value. (Only appears if <i>ModHLPProfile</i> is set to <i>InternAnalog</i> or <i>RHSrc</i> is set to <i>SupplyHLRH</i>.)
	SupplyHLTemp:	Current value	* (min: -40.0°F, max: 212.0°F) * [min: -40.0°C, max: 100.0°C] Units: C, F	Displays the supply high limit temperature reading value. (Only appears if <i>ModHLPProfile</i> is set to <i>InternCoolAnalog</i> or <i>TempSrc</i> is set to <i>SupplyTemp</i>.)
	FanFeedBack:	Current value	* (min: 0Hz, max: 30000Hz)	Displays the feedback value from the ECM fan.
	FanFeedBack2:	Current value	* (min: 0Hz, max: 30000Hz)	Displays the feedback value from the second ECM fan. (Only applicable for SKVF-x60 models.)
	FloatSwitch:	Current value	* (Inactive, Active)	Displays the status of the float switch. (Only appears for SKVF-R models.)
	WtrLeakDet:	Ok	* (Ok, Leak)	Displays whether a water leak has been detected. If <i>Leak</i> is displayed, it indicates that there is a leak within the water line.
	RelayFuse:	Normal	* (Normal, Blown Fuse)	Displays the current status of the PCB fuse. If <i>Blown Fuse</i> is displayed, the fuse must be replaced.
	PowerFdbck:	Current value	* (min: 0%, max: 100%)	Displays the value of the power output feedback.
	AlarmRelay:	Current value	* (Off, On)	Displays the status of the alarm warning relay.
	ServiceRelay:	Current value	* (Off, On)	Displays the status of the service warning relay.
	WaterSupplyValve:	Current value	* (Off, On)	Displays the status of the normally open water supply valve.
	DrainValve:	Current value	* (Off, On)	Displays the status of the normally open drain valve. (Only appears for SKVF-R models.)
	Pump:	Current value	* (Off, On)	Displays the status of the circulation pump. (Only appears for SKVF-R models.)
	ECMFanSig:	Current value	* (min: 0V, max: 10V)	Displays the control signal value of the ECM fan.
System	SysStatus:	Operational	* (Operational, Operational Read-Only, Download required, Download in progress, Non-operational, Backup in progress)	Displays the current system status.
	Vendor:	Neptronic	*	Displays the name of the vendor of the product. (Always Neptronic)

Sub-Menu	Setting	Default	Range (* indicates no configuration; display only)	Description/Notes
System	Model:	-	*	Displays the evaporative cooler model number.
	AppVersion:	1.00.20211018	*	Displays the current application software version.
	SerialNo:	-	*	Displays the serial number of the evaporative cooler.
	Profile:	-	*	Displays a short profile for the configured device.
	MCULoad:	<i>Current value</i>	* (min: 0%, max: 100%)	Displays the current microcontroller load.
	MemoryLoad:	<i>Current value</i>	* (min: 0%, max: 100%)	Displays the current memory load.
	Runtime:	<i>Current value</i>	* (min: 0 sec, max: 999999999 sec)	Displays the number of seconds that the system has been powered on. This value is reset every time the system is shut off.
	ResetReason:	None	* (None, BOR, Pin, POR, Soft, IWDG, WWDG, LPWR, Unknown)	Displays the reason for the previous system reset: <i>None = No Reset; BOR = Brownout Reset; Pin = Pin Reset (using PCB Reset Button); POR = Power-on Reset; Soft = Software Reset; IWDG = Independent Watchdog; WWDG = Windowed Watchdog; LPWR = Low Power Reset; Unknown = Unknown Cause</i>

Menu - User Settings [Level 2 - Requires level 2 (or higher) password in order to access]

Sub-Menu	Setting	Default	Range	Description/Notes
Command	OccupSchedule:	-	00:00 Monday to Sunday Event 1 to Event 6	Create a customized occupancy schedule with up to six events per day.
Control	RoomDemandLoop [3]			Only appears if <i>ControlProfile</i> is set to an internal humidity mode or <i>DemandSrc</i> is set to <i>HumRoomDemand</i>.
	OccStp:	40.0%	min: 0.0%, max: 100.0%	Define the room humidity demand setpoint value used during <i>Occupied</i> state. (Only appears if <i>StptSrc</i> is set to <i>Internal</i>.)
	UnoccStp:	30.0%	min: 0.0%, max: 100.0%	Define the room humidity demand setpoint value used during <i>Unoccupied</i> state.
	VacantStp:	20.0%	min: 0.0%, max: 100.0%	Define the room humidity demand setpoint value used during <i>Vacant</i> state.
	RoomTempDemandLoop [3]			Only appears if <i>ControlProfile</i> is set to an internal cool mode or <i>DemandSrc</i> is set to <i>TempRoomDemand</i>.
	OccStp:	71.6°F [22.0°C]	* (min: 32.0°F, max: 104.0°F) * [min: 0.0°C, max: 40.0°C] Units: C, F	Define the room temperature demand setpoint value used during <i>Occupied</i> state. (Only appears if <i>StptSrc</i> is set to <i>Internal</i>.)
	UnoccStp:	75.2°F [24.0°C]	* (min: 32.0°F, max: 104.0°F) * [min: 0.0°C, max: 40.0°C] Units: C, F	Define the room temperature demand setpoint value used during <i>Unoccupied</i> state.
	VacantStp:	78.8°F [26.0°C]	* (min: 32.0°F, max: 104.0°F) * [min: 0.0°C, max: 40.0°C] Units: C, F	Define the room temperature demand setpoint value used during <i>Vacant</i> state.
	RHSupplyHLLoop [3]			Only appears if <i>ModHLLProfile</i> is set to an internal humidity mode or <i>HighLimitSrc</i> is set to <i>SupplyHLLDemand</i>.
	OccStp:	80.0%	min: 0.0%, max: 100.0%	Define the supply high limit humidity demand setpoint value used during <i>Occupied</i> state.
	UnoccStp:	80.0%	min: 0.0%, max: 100.0%	Define the supply high limit humidity demand setpoint value used during <i>Unoccupied</i> state.
	VacantStp:	80.0%	min: 0.0%, max: 100.0%	Define the supply high limit humidity demand setpoint value used during <i>Vacant</i> state.
	TempSupplyHLLoop [3]			Only appears if <i>ModHLLProfile</i> is set to an internal cool mode or <i>HighLimitSrc</i> is set to <i>SupplyTempDemand</i>.
	OccStp:	59.00°F [15.0°C]	* (min: 32.00°F, max: 104.00°F) * [min: 0.0°C, max: 40.0°C] Units: C, F	Define the supply high limit temperature demand setpoint value used during <i>Occupied</i> state.
	UnoccStp:	60.80°F [16.0°C]	* (min: 32.00°F, max: 104.00°F) * [min: 0.0°C, max: 40.0°C] Units: C, F	Define the supply high limit temperature demand setpoint value used during <i>Unoccupied</i> state.
	VacantStp:	62.60°F [17.0°C]	* (min: 32.00°F, max: 104.00°F) * [min: 0.0°C, max: 40.0°C] Units: C, F	Define the supply high limit temperature demand setpoint value used during <i>Vacant</i> state.
System	UTCOffset:	-300min	min: -720min, max: 720min	Configure the value of the UTC offset.
	DaylightSavings:	No	No, Yes	Select whether to enable daylight savings or not.
	LocalDateTime:	YYYY-MM-DD 00:00:00		Configure the current date and time.

Sub-Menu	Setting		Default	Range	Description/Notes
Interface	LocalDisplay		[5]		
		BacklightLvl:	25%	min: 0%, max: 100%	Select the backlight level of the LCD screen.
		Contrast:	10%	min: 0%, max: 30%	Select the contrast level of the LCD screen.
		KeypadBuzzer:	Inactive	Inactive, Active	Select whether to enable or disable the key press sound.
		Language:	English	English	Select the device language.
		Units:	Imperial	Metric, Imperial	Select whether to use a metric or imperial system of units for the local device.
	HRL		[3]		For units connected to the HRL24 controller.
		Temperature:	<i>Current value</i>	* (min: -40.0°F, max: 500.0°F) * [min: -40.0°C, max: 260.0°C] Units: C, F	Displays the room temperature value measured by the HRL24 controller.
		Humidity:	<i>Current value</i>	* (min: 0.0%, max: 100.0%)	Displays the room humidity value measured by the HRL24 controller.
		LockSetpnt:	Unlock	Unlock, Lock	Displays whether the setpoint obtained from the HRL24 controller can be modified or not.

Menu - Service [Level 3 - Requires level 3 (or higher) password in order to access]

Sub-Menu	Setting	Default	Range (* indicates no configuration; display only)	Description/Notes
Status	RunTime:	0.00hr	*	Displays the total runtime of the unit.
	OnTime:	0.00hr	*	Displays the total operating time of the unit.
	WtrServOnTime:	0.00hr	*	Displays the operating time of the 5µm pre-filter and silver ion cartridges, since the last servicing.
	ServOnTime:	0.00hr	*	Displays the operating time of the unit, since the last servicing.
	WtrServiceDue:	No	* (No, Yes)	Displays whether the 5µm pre-filter and silver ion cartridges are due for replacement.
	ServiceDue:	No	* (No, Yes)	Displays whether the evaporative cooler is due for servicing.
Command	DrainSchedule:	-	00:00 Monday to Sunday Event 1 to Event 6	Create a customized draining schedule with up to six events per day. (Only appears for SKVF-R models.)
	Request:	None	None, ResetAlarms, Drain, ResetServCnt, ResetWtrServCnt, Filling	Perform one of the following actions for the evaporative cooler: reset warning alarms, initiate a drain cycle, reset service counters for the unit, reset service counters for the 5µm pre-filter and silver ion cartridges or fill the unit with water. (Drain and Filling options only appear for SKVF-R models.)
	FanRequest:	Default	Off, Default, On	Perform one of the following actions for the fan: turn off the fan, default operation, turn on the fan at maximum speed.
	PumpRequest:	Default	Off, Default, On	Perform one of the following actions for the circulation pump: turn off the pump, default operation, turn on the pump. (Only appears for SKVF-R models.)
	WtrSupRequest:	Default	Off, Default, On	Perform one of the following actions for the water supply valve: turn off the water supply valve, default operation, turn on the water supply valve. (Only appears for SKVF-D models.)

Menu - Installation [Level 4 - Requires level 4 (or higher) password in order to access]

Sub-Menu	Setting	Default	Range (* indicates no configuration; display only)	Description/Notes
Import User Config				Import all the evaporative cooler configuration values onto the SD card or USB device. A SD card or USB device must be inserted in order to import the values.
Export User Config				Export all the evaporative cooler configuration values onto the SD card or USB device. A SD card or USB device must be inserted in order to export the values.
Quick Config	ServInterval:	1000hr	min: 1000hr, max: 3000hr	Set the time of operation before the evaporative cooler calls for servicing.
	DrainInterval:	4hr	min: 1hr, max: 24hr	Set the frequency of the drain cycle when the unit is in operation. In general, a more frequent drain cycle is required as the water hardness level rises. (Only appears for SKVF-R models.)
	FixedDrainTime:	6hr	min: 4hr, max: 72hr	Set the amount of time after which the unit will have to drain regardless of whether it was in operation or not. (Only appears for SKVF-R models.)
	LineRinseTime:	180sec	min: 0sec, max: 2000sec	Set the duration period for the pipe line rinse cycle performed upon start-up of the evaporative cooler. (Only appears for SKVF-R models.)
	WtrServInterval:	1000hr	min: 1000hr, max: 3000hr	Set the time of operation before the evaporative cooler calls for servicing.
	RunWhileWtrServiceAlarm:	Allowed	Not Allowed, Allowed	Select whether to enable the unit to continue operating, even when the 5µm pre-filter and silver ion cartridges are due for replacement. When set to <i>Allowed</i> , the unit will continue operating even when a service alarm is active.
	StartupLineRinse:	Off	Off, On	Select whether to perform an automatic pipe line rinse cycle upon each start-up of the evaporative cooler. (Only appears for SKVF-R models.)
	RunWhileServiceAlarm:	Allowed	Not Allowed, Allowed	Select whether to enable the unit to continue operating, even when it is due for servicing. When set to <i>Allowed</i> , the unit will continue operating even when a service alarm is active.
Control	ControlProfile:	ExternAnalog	ExternAnalog, ExternNetwork, InternHumAnalog, InternHumNetwork, InternCoolAnalog, InternCoolNetwork, HRL Hum, HRL Cool, Custom	Select a preconfigured control mode profile for the modulating humidity demand. Select the <i>Custom</i> option to configure individual settings. (Network options only applicable for models connected to BACnet or Modbus.)
	ModHLPProfile:	Disabled	Disabled, ExternAnalog, ExternNetwork, InternHumAnalog, InternHumNetwork, InternCoolAnalog, InternCoolNetwork, Custom	Select a preconfigured control mode profile for the modulating high limit demand. Select the <i>Custom</i> option to configure individual settings. (Network options only applicable for models connected to BACnet or Modbus.)
	RoomRHDemandLoop [6]			Only appears if ControlProfile is set to an internal humidity mode or DemandSrc is set to HumRoomDemand.
	PropGain:	28.5	min: 1.0, max: 200.0	Set the value of the room humidity demand proportional gain.
	ITime:	15.0sec	min: 0.0sec, max: 900.0sec	Set the value of the room humidity demand integral time.
	DTime:	0.0sec	min: 0.0sec, max: 60.0sec	Set the value of the room humidity demand derivative time.
	ProbBand:	5.0%	min: 1.0%, max: 100.0%	Set the value of the room humidity demand proportional band.
	RHSrc:	None	None, RoomRH, Network, HRL	Select the reading source for the room humidity demand. (Network option only applicable for models connected to BACnet or Modbus.)
	StptSrc:	None	None, Internal, ControllInput	Select the room humidity demand setpoint source.



Sub-Menu	Setting	Default	Range (* indicates no configuration; display only)	Description/Notes
Control	RoomTempDemandLoop [6]			Only appears if ControlProfile is set to an internal cool mode or DemandSrc is set to TempRoomDemand.
	PropGain:	28.5	min: 1.0, max: 200.0	Set the value of the room temperature demand proportional gain.
	ITime:	15.0sec	min: 0.0sec, max: 900.0sec	Set the value of the room temperature demand integral time.
	DTime:	0.0sec	min: 0.0sec, max: 60.0sec	Set the value of the room temperature demand derivative time.
	ProbBand:	5.0%	min: 1.0%, max: 100.0%	Set the value of the room temperature demand proportional band.
	TempSrc:	None	None, RoomRH, Network, HRL	Select the reading source for the room temperature demand. (Network option only applicable for models connected to BACnet or Modbus.)
	StptSrc:	None	None, Internal, ControllInput	Select the room temperature demand setpoint source.
	RHSupplyHLLoop [6]			Only appears if ModHLProfile is set to an internal humidity mode or HighLimitSrc is set to SupplyHLDemand.
	PropGain:	28.5	min: 1.0, max: 200.0	Set the value of the supply high limit humidity demand proportional gain.
	ITime:	15.0sec	min: 0.0sec, max: 900.0sec	Set the value of the supply high limit humidity demand integral time.
	DTime:	0.0sec	min: 0.0sec, max: 60.0sec	Set the value of the supply high limit humidity demand derivative time.
	ProbBand:	10.0%	min: 1.0%, max: 100.0%	Set the value of the supply high limit humidity demand proportional band.
	RHSrc:	None	None, SupplyHLRH, Network	Select the reading source for the supply high limit humidity demand. (Network option only applicable for models connected to BACnet or Modbus.)
	StptSrc:	None	None, Internal, ControllInput	Select the supply high limit humidity demand setpoint source.
	TempSupplyHLLoop [6]			Only appears if ModHLProfile is set to an internal cool mode or HighLimitSrc is set to SupplyTempDemand.
	PropGain:	28.5	min: 1.0, max: 200.0	Set the value of the supply high limit temperature demand proportional gain.
	ITime:	15.0sec	min: 0.0sec, max: 900.0sec	Set the value of the supply high limit temperature demand integral time.
	DTime:	0.0sec	min: 0.0sec, max: 60.0sec	Set the value of the supply high limit temperature demand derivative time.
	ProbBand:	10.0%	min: 1.0%, max: 100.0%	Set the value of the supply high limit temperature demand proportional band.
	TempSrc:	None	None, SupplyHLRH, Network	Select the reading source for the supply high limit temperature demand. (Network option only applicable for models connected to BACnet or Modbus.)
	StptSrc:	None	None, Internal, ControllInput	Select the supply high limit temperature demand setpoint source.
	UnitControl [4]			
	NtwkTimeout:	900sec	min: 1sec, max: 900sec	Define the amount of time the evaporative cooler may attempt to connect to the BACnet or Modbus network before it stops operating due to a communication error. (Only appears if ControlProfile or ModHLProfile are set to InternNetwork or ExternNetwork.)
	DemandSrc:	None	None, ControllInput, HumRoomDemand, Network, TempRoomDemand	Select the control demand source for the evaporative cooler. (Network option only applicable for models connected to BACnet or Modbus.)
	HighLimitSrc:	None	None, ControllInput, SupplyHLDemand, Network, SupplyTempDemand	Select the control high limit source for the evaporative cooler. (Network option only applicable for models connected to BACnet or Modbus.)
	BinDemandSrc:	None	None, BinaryExtDemand	Select the demand source when in On/Off control mode.



Sub-Menu	Setting		Default	Range (* indicates no configuration; display only)	Description/Notes
Physical IO	ControllInput [6]				Does not appear if ControlProfile is set to InternHumNetwork, InternCoolNetwork, HRL Hum or HRL Cool.
	Signal:		0.000V	* (min: 0.000V, max: 15.000V)	Displays the value of the humidity demand control analog input signal.
	ControllInput:		0.0% or 68°F [20.0°C]	* (min: 0.0%, max: 100.0%) or * (min: -40.0°F, max: 302.0°F) * [min: -40.0°C, max: 150.0°C] Units: C, F	Displays the actual value of the humidity demand control analog input. (Values are displayed in °C or °F when ControlProfile is set to InternCoolAnalog.)
	Min:		0.0% or 32°F [0.0°C]	min: 0.0%, max: 100.0% or * (min: -40.0°F, max: 302.0°F) * [min: -40.0°C, max: 150.0°C] Units: C, F	Set the minimum value of the humidity demand control analog input. (Values are displayed in °C or °F when ControlProfile is set to InternCoolAnalog.)
	Max:		100.0% or 104°F [40.0°C]	min: 0.0%, max: 100.0% or * (min: -40.0°F, max: 302.0°F) * [min: -40.0°C, max: 150.0°C] Units: C, F	Set the maximum value of the humidity demand control analog input. (Values are displayed in °C or °F when ControlProfile is set to InternCoolAnalog.)
	Bias:		0.0% or 0.00Δ°F [0.00Δ°C]	min: -10.0%, max: 10.0% or min: -18.00Δ°F, max: 18.00Δ°F [min: -10.00Δ°C, max: 10.00Δ°C] Units: Δ°C, Δ°F	Set the bias value for the humidity demand control analog input. (Values are displayed in Δ°C or Δ°F when ControlProfile is set to InternCoolAnalog.)
	SignalType:		0-10Vdc	0-10Vdc, 2-10Vdc, 4-20mA, 0-20mA	Select the signal type for the humidity demand control analog input.
	RoomRH [6]				Only appears if ControlProfile is set to an InternHumAnalog or DemandSrc is set to HumRoomDemand.
	Signal:		0.000V	* (min: 0.000V, max: 15.000V)	Displays the value of the room humidity analog input signal.
	RoomRH:		0.0%	* (min: 0.0%, max: 100.0%)	Displays the actual value of the room humidity analog input.
	Min:		0.0%	min: 0.0%, max: 100.0%	Set the minimum value of the room humidity analog input.
	Max:		100.0%	min: 0.0%, max: 100.0%	Set the maximum value of the room humidity analog input.
	Bias:		0.0%	min: -10.0%, max: 10.0%	Set the bias value for the room humidity analog input.
	SignalType:		0-10Vdc	0-10Vdc, 2-10Vdc, 4-20mA, 0-20mA	Select the signal type for the room humidity analog input.
	RoomTemp [6]				Only appears if ControlProfile is set to an InternCoolAnalog or DemandSrc is set to TempRoomDemand.
	Signal:		0.000V	* (min: 0.000V, max: 15.000V)	Displays the value of the room temperature analog input signal.
	RoomTemp:		68°F [20.0°C]	* (min: -40.0°F, max: 302.0°F) * [min: -40.0°C, max: 150.0°C] Units: C, F	Displays the actual value of the room temperature analog input.
	Min:		32°F [0.0°C]	* (min: -40.0°F, max: 302.0°F) * [min: -40.0°C, max: 150.0°C] Units: C, F	Set the minimum value of the room temperature analog input.
	Max:		104°F [40.0°C]	* (min: -40.0°F, max: 302.0°F) * [min: -40.0°C, max: 150.0°C] Units: C, F	Set the maximum value of the room temperature analog input.
	Bias:		0.00Δ°F [0.00Δ°C]	min: -18.00Δ°F, max: 18.00Δ°F [min: -10.00Δ°C, max: 10.00Δ°C] Units: Δ°C, Δ°F	Set the bias value for the room temperature analog input.
	SignalType:		0-10Vdc	0-10Vdc, 2-10Vdc, 4-20mA, 0-20mA	Select the signal type for the room temperature analog input.



Sub-Menu	Setting	Default	Range (* indicates no configuration; display only)	Description/Notes
Physical IO	SupplyHLRH [6]			Only appears if ModHLProfile is set to an internal humidity mode InternHumAnalog or HighLimitSrc is set to SupplyHLDemand.
	Signal:	0.000V	* (min: 0.000V, max: 15.000V)	Displays the value of the supply high limit humidity analog input signal.
	SupplyHLRH:	0.0%	* (min: 0.0%, max: 100.0%)	Displays the actual value of the supply high limit humidity analog input.
	Min:	0.0%	min: 0.0%, max: 100.0%	Set the minimum value of the supply high limit humidity analog input.
	Max:	0.0%	min: 0.0%, max: 100.0%	Set the maximum value of the supply high limit humidity analog input.
	Bias:	0.0%	min: -10.0%, max: 10.0%	Set the bias value for the supply high limit humidity analog input.
	SignalType:	0-10Vdc	0-10Vdc, 2-10Vdc, 4-20mA, 0-20mA	Select the signal type for the supply high limit humidity analog input.
	SupplyHLTemp [6]			Only appears if ModHLProfile is set to an InternHumAnalog or HighLimitSrc is set to SupplyTempDemand.
	Signal:	0.000V	* (min: 0.000V, max: 15.000V)	Displays the value of the supply high limit temperature analog input signal.
	SupplyHLTemp:	68°F [20.0°C]	* (min: -40.0°F, max: 302.0°F) * [min: -40.0°C, max: 150.0°C] Units: C, F	Displays the actual value of the supply high limit temperature analog input.
	Min:	32°F [0.0°C]	* (min: -40.0°F, max: 302.0°F) * [min: -40.0°C, max: 150.0°C] Units: C, F	Set the minimum value of the supply high limit temperature analog input.
	Max:	104°F [40.0°C]	* (min: -40.0°F, max: 302.0°F) * [min: -40.0°C, max: 150.0°C] Units: C, F	Set the maximum value of the supply high limit temperature analog input.
	Bias:	0.00Δ°F [0.00Δ°C]	min: -18.00Δ°F, max: 18.00Δ°F [min: -10.00Δ°C, max: 10.00Δ°C] Units: Δ°C, Δ°F	Set the bias value for the supply high limit temperature analog input.
	SignalType:	0-10Vdc	0-10Vdc, 2-10Vdc, 4-20mA, 0-20mA	Select the signal type for the supply high limit temperature analog input.
	FloatSig:	0.000V	* (min: 0.000V, max: 10.000V)	Displays the value of the float sensor signal. (Only appears for SKVF-R models.)
	PowerOutFdbck [5]			
	Signal:	0.000V	* (min: 0.000V, max: 10.000V)	Displays the value of the power output feedback signal.
	Bias:	0.000V	min: 0.000V, max: 10.000V	Set the bias value for the power output feedback signal.
	Min:	0.000V	min: 0.000V, max: 10.000V	Set the minimum value of the power output feedback signal.
	Max:	10.00V	min: 0.000V, max: 10.000V	Set the maximum value of the power output feedback signal.
	PowerFdbck:	0.00%	* (min: 0.00%, max: 100.00%)	Displays the value of the power output feedback.
System	ResetFactory:	No	No, Yes	Select Yes in order to reset the evaporative cooler back to its original factory configuration settings. WARNING: There is no way to recover previous configurations once the device has been reset.
Extended Config	InstallationDate:	YYYY/MM/DD		Set the device installation date.
	AlarmBuzzer:	Disabled	Normal, Disabled	Select whether to enable or disable the alarm buzzer sound whenever there is a system warning. This will not affect the Status Display LED.
	SysLogLevel:	Debug	None, Emergency, Alert, Critical, Error, Warning, Notice, Info, Debug	Select the type of information to be stored on log file. (The unit must be connected to an SD card or USB device.)
	DeadBand:	5%	min: 1%, max: 100%	Set the deadband value for the demand.
	MinProdOut:	10%	min: 0%, max: 100%	Set the minimum production output value for the fan.
	MaxProdOut:	100%	min: 0%, max: 100%	Set the maximum production output value for the fan.



Sub-Menu	Setting	Default	Range (* indicates no configuration; display only)	Description/Notes
Extended Config	FanOnDelay:	15min	min: 0min, max: 300min	Set the amount of time after which the fan will run at the DryFanSpeed value when there is no demand.
	DryFanSpeed:	0%	min: 0%, max: 100%	Set the speed at which the fan will run after the FanOnDelay time has passed when there is no demand.
	ServInterval:	1000hr	min: 1000hr, max: 3000hr	Set the time of operation before the evaporative cooler calls for servicing.
	DilutionRatio:	100%	min: 0%, max: 150%	Set the dilution ratio to specify how much water will be drained during each dilution cycle. (Only appears for SKVF-R models.)
	DrainInterval:	4hr	min: 1hr, max: 24hr	Set the frequency of the drain cycle when the unit is in operation. In general, a more frequent drain cycle is required as the water hardness level rises. (Only appears for SKVF-R models.)
	FixedDrainTime:	6hr	min: 4hr, max: 72hr	Set the amount of time after which the unit will have to drain regardless of whether it was in operation or not. (Only appears for SKVF-R models.)
	LineRinseTime:	180sec	min: 0sec, max: 2000sec	Set the duration period for the pipe line rinse cycle performed upon start-up of the evaporative cooler. (Only appears for SKVF-R models.)
	WtrServiceInterval:	1000hr	min: 1000hr, max: 3000hr	Set the time of operation before the 5µm pre-filter and silver ion cartridges call for replacement.
	WtrSupDutyCycle:	10%	min: 8%, max: 70%	Set the percentage of time that the water supply valve will stay on during the water supply period defined by WtrSupPeriod . (Only appears for SKVF-D models.)
	WtrSupPeriod:	60sec	min: 0sec, max: 180sec	Set the amount of time required to complete an on and off cycle for the water supply valve. (Only appears for SKVF-D models.)
	RunWhileWtrServiceAlarm:	Allowed	Not Allowed, Allowed	Select whether to enable the unit to continue operating, even when the 5µm pre-filter and silver ion cartridges are due for replacement. When set to <i>Allowed</i> , the unit will continue operating even when a service alarm is active.
	StartupLineRinse:	Off	Off, On	Select whether to perform an automatic tank rinse cycle upon each start-up of the evaporative cooler. (Only appears for SKVF-R models.)
	RunWhileServiceAlarm:	Allowed	Not Allowed, Allowed	Select whether to enable the unit to continue operating, even when it is due for servicing. When set to <i>Allowed</i> , the unit will continue operating even when a service alarm is active.
	CompletelyDryDelay:	2hr	min: 0hr, max: 24hr	Set the duration of time for the drying cycle for the evaporative media.
	HourOfDayDryingCycle:	24hr	min: 0hr, max: 24hr	Set the hour of day during which the drying state of the evaporative media is verified, in order to initiate a drying cycle if necessary.

Menu - Integration [Level 5 - Requires level 5 password in order to access]

Sub-Menu	Setting	Default	Range (* indicates no configuration; display only)	Description/Notes
Network	NtwrkOption:	BACnet	BACnet, Modbus	Select whether to connect to a BACnet MS/TP or Modbus RTU communication interface on terminal TB2 of the SKVF PCB.
	Device [4]			
	DeviceName:	-		Establish a name for the device.
	Location:	-		Establish a designated location for the unit.
	Description:	-		Establish a brief description for the unit.
	DeviceInstance:	0153001 (0x000255a9)		Define the device instance value.
	HTTPServer [1]			
	HttpServerUnits:	Imperial	Metric, Imperial	Select whether to use a metric or imperial system of units for the web server.
	BACnetServer [3]			For models connected to the BACnet network.
	Language:	English	English	Select the language for the BACnet server.
	ListMode:	Integrator	Integrator, Advanced, Factory	Select the category of BACnet objects to display.
	Units:	Imperial	Metric, Imperial	Select whether to use a metric or imperial system of units for the BACnet server.
	BACnetMSTP [10]			Only appears if NtwrkOption is set to BACnet.
	MaxMaster:	127	min: 1, max: 127	Configure MaxMaster value to increase network efficiency when there are less than 127 devices on the network. For optimal efficiency, set value to the highest MAC address in the MS/TP network.
	MaxInfoFrames:	1	min: 1, max: 100	Configure the maximum number of information messages the controller may transmit, before it must pass the token to the next controller.
	AutoBaud:	Yes	No, Yes	Enable or disable automatic baud rate detection.
	BaudRate:	38400	9600, 19200, 38400, 76800	Select the baud rate for data transfer.
	MAC:	001		Set the MS/TP network MAC address.
	RxValid:	0	*	Displays information on the received communication frames for troubleshooting purposes.
	RxInvalid:	0	*	
	RxLost:	0	*	
	Tx:	0	*	Displays information on the transmitted communication frames for troubleshooting purposes.
	TxLost:	0	*	
	BACnetIP [6]			For models connected to BACnet IP.
	RxValid:	0	*	Displays information on the received communication frames for troubleshooting purposes.
	RxInvalid:	0	*	
	RxLost:	0	*	
	Tx:	0	*	Displays information on the transmitted communication frames for troubleshooting purposes.
	TxLost:	0	*	
	BACnetIPPort:	47808	min: 0, max: 65535	Set the User Datagram Protocol (UDP) port number. BACnet port number is set by default.



Sub-Menu	Setting	Default	Range (* indicates no configuration; display only)	Description/Notes
Network	ModbusServer [1]			For models connected to Modbus.
	Units:	Imperial	Metric, Imperial	Select whether to use a metric or imperial system of units for the Modbus server.
	ModbusRTU1In [4]			Only appears if <i>NtwrkOption</i> is set to <i>Modbus</i>.
	MAC:	1	min: 1, max: 247	Set the Modbus MAC address.
	Autobaud:	Yes	No, Yes	Enable or disable automatic baud rate detection.
	PortConfig:	No Parity, 2 Stop Bits	No Parity, 2 Stop Bits Even Parity, 1 Stop bit Odd Parity, 1 Stop bit	Select the Modbus communication port configuration.
	BaudRate:	19200	9600, 14400, 19200, 38400, 57600	Select the baud rate for data transfer.
	ModbusTCP0In [2]			For models connected to Modbus TCP/IP.
	KeepAliveTimeOut:	5min	min: 1min, max: 1440min	Set the amount of time the communication stays open before connection is cut out, when no signal is received from the device.
	ListeningPort:	502	min: 0, max: 65535	Set the communication port number. Modbus TCP port number is set by default.
	SMTP [7]			
	SSL:	Off	Off, On	If turned to <i>On</i> , a secure socket layer will be used to encrypt the communication between the device and the email server (Port value must be set to <i>587</i> and <i>Username</i> and <i>Password</i> settings must be filled out). If turned to <i>Off</i> , the default socket will be used (use Port <i>25</i> to use server without login account or Port <i>587</i> if login details for email account have been entered).
	Port:	25	25, 587	If set to <i>25</i> , server to server email transfer is enabled (can only be used if SSL is set to <i>Off</i>). If set to <i>587</i> , client to server email transfer is enabled.
	ServerAddr:	192.168.100.100		Configure the server IP address for the email account.
	From:	Current value		Set the email address that will be sending the evaporative cooler notification messages.
	To:	Current value		Set the email address that will be receiving the evaporative cooler notification messages.
	Username:	Current value		Set the login username for the email account.
	Password:	Current value		Set the login password for the email account.
	Notify [3]			
	Alarm:	Off	Off, On	If turned to <i>On</i> , then the evaporative cooler alarm messages will be sent to the email configured in the <i>SMTP</i> sub-menu.
	Warning:	Off	Off, On	If turned to <i>On</i> , then the evaporative cooler warning messages will be sent to the email configured in the <i>SMTP</i> sub-menu.
	AppMsg:	Off	Off, On	If turned to <i>On</i> , then the evaporative cooler event messages will be sent to the email configured in the <i>SMTP</i> sub-menu.
	BACnetETH [5]			For models connected to BACnet Ethernet.
	RxValid:	0	*	Displays information on the received communication frames for troubleshooting purposes.
	RxInvalid:	0	*	
	RxLost:	0	*	

Sub-Menu	Setting	Default	Range (* indicates no configuration; display only)	Description/Notes
Network	Tx:	0	*	Displays information on the transmitted communication frames for troubleshooting purposes.
	TxLost:	0	*	
Communication	IPSettings [10]			
	DHCP:	Inactive	Inactive, Active	Select whether to enable Dynamic Host Configuration Protocol (DHCP) to automatically provide an IP address.
	RstIPSetting:	No	No, Yes	Select whether to restart the IP module, in order to allow recent parameter modifications to be effective.
	StaticAddress:	192.168.1.100		Configure the static IP address.
	StaticSubnetMask:	255.255.255.0		Configure the static subnet mask.
	StaticDefaultGateway:	192.168.0.100		Configure the static default gateway.
	StaticDnsServer:	192.168.10.50		Configure the static DNS server.
	ActualAddress:	Current value	*	Displays the actual IP address.
	ActualSubnetMask:	Current value	*	Displays the actual subnet mask.
	ActualDefaultGateway:	Current value	*	Displays the actual default gateway.
	ActualDnsServer:	Current value	*	Displays the actual DNS server.
	ETHSettings [1]			
	EthernetMacAdd:	Current value	*	Displays the MAC address of the Ethernet interface. (Only applicable if using an Ethernet connection.)



List of Alarms

Table 10 - List of Alarms

Display	Description	Alarm Reset
AirFlow	Indicates that the airflow sensor is open. This fault does not trigger the alarm contact (no message will be displayed), but will prevent the SKVF from running. Verify that the signal from the airflow sensor is present at the controller's input on the PCB and verify wiring.	Automatic
SupplyHighLimit	Indicates that the high limit item is open. Verify that the signal from the supply high limit sensor is present at the controller's input on the PCB and verify wiring.	Automatic
Interlock	Indicates that the interlock and the cut-out circuitry are open. This fault does not trigger the alarm contact (no message will be displayed), but will prevent the SKVF from running. Verify that the signal from the interlock sensor is present at the controller's input on the PCB and verify wiring.	Automatic
HighLimitCutout	Indicates that the high limit cutout has been activated due to a reading that exceeds the high limit setpoint. Ensure that the high limit humidistat is operating correctly and is not located too close in proximity to the SKVF.	Automatic
RelayFuse	Indicates that there is an issue with the printed circuit board fuse. Check the status of the fuse and replace it if defective.	Automatic
FloatSwitch	Indicates that the float switch is defective or incorrectly wired. Check the status and operation of the switch and verify wiring.	Automatic
MemoryCard (Warning)	Indicates that the SD card has been detected, but it is not operating correctly or is non-functional. Verify the SD card and replace if defective.	Automatic
USB Device (Warning)	Indicates that the USB device has been detected, but it could not be read or is not operating correctly. Verify the functionality of the USB device and replace if defective.	Automatic
DrainTimeout	Indicates that the water in the tank has not drained within the programmed delay. Verify and remove any obstructions in the drain piping and ensure that the piping is not clogged. (Only applicable for SKVF-R models).	Manual *
FillTimeout	Indicates that the desired water level has not been reached within the programmed delay. Verify and remove any obstructions in the water inlet line, verify that the shut-off valve is not closed and ensure that the float switch is working properly. (Only applicable for SKVF-R models).	Manual *
WaterLeak	Indicates that a water leak has been detected. Verify the water line for signs of leaks and ensure that all piping and water connections have been properly installed and secured.	Manual *
FanDefect	Indicates that there is no feedback coming from the fan after receiving a control signal from the controller. Verify the status and connections of the fan and replace if defective.	Manual *
HRLState	Indicates that there is a communication error when attempting to connect to the HRL24 controller. Verify the wiring between the SKVF and the HRL24 and ensure that the controller is functioning properly. (Only applicable for units connected to the HRL24 controller).	Manual *
NtwkCtrlState	Indicates that the communication attempt to the BMS server has exceeded the delay defined by the <i>NtwkTimeout</i> setting. Verify the wiring between the humidifier and the BACnet or Modbus network and ensure proper connection. (Only applicable for units connected to BACnet or Modbus).	Manual *
WtrServiceDue	Indicates that the due date for replacing the 5µm pre-filter and silver ion cartridges has arrived.	Manual **
ServiceDue	Indicates that the due date for servicing the SKVF unit has arrived. See Servicing and Maintenance section on page 45 for details.	Manual ***

* Use the *ResetAlarms* function in the *Request* setting (see page 33).

** Use the *ResetWtrServCnt* function in the *Request* setting (see page 33).

*** Use the *ResetServCnt* function in the *Request* setting (see page 33).



Start-up Procedure



Initial verification and start-up must be carried out by suitably qualified personnel.

It is strictly recommended to follow this start-up procedure in order to avoid any anomaly resulting from inaccurate installation of the components.


Initial Verification

Initial Set-up	1. Ensure that the evaporative cooler is installed in a location in which it can be serviced correctly.	<input type="checkbox"/>
	2. Ensure that the tank at the bottom of the evaporative cooler is clean and free from dust or dirt.	<input type="checkbox"/>
Electrical Supply	3. Verify that the power supply (voltage) conforms to the appliance name plate on the side of the evaporative cooler.	<input type="checkbox"/>
	4. Confirm that 24Vac is present between terminals TB4 1&2 on the printed circuit board.	<input type="checkbox"/>
Water Supply	5. Ensure that water is supplied to the evaporative cooler and that a shutoff valve is placed outside the evaporative cooler and is installed before the 5µm pre-filter and silver ion cartridges.	<input type="checkbox"/>
	6. With the water shutoff valve turned on, check that the drain connections are connected to the main drain line with sufficient diameter. Ensure that there are no apparent leaks.	<input type="checkbox"/>
	7. Confirm that the main and pan drains are separated and connected to an open drain, and that the piping is properly connected with a slope of at least 10°.	<input type="checkbox"/>
Controls	8. Ensure that the Airflow switch is properly installed and connected to the printed circuit board. If an Airflow switch is not used, verify that a jumper is connected between terminals TB3 1&2.	<input type="checkbox"/>
	9. Ensure that the High limit humidistat is properly installed and connected to the printed circuit board. Verify that the setpoint is properly adjusted. If a High limit humidistat is not used, verify that a jumper is connected between terminals TB3 1&3.	<input type="checkbox"/>
	10. Ensure that the Interlock is properly connected to the printed circuit board. If the Interlock is not used, verify that a jumper is connected between terminals TB3 1&4.	<input type="checkbox"/>
	11. If a room humidistat or thermostat is used, verify that it is correctly installed and properly connected to the evaporative cooler. Verify that the setpoints are properly adjusted.	<input type="checkbox"/>
	12. Turn the power on using the circuit breaker.	<input type="checkbox"/>
	13. Confirm the control set-up of the evaporative cooler and verify that the setpoints are properly adjusted.	<input type="checkbox"/>



Start-Up

Start-up

1. Proceed to start-up the evaporative cooler, as follows:
 - a) Turn on the evaporative cooler by pressing and holding the Power button  for 3 seconds. Verify that the controller Status Display LED is blue. ☐
 - b) Verify that there is a demand displayed on the LCD screen of the evaporative cooler. ☐
 - c) Ensure that the water supply valve connected to the evaporative cooler is turned on and that water is flowing directly to the evaporative cooler water supply inlet. Ensure that the water shut off valve is turned off. ☐
 - d) While the unit is in operation for several minutes, observe the system for water leaks. ☐




Water Conductivity

2. When the tank is full of water, measure the water conductivity and ensure that it lies between 100 and 550 $\mu\text{S}/\text{cm}$ at 68°F (20°C). ☐

Safety Test

3. While maintaining a demand from the system, manually open the safety contacts and ensure that the SKVF automatically stops operation. ☐
4. Close the safety contacts after verifying their operation. ☐

Drain (only for SKVF-R models)

5. Turn off the evaporative cooler by pressing and holding the Power button  for 3 seconds. ☐
6. Conduct a drain cycle by pressing and holding the Drain button  for 3 seconds. ☐
7. Once the drain cycle is complete, restart the evaporative cooler by pressing and holding the Power  button for 3 seconds. ☐

End

8. The evaporative cooler is now ready for normal operation. ☐



Servicing and Maintenance



This evaporative cooler must be installed, operated, and maintained by suitably qualified personnel and in accordance with this manual.



CAUTION: Risk of electric shock. The electric supply of the evaporative cooler must be shut down. Disconnect the power at the external breaker before commencing any maintenance work.

Preventative Maintenance

The SKVF requires regular periodic service to ensure efficient and trouble-free running. Generally, frequency of cleaning can range from two months to once a year, depending on the following factors:

- Quality of water
- Frequency of automatic drain cycles
- Demand placed on the evaporative cooler

All SKVF evaporative coolers are programmed for 1000 hours of operation. This is a default factory setting.

To view the number of hours the unit has run and the number of service hours, use the control panel to access the *Service* Menu (see page 33 for more details).

After 1000 hours of operation have passed, the Status Display LED on the control panel will turn red, indicating that the unit is due for servicing. Although the SKVF will continue to operate, it is imperative that service is performed as soon as possible, in order to ensure proper functionality.

Verification List

Perform the following activities regularly to ensure optimal performance and operation of the evaporative cooler.

- Ensure that all electrical connections are secure.
- Check drain operation and flow.
- Check for water leaks.
- Check for stagnant water or excessive water in floor pan.
- Remove the media cassette(s) (see Removing the Evaporative Media section on page 47) and remove / clean any residue or deposits accumulated on the media(s).
- Check for any mineral deposit in the tank or on the media, which would indicate that the water quality is poor and that the dilution ratio must be increased (see *DilutionRatio* setting in the *Installation* menu on page 34).
- Check for any accumulation of dirt in the bottom of the tank and the floor pan. If there is presence of impurities, clean the tank at the bottom of the unit.
- Check the distribution pipe at the top of the media and ensure that the water distribution is even. Remove the pipe and clean it if necessary.
- Check the flow rate at the output of the pump and clean or replace it if necessary (only for SKVF-R models).
- Ensure that the water supply and drain hoses at the bottom of the evaporative cooler are clean and in good condition.
- Ensure that the 5µm water pre-filter is not clogged.
- Verify if the 5µm pre-filter and silver ion service warning has appeared (*WtrServiceDue*). If so, replace the 5µm pre-filter and silver ion dosing cartridges.
- Observe the operation of the water flow and evaporation cycle.



Water Sampling and Testing (Hygiene)



Legionella disease can be fatal. Maintain and control the water system according to the local Health & Safety regulation codes.

The SKVF has been designed to minimise any possible risk of Legionellosis growth. However, it is still necessary to perform the following checks in order to reduce the growth of Legionellosis:

- Conduct a risk assessment of the water system by a competent authority.
- Implement appropriate inspection and control measures.
- Maintain water temperature below 68°F [20°C].
- Maintain clean, drinking quality water supply.
- Avoid water stagnation.
- Carry out regular microbiological testing of water (counting the number of bacterial units). Refer to the ISO 5667-1 standard (Water quality - Sampling - Part 1: Guidelines for the design of programs and sampling techniques)
- Clean and disinfect the system regularly. Refer to Legionella and the prevention of legionellosis, by World Health Organization 2007, ISBN 92 4 156297 8 for more detailed advice on control measures.
- Apply disinfection measures based on the results of visual inspection and microbiological tests.
- Record and evaluate the results obtained during verifications, servicing and microbiological testing in order to improve the control plan.

If the SKVF is stopped for extended periods (over 24 hours), make sure the tank at the bottom of the unit and the water supply hose to the unit are drained, unless there is a regular renewal of the water system. Contamination of the water system can cause the development of Legionella bacteria that can be fatal.

Table 11 - Proposed Plan of Control and Disinfection According to Results of Microbiological Testing of Water

Aerobic Heterotrophic Count (CFU/ml)	Required Action
10,000 or less	Acceptable control. No remedial action required.
More than 10,000 and up to 100,000	Disinfect the SKVF (refer to the Disinfection section on page 48); then perform another microbiological test of the water after disinfection to ensure that the result is now 10,000 CFU/ml or less.
More than 100,000	Immediately stop the SKVF and perform a manual cleaning and disinfection. Corrective action must be undertaken to reassess the level of hygiene control and a new risk analysis of the water network and system.



Removing the Evaporative Media

Media Cassette(s) Removal

1. Use the access key to unlock the media cassette panel(s).
2. Remove from the media cassette(s) from the SKVF.

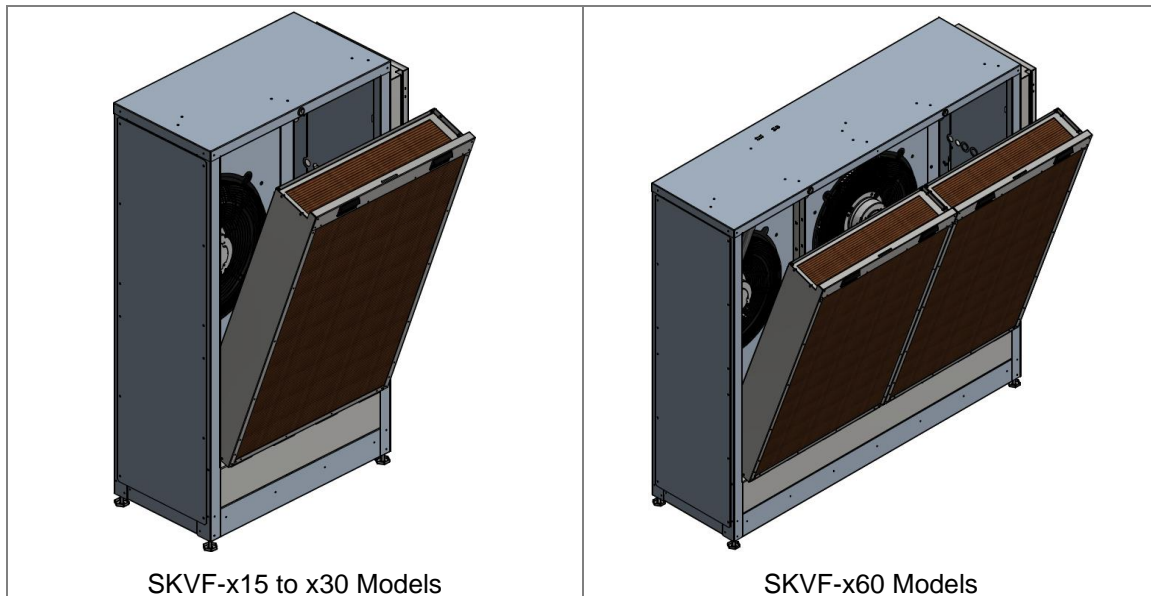


Illustration 23 - Media Cassette(s) Removal

Evaporative Media Removal

1. Using a screw driver, remove the 4 screws in each corner of the media cassette bracket and remove the two brackets.
2. Carefully remove the evaporative media from the cassette.
3. Clean the evaporative media properly by following the steps outlined in the Disinfection section on page 48.
4. To reinstall the evaporative media after servicing, slide it back into the media cassette and re-attach the brackets using the 4 screws.

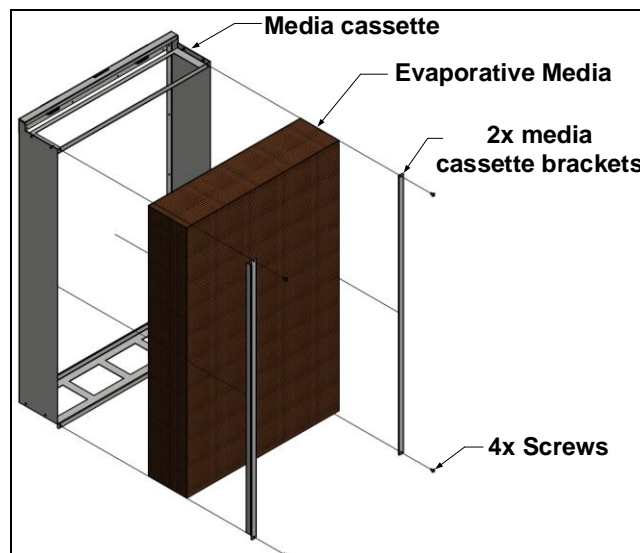


Illustration 24 - Evaporative Media Removal



Disinfection



Use personal protective equipment that provide proper protection against the disinfection solution and the inhalation of the Legionella bacteria.

Before commencing disinfection, perform the following functions:

- Assess the situation for any security risk with the person responsible for health and safety of the building.
- Check records, namely, sample results of microbiological testing of water.
- If possible, carry out disinfection when the building is unoccupied.

All surfaces that require disinfection or cleaning must be in contact with the same concentration of disinfection solution for same amount of time. All surfaces must be clear of any sort of residue to ensure that the disinfectant neutralises any harmful bacteria. In order to ensure that the residue is properly removed, manually clean all surfaces. Ensure that the disinfection solution reaches all the ends of lines of the pipe-work. It may also be necessary to disinfect the supply water system pipe-work or water treatment systems. Neptronic recommends routine disinfection of the evaporative cooler in the following situations:

- At initial commissioning.
- Depending on the results of the microbiological water testing and monitoring plan and sampling adopted (see Table 11 on page 46).
- If the system or part of it has been shutdown and/or substantially altered, creating a risk of contamination.
- During or following an outbreak, or suspected outbreak of Legionellosis.

When disinfecting the SKVF evaporative media, ensure that it is fully rinsed and then fully dried for a period of 2 hours, before it is reinstalled in the media cassette and returned to normal operation in the evaporative cooler.

Recommended Disinfection Solution

- Quaternary amines such as:
 - Octyl Decyl Dimethyl Ammonium Chloride
 - Alkyl Dimethyl Benzyl Ammonium Chloride
 - n-Alkyl Dimethyl Ethyl Benzyl Ammonium Chloride

The concentration of quaternary amines must be maintained between 30 to 50 PPM, in order to be effective without damaging the system.

- Oxidizing biocides such as:
 - Sodium Hypochlorite (household bleach)
 - Solid Calcium Hypochlorite
 - Dimethyl Hydantoin
 - Ethyl Methyl Hydantoin
 - Hydrogen Peroxide
 - Potassium Peroxymonosulfate

The concentration of oxidizing biocides must be maintained between 1 and 2 ppm only for disinfection. Products containing hypochlorite should only be used if the system water has a pH level of 7.5 or less.



De-scaling

If untreated tap water is used, de-scaling of the SKVF may be required. To avoid accumulation of scale, Neptronic recommends using RO water whose conductivity is between 100 and 550 $\mu\text{S}/\text{cm}$. When using city water, Neptronic recommends a visual inspection of all parts of the evaporative module one month after commissioning to define the required frequency of de-scaling based on the accumulation of scale observed.

Recommended de-scaling solution:

- White vinegar (acetic acid)



CAUTION: Avoid the use of phosphate based scale control agents, as they will promote algae growth in the system.

De-scaling Method Statement

Step 1 - Preparation

- Refer to the manufacturer's recommendations for concentrations to apply and the method of preparation of the solution. When using white vinegar (acetic acid), do not exceed a concentration of 250-260 ppm when descaling the media.
- Ensure that the SKVF is stopped.



CAUTION: When working with de-scaling solution, always wear appropriate personal protective clothing, protective gloves, and eye protection.

Step 2 - Dismantle the Evaporative Module

- Turn off and isolate the electrical supplies to the unit.
- Remove the media cassette(s) as per the Removing the Evaporative Media section on page 47.

Step 3 - Prepare the De-scaling Solution



CAUTION: Risk of emanation of gas irritants, ensure to perform these tasks in a well ventilated area. It is recommended to perform the following steps outside.

- Mix the de-scaling solution according to the manufacturer's recommendations.
- Use a clean container of a suitable size to completely immerse the media cassette(s).
- Ensure to also have a second clean container of a suitable size filled with clean and clear water to immerse the cassette(s) after de-scaling.

Step 4 - Remove Scale from the Cassette(s)

- Using a soft brush, lightly brush any loose scale from the surface of the media.
- Lower the cassette(s) into the de-scaling solution.
- Keep the cassette(s) in the solution until the reaction between the calcium on the matrix and the de-scaling solution is complete.



Note: The effect of the de-scaling solution will vary depending on the condition of the media's material. For an improved effect, the above process may have to be repeated.

- Clean and if necessary, apply the de-scaling solution on all parts of the SKVF which are covered with scale.

Step 5 - Rinse

- Lift the cassette(s) out of the acid solution, allow any excess de-scaling solution to drip, and directly submerge it into the clean water container.
- If necessary, rinse a second time while profusely wetting the media.

Step 6 - Re-assemble and Restart

- Reinstall the media cassette(s) on the unit.
- Reconnect the power supply.



Air Filter Maintenance



CAUTION: Risk of electric shock. The electric supply of the evaporative cooler must be shut down. Disconnect the power at the external breaker before commencing inspection and replacement.

1. Remove the power supply to the evaporative cooler.
2. Remove the screws securing the bracket of the air filter assembly to the SKVF and remove the bracket.
3. Slide the air filter out from the bracket assembly and visually inspect it. If the filter needs to be replaced, ensure to replace it with a new filter having the same MERV13 rating and size.



Note: MERV filters cannot be cleaned. If dirty, the filter must be replaced with a new one.



Note: Ensure to dispose of old filters as contaminated waste.

4. Vacuum and wipe around the filter area and the surrounding equipment. If using a new filter, follow the directions on the filter's packaging and ensure that the arrows printed on the new MERV13 filter are pointing in line with the direction of the airflow.
5. Slide the air filter back into the bracket assembly.
6. Use the screws to re-attach the bracket to the SKVF air filter assembly.



PCB Fuse Replacement



CAUTION: Risk of electric shock. The electric supply of the evaporative cooler must be shut down. Disconnect the power at the external breaker before commencing replacement.

7. Remove the power supply to the evaporative cooler.
8. Remove the three screws located on the control panel.

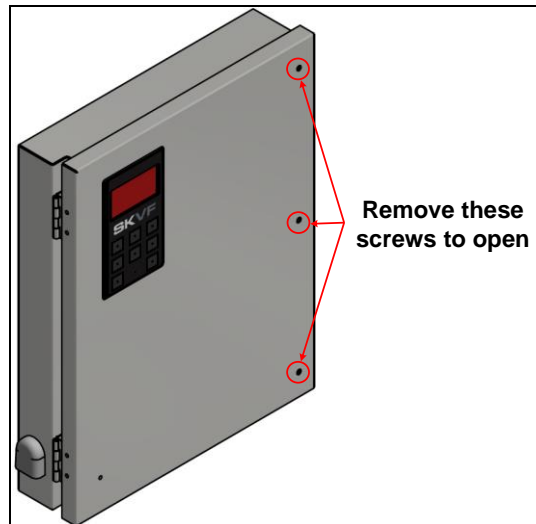


Illustration 25 - Control Panel

9. Locate the PCB and remove the fuse cover from the PCB fuse.

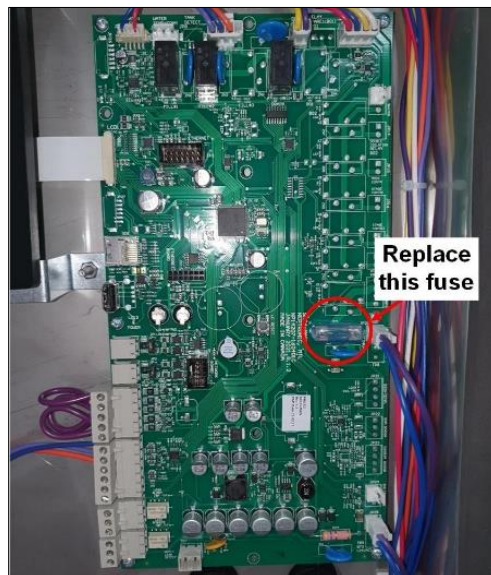


Illustration 26 - PCB Fuse

10. Remove the old fuse carefully and replace it with a new fuse (part number: NP092050019).



CAUTION: Risk of fire. Replace only with an identical 4A, 250V fuse (NP092050019). Contact factory for more details.

11. Reattach the fuse cover back onto the new fuse.
12. Reattach the control panel using the screws that were previously removed.



Troubleshooting

Table 12 - Troubleshooting Guide

Problem	Possible Cause	Corrective Action
<i>Evaporative cooler does not operate (Screen turned Off)</i>	Power is not being supplied to the evaporative cooler.	Check the main power supply. Verify the circuit breaker.
	The low voltage fuse is open.	Check the transformer and the low voltage fuse. Verify that the low voltage circuit is complete.
	Wire harnesses inside the evaporative cooler are not secured properly.	Check the wires harnesses and the main PCB. Verify that all connections have been made properly.
<i>Evaporative cooler does not operate (Screen turned On, Status Display LED: Off)</i>	The evaporative cooler is not powered on.	Verify that the Power button has been pressed and held for 3 seconds for correct activation.
<i>Evaporative cooler does not cool or humidify (No demand)</i>	No analog signal detected.	Verify the setting of the control input.
	High limit switch is open.	Check the operation of the high limit switch.
	Interlock contact is open.	Check the interlock contact.
	Control wires are not properly secured to the terminal blocks.	Verify the connections of the wires to the control terminal blocks.
<i>No water inside the tank or evaporative cooler does not stop draining (Only for SKVF-R models)</i>	Evaporative cooler is being filled with water but has not yet reached or does not reach the high limit.	<ul style="list-style-type: none"> - Verify that the drain valve is closed. - Check if the shutoff valve on the water supply line is open. - Verify the operation of the fill valve. - Check that the fill valve strainer and the external strainer are not blocked.
	Evaporative cooler is not being filled with water.	
<i>Evaporative cooler does not drain (Only for SKVF-R models)</i>	Drain valve is clogged.	Check the drain valve.
	During a drain cycle, the water level has not decreased.	Verify that the recirculation pump, the fill and drain water pipe connections are not obstructed.
<i>Water is leaking from the tank</i>	The evaporative cooler is not properly levelled or installed.	Check that the installation of the evaporative cooler is level.
	The tank is damaged.	Check for any damage or holes in the tank.
	Water is leaking from the water piping connections.	Check for any damaged or ill-fitted drainpipe-work and ensure that there are no leaks.
<i>Evaporative cooler has a loss of performance</i>	The media cassette is blocked or damaged.	Check for any damage or accumulation of scale or minerals, then replace the media cassette if required.
	The media cassette is not installed correctly.	Verify that the cassette is properly fitted and installed and fix the position if necessary.
	Not enough water is flowing.	Check to see that the hoses are not blocked and clean or replace if required.



Problem	Possible Cause	Corrective Action
There is scale build-up on the surface of the media panel	There is an excess concentration of minerals and salts in the tank.	<ul style="list-style-type: none"> - Ensure that the water conductivity is between 100 and 550 $\mu\text{S/cm}$ and correct it if necessary. - Increase the dilution ratio using the <i>DilutionRatio</i> setting located in the <i>Installation</i> menu (only for SKVF-R models). - Increase the water supply using the <i>WtrSupDutyCycle</i> setting located in the <i>Installation</i> menu, in order to drain more water (only for SKVF-D models).
	Water quality has changed.	Carry out a water quality test as per the <i>Water Sampling and Testing (Hygiene)</i> section and ensure to follow the guidelines listed in the <i>Water Quality Guide</i> section.
Recirculation pump is not functioning (Only for SKVF-R models)	The SKVF is blocked by safety contacts or an alarm.	Check that the safety contacts are not open, in particular the high limit switch, and that no alarms are present.
	There is no demand.	Check that there is a demand for humidity or temperature, otherwise setup the system demand accordingly.
	There is not enough water in the tank.	Check that the water level in the tank is sufficient and that the fill pipe connections are not being obstructed.
Evaporative cooler is operating and the Status Display LED is Red (ServiceDue setting displays On)	The evaporative cooler is due for servicing.	Service the evaporative cooler (see Servicing and Maintenance section on page 46). Use <i>Request</i> setting in <i>Service</i> menu to reset counters (see page 33).
Evaporative cooler is operating and the Status Display LED is Red (WtrServiceDue setting displays On)	The 5 μm pre-filter and silver ion cartridges are due for replacement.	Replace the 5 μm pre-filter and silver ion cartridges. Use <i>Request</i> setting in <i>Service</i> menu to reset counters (see page 33).
Evaporative cooler does not operate (Screen turned Off, Status Display LED: Blue)	The following components can be the cause of this problem: float switch, PCB or LCD display.	Call factory for troubleshooting instructions.
Evaporative cooler is cooling/humidifying (Screen turned Off, Status Display LED: Blue)	The display FFC cable is not connected properly.	Verify that the connections of the FFC cable are properly secured and are on the correct side.
	The LCD display is defective.	Replace the LCD display.

Notes



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