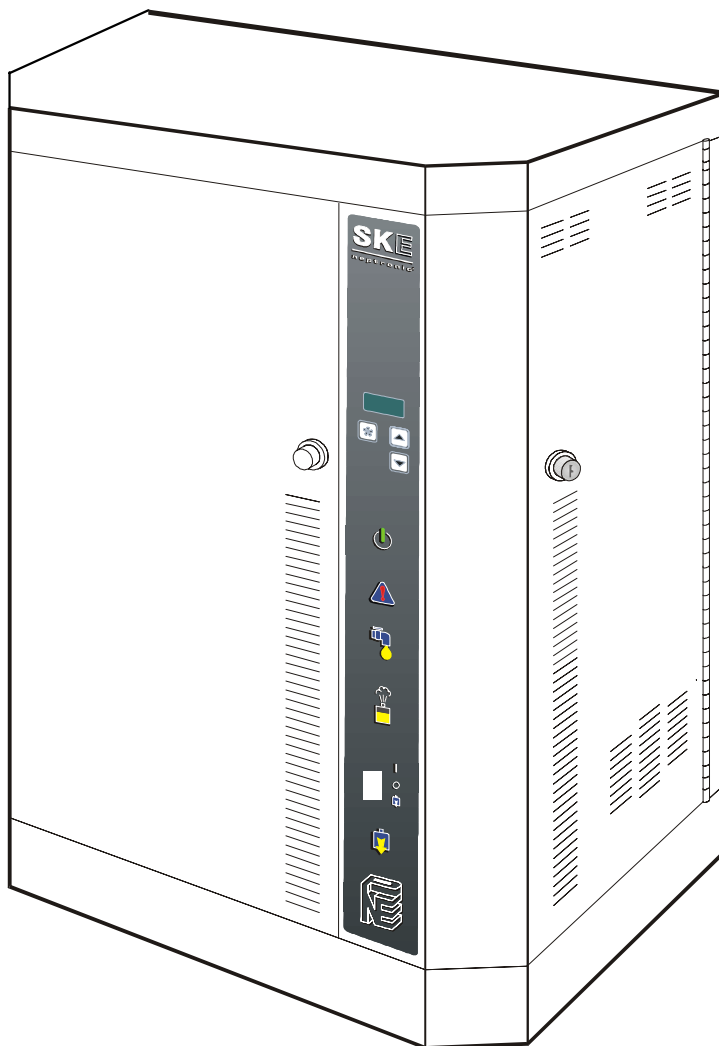

Neptronic SKE Steam Humidifier

Installing, Operating and Instruction Manual

SKE 05M - 80M



Version 4.4 - 110201

Read & save this manual

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Health & Safety

General

This manual has been written to ensure correct, safe and sustainable operation of the SKE humidifier and is intended for use by engineers and technical personnel trained by JS Humidifiers plc. This manual must be read thoroughly before specifying, designing, installing or operating a SKE humidifier. Please retain for reference and should you have any questions please contact JS Humidifiers plc and we will be pleased to assist.



The triangular symbol with the word **WARNING**: is used to designate danger of severe or lethal consequence.



The circular symbol with the word **CAUTION**: is used to designate danger of injury, or to warn of hazardous operating condition.

Front and side access door 1st warning message



WARNING: Risk of electric shock. Do not access. Disconnect Humidifier prior to open access door.

Front access door 2nd warning message



WARNING: Hot surfaces, Do not touch, To be serviced by trained/qualified personnel.

Health & Safety

Installation, maintenance, repair work or de-commissioning should 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, should 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 JS Humidifiers plc 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 is any sign of water leaking from the unit.



WARNING: Danger of scalding! SKE Humidifier generates steam during operation and therefore, surfaces and pipe-work become very hot. To avoid scalds or burn injuries, always ensure that the boiling vessel has been drained and the system and associated pipe-work has been allowed suitable time to cool prior to carrying out maintenance work. Water temperature is between 60 - 100 °C. Always ensure that the drain pipe-work is suitable for boiling water.

Protective equipment

COSHH and Personal Protective Equipment: 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.

Health & Safety

Hygiene

IMPORTANT: Hygiene correctly installed and maintained, SKE humidifiers typically present a very low risk with respect to development of micro-organisms, including the bacterium which causes Legionnaires' disease. However, attention is drawn to your responsibilities as outlined in the Health and Safety Executive's Approved Code of Practice, L8. The control of Legionella bacteria in water systems and their technical guidance on the prevention and control of legionellosis in water systems. Water systems, if not adequately maintained, can support the growth of micro-organisms including the bacterium that causes Legionnaires' disease.



WARNING: In the event that the unit is turned off for prolonged periods, 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 (AcoP L8 The prevention or control of legionellosis, paragraph 8 refers) to determine all control and preventative measures outlined in this manual.

Commissioning service

JS Humidifiers plc offers an installation and commissioning service.

Services available include: Site surveys - Turnkey packages - Contract management-Management of site health & safety - Risk management - Preparation of operation & maintenance documentation & drawings - Client demonstration and handover.

In accordance with the Health & Safety at Work Act 1974 and subsidiary regulations, only trained operatives meeting the health and safety standards dictated by Construction Skills Certification Scheme (CSCS) are used on JS Contracts.

JS Humidifiers are compliant with the government's "Contractors Health & Safety Assessment Scheme" (CHAS), and meet the requirements of "SAFE", the contractor accreditation scheme for business.

Contact

For further information, please contact your local areas sales manager or JS Head Office on +44(0)1903 850

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CE Declaration of conformity

CE Directives Applied	Low Voltage Directive 2006/95/EC Electromagnetic Compatibility Directive 2004/108/EC
Standard(s) to Which Conformity is Declared	EN50081-1: Electromagnetic compatibility generic requirements (residential, commercial, and light industry) EN50082-1: Electromagnetic compatibility immunity requirements (residential, commercial and light industry) EN61000-4-2 Electrostatic discharge immunity test level 3 EN61000-4-3 Radiated, radio frequency, electromagnetic field immunity test tested in situ EN60204-1: Safety of machinery - electrical equipment of machines - Part 1: General requirements EN292 Parts 1 & 2: Safety of machinery basic principle mechanical design EN60335-1: Specification for safety of household and similar electrical appliances. General requirements, A11:95 + A1:96 + A12:96. EN60335-2-88; IEC 60335-2-88: Specification for safety of household of similar electrical appliances. Particular requirements. Humidifiers intended for use with heating, ventilation, or air conditioning systems.
Manufacturer's Name and Address	National Environmental Products Ltd 400 Lebeau Montreal, Québec, Canada H4N 1R6
Authorised Distributor Name and Address	JS Humidifiers plc Artex Avenue Rustington, LITTLEHAMPTON, West Sussex, UK BN16 3LN Tel: 01903 850200
Type of Equipment	Steam Humidifier
Model Name(s) & Series	SKE series
Year of Manufacture	2008

We the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s)

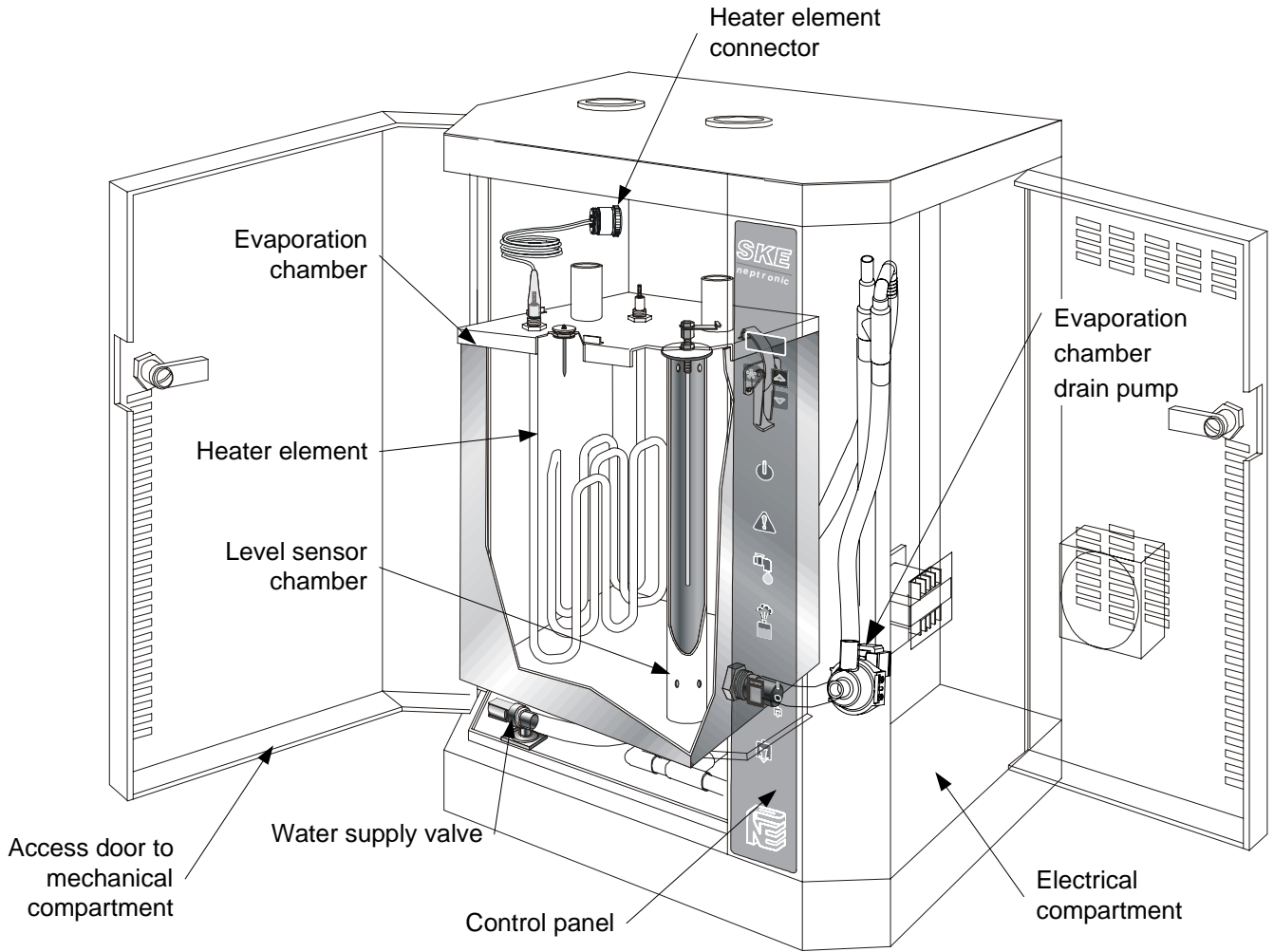


Signature:

Name: S.P.Verney

Position: Managing Director

Technical specification

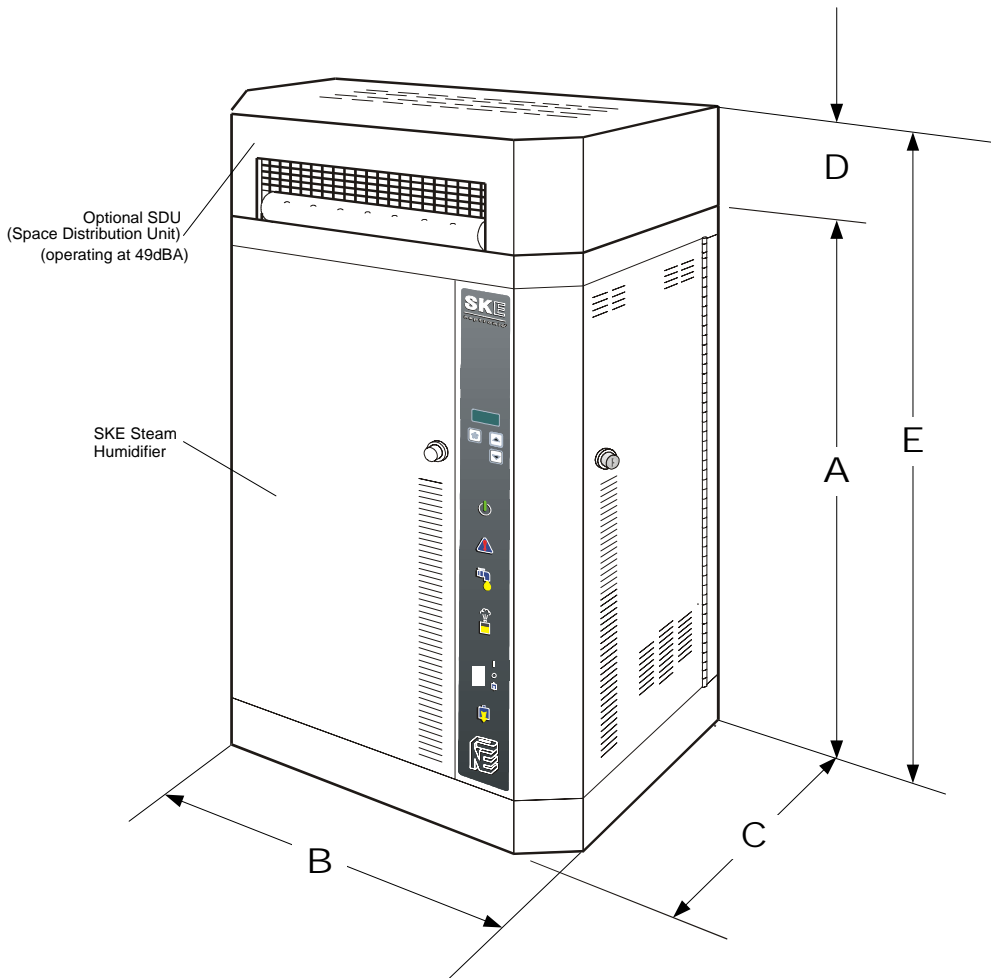


(Illus. 1)

Model	Capacity (kg/h)	Voltage	Current (Amps)	Power (kW)	Steam Outlets	Weight (kg)	Duct Pressure
SKE 05(M)	5	230V 1ph	16	3.7	1 x 35mm	20	+/-1250Pa
		400V 3ph	5.5				
SKE 10(M)	10	230V 1ph	33	7.5	1 x 35mm	30	
		400V 3ph	11				
SKE 20(M)	20	400V 3ph	22	15	1 x 35mm	30	
SKE 30(M)	30	400V 3ph	33	22	2 x 35mm	30	
SKE 40(M)	40	400V 3ph	44	30	2 x 35mm	30	
SKE 50(M)	50	400V 3ph	53	36	2 x 51mm	50	
SKE 60(M)	60	400V 3ph	64	44	2 x 51mm	50	
SKE 80(M)	80	400V 3ph	87	60	3 x 51mm	50	

For static duct pressure higher than +/- 1250Pa, please consult JS Humidifier.

Dimensions



(Illus. 2)

Model	Dimension A (mm)	Dimension B (mm)	Dimension C (mm)	Dimension D (mm)	Dimension E (mm)
SKE 05(M)	597	470	292	140	737
SKE 10(M)	724	533	318	165	890
SKE 20(M)	724	533	318	165	890
SKE 30(M)	724	533	318	324	1048
SKE 40(M)	724	533	318	324	1048
SKE 50(M)	794	813	318	N/A	N/A
SKE 60(M)	794	813	318	N/A	N/A
SKE 80(M)	794	813	318	N/A	N/A

Principle of operation

Construction

The SKE steam humidifier range is designed to produce dry sterile steam for the purpose of humidification. Combining the latest microprocessor based electronic design with carefully matched metallurgical and mechanical technology; the design has been perfected over two decades and is based on sustainable principles that recognize natural resource depletion. The recyclable aluminum cabinet and permanent robust 316 stainless steel boiling vessel are designed for life, rather than disposable and environmentally unfriendly costly plastic disposable parts that end life in landfill. The standard range consists of modulating humidifiers with duties of between 5-80kg/h or an 'Ultra' is available for close control applications, where a feed water supply of 1ppm or less total dissolved solids (TDS) concentration is available.

Principle of operation



The SKE steam humidifier consists of a locking door cabinet, with 316 stainless steel evaporation chamber and easily removable lid. Incoloy 825 alloy, self cleaning heating elements and patented AFEC water level sensor technology are contained within the tank. The sheathed resistive elements are manufactured from Incoloy, an extremely hard alloy, and are designed to have an output capacity of 12.8 w/sq cm, a low intensity of heat per sq cm which prolongs element life and naturally cracks scale off the surface.

The patented AFEC (Anti-Foaming Energy Conservation System) technology offers a unique safety system and energy conservation management for expensive boiling water. The AFEC system consists of a PTFE coated stainless steel, water mass measuring sensor, anti foam sensor, electronic high temperature sensor, and interactive LCD display and microprocessor controller.

The patented anti foam sensor is based on technology that is able to sense the difference between foam formation and true water level, thus eliminating the risk of elements burning out in free air, due to low water level. The foam sensing probe will automatically initiate a drain cycle if foam is sensed, unlike some other humidifiers, where foaming is controlled by the continuous skimming of expensive boiling water to drain.

The SKE Humidifier is also unique in having a fast acting electronic safety temperature sensor inside the evaporation chamber in very close proximity to the heating elements as well as a standard bimetallic external electromechanical temperature switch. Therefore the patented AFEC system provides an additional layer of protection.

The alphanumeric display continuously displays the status of the unit. It is also used to program variable parameters into the memory of the control microprocessor. The intelligence built into the control system ensures simple interaction between the service personnel and the humidifier. The microprocessor control incorporates frequency and duration parameters of water dilution cycles for scale management of the SKE steam humidifier. This allows for compensation of all types of feed water qualities. The humidifier is able to modulate its output from 0-10Vdc, 2-10Vdc or a 4-20mA control signal (also available for on/off control to special order). The maximum output can be minimized by using the "Lock On" feature. Modulation of all elements is achieved using silent Solid state relays that have zero voltage crossing. These are backed up by an electro-mechanical contactor and wiring is to the TEW 105 deg C, 600V CSA thermoplastic wire standard

Packaging

Handling

The SKE steam humidifier must always be handled with care and should remain within its original packaging for as long as possible prior to installation.

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 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. Any personnel handling or lifting the SKE Steam humidifier must follow the Lifting Operations and Lifting Equipment Regulations 1998 and Approved Code of Practice L113. The regulation imposes duties on employers and self employed persons and persons who have control, to any extent of lifting equipment.

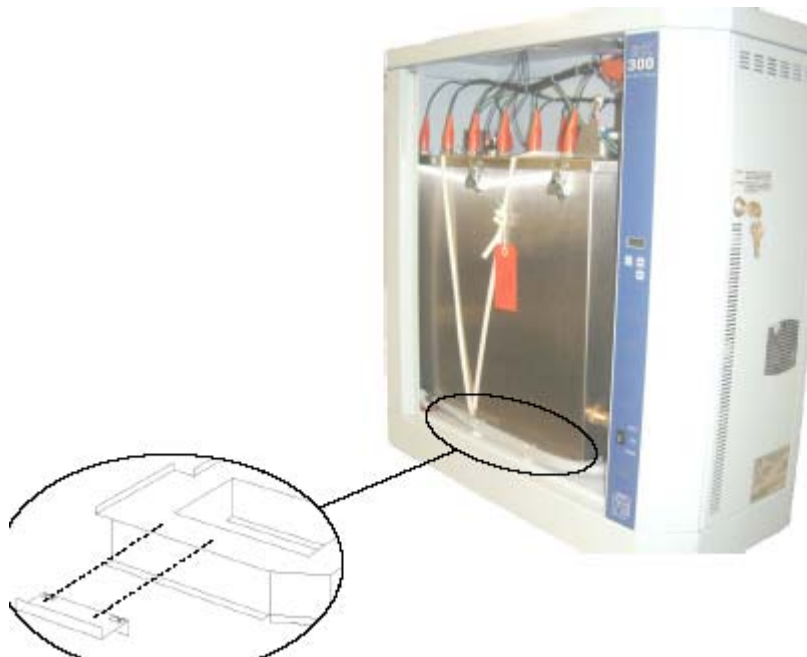
Refer to weights and measures section for system dry weights

Unpacking

SKE humidifier evaporation chamber is maintain/attached by packing strap and transit plate, in order to prevent movement of this one during transport.



CAUTION. Transit plate and packing strap must be removed and disposed of accordingly before to install SKE humidifier



(Illus. 3)

List of accessories supplied

- 2 sets of keys.
- 2 adjustable collars for the connection of the steam hose for each steam output.
- 1 female fitting 22mm hydraulic for the drain output of the evaporation chamber.
- 1 female fitting 15mm hydraulic for the drain output of the drip pan.
- 1 Installation instruction and operation manual.

Overview



WARNING: Failure to observe manufacturers installation recommendations will invalidate the manufacturer's warranty

Local regulations

All installation work must comply with local regulations.

All work concerned with the installation of the SKE steam humidifier **MUST** only be performed by skilled and qualified technical personnel (e.g. fitters, electricians, plumbers or technicians with appropriate training).



The customer **MUST** be responsible for ensuring their suitability.

For the installation of the SKE steam humidifier and associated components there should be no special tooling requirements above that of a fitter's tool kit.

Installation method

Stage 1: Unit positioning and mounting

Stage 2: Steam distribution pipes positioning

Stage 3: Steam distribution pipes installation

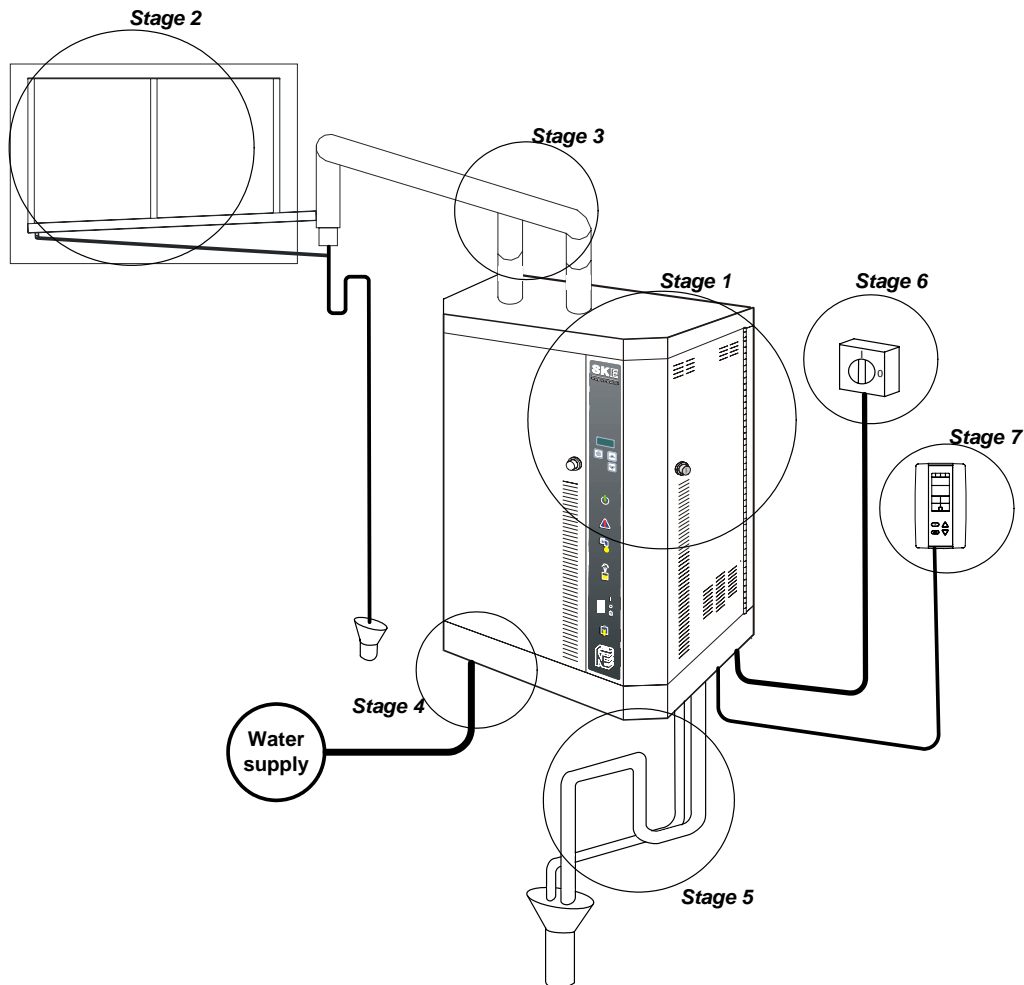
Stage 4: Water supply installation

Stage 5: Drain installation

Stage 6: Electrical supply installation

Stage 7: Electrical control connection

Stage 8: Common alarm connection



(Illus. 4)

Multisteam

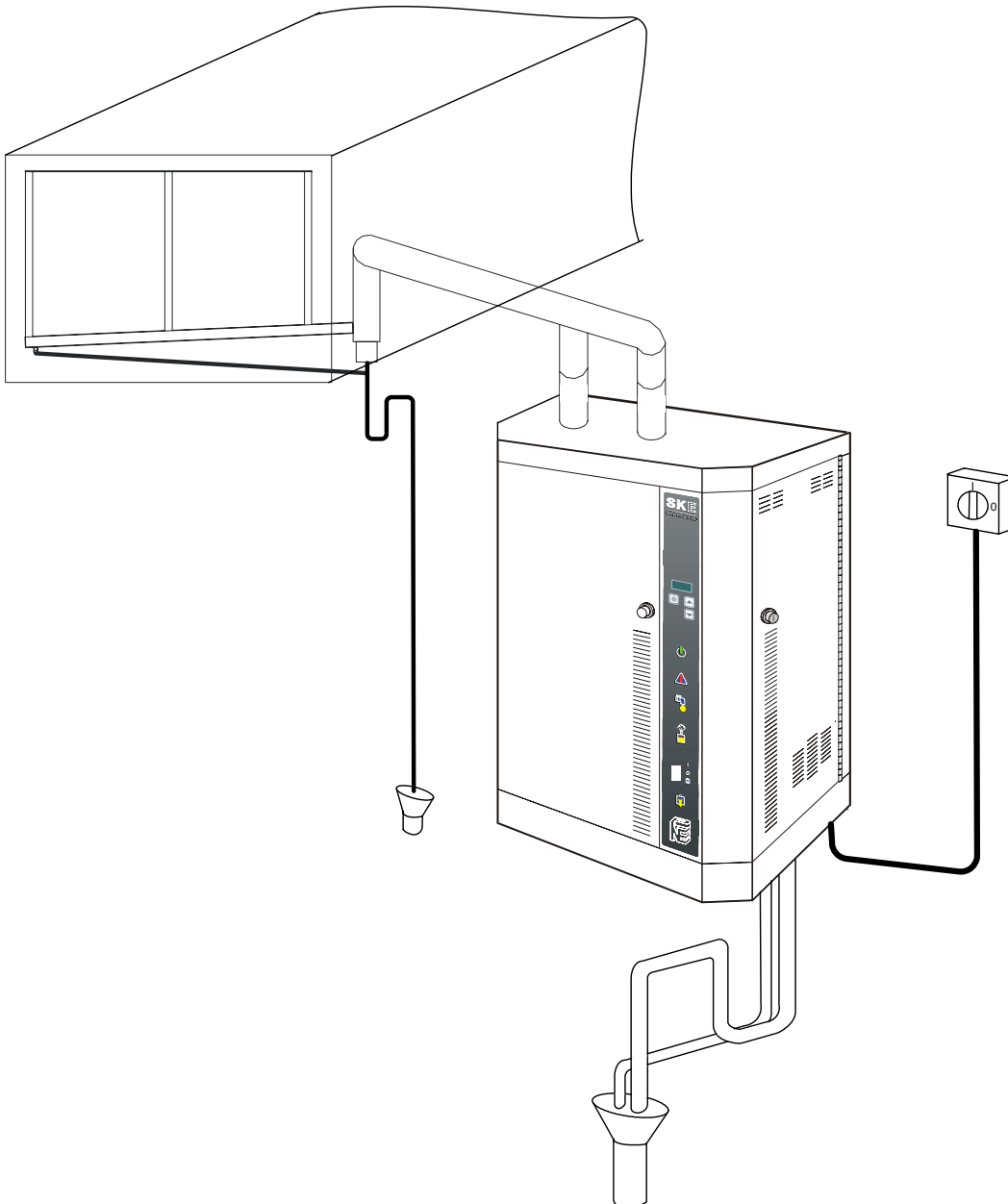
For Installation where multiple units or multiple steam pipes are required, specialized Multisteam manifolds should be used as shown below.

Always contact your JS Humidifiers representative to discuss details.

Please refer to the SKE Multisteam manual for full installation details



WARNING: Never reduce the diameter of the steam lines. Improper pipe diameter will over-pressurize the humidifier



(Illus. 5)
Typical 50Kg/Hr with 2 to 1 steam connector

Note



IMPORTANT. Always contact JS Humidifiers for information or advice on positioning the Steam Distribution Pipe(s).

+44 (0) 1903 850200

Stage 1 – Unit Positioning and Mounting



WARNING. ANY INSTALLATION WORK MUST BE CARRIED OUT BY SUITABLY QUALIFIED PERSONNEL. THE CUSTOMER IS RESPONSIBLE FOR ENSURING THEIR SUITABILITY.

Location

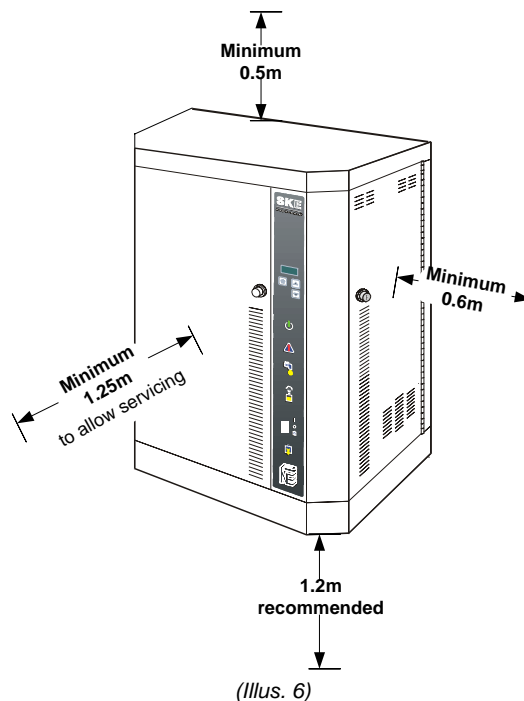
Plan an easy to access location to allow easy inspection and servicing of the humidifier.

Do not install humidifier where failure of the appliance could cause damage to the building structure or to costly equipment.

This location should be well ventilated; the ambient temperature should not exceed 30°C, nor be less than 5°C.

Steam distribution length

The maximum distance between the humidifier and the ventilation duct should not exceed 3m if flexible steam hose is used. If solid insulated pipe work is used, the steam pipe run between the humidifier and the steam distribution pipe must not exceed 5m.



Positioning

The front panel and the right side (electrical compartment) should be accessible to allow for servicing. Leave a clearance of at least 1.25m to the front panel and 0.6m to the right side, as shown.

The humidifier should be mounted at a minimum of 1m to 1.2m above floor level.

Leave a clearance of at least 0.25m under the humidifier for installation of water supply, drain piping and electrical connections.

The humidifier should be mounted on a suitably constructed wall or frame, capable of supporting the operational weight of the humidifier. Always ensure unit is level. The rear panel of the humidifier will become warm during operation (60-70°C). Ensure the structure on which the unit is mounted is not a heat sensitive material.

Allowance must be made for power isolator and fusing to be installed within 1 meter of the humidifier.

The floor below the humidifier should be constructed from waterproof materials to withstand any water spillage during servicing or if a problem occurs.

Allowance should be made for the drain to be offset from the underside of the unit as shown. This will prevent steam/ condensate ingress into the cabinet.

The humidifier is IP21 rated and therefore must be protected from weather if mounted outside.

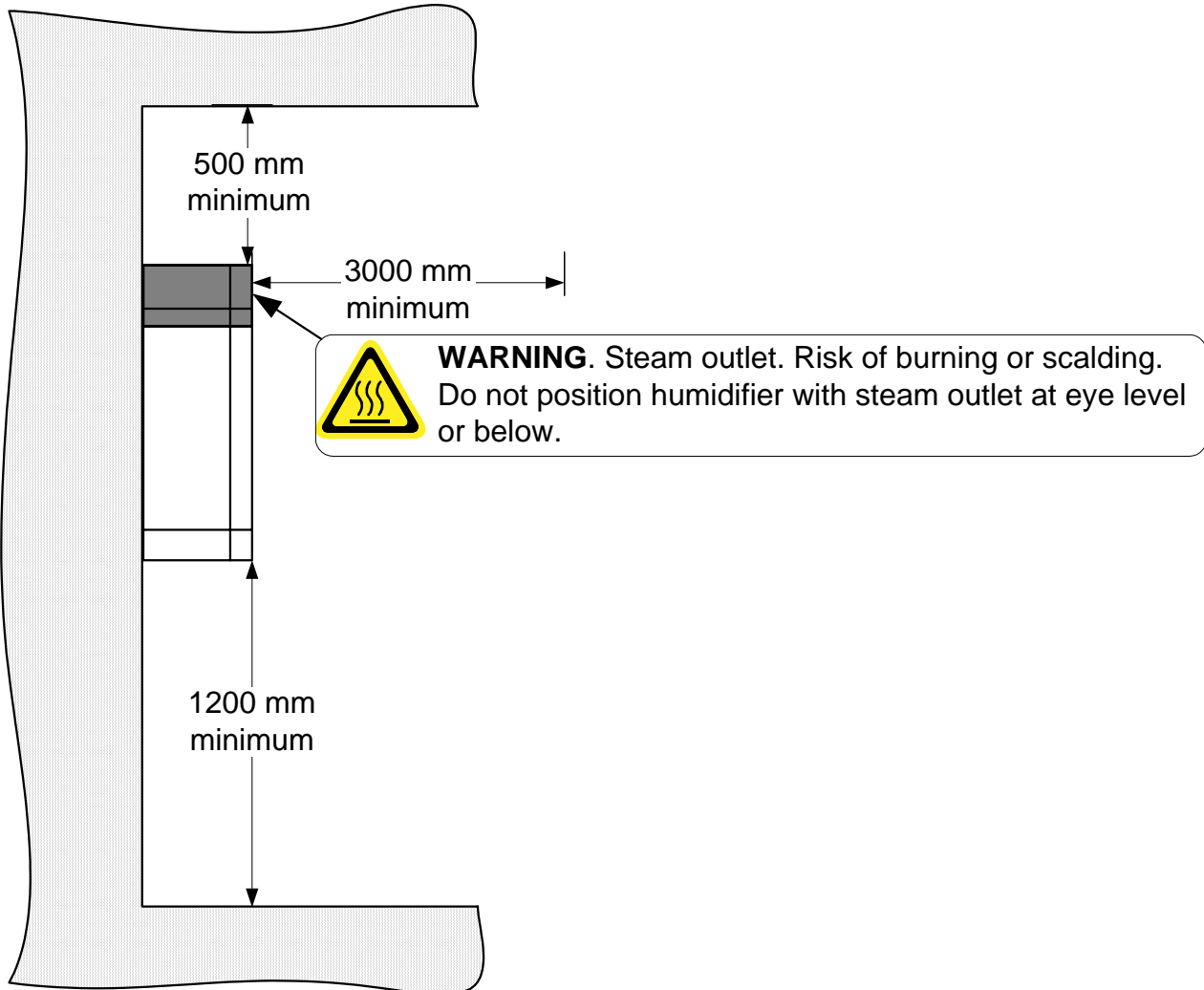
The drain discharge point should be offset from the underside of the unit as shown with each steam cylinder to have its own drain pipe and tundish.

This will prevent steam/ condensate ingress into the cabinet.

Stage 1 – Unit positioning and mounting

Fan Distribution Unit (SDU Unit)

When positioning SKE humidifier with optional fan distribution unit, follow positioning guidelines for the standard system and recommendations below - minimum dimensions must be observed.



(Illus. 7)



WARNING. Risk of burning or scalding. Allow space to mount the SKE so that the steam outlet is above eye line.



CAUTION. A minimum of 3m is required in front of the steam outlet to prevent damage caused by steam or condensation on surrounding surfaces.

Mount the humidistat/sensor in a position where there is free circulation of air. Make sure that:

- The humidistat/sensor is not subject to the influence of sources of heat (direct sunlight, radiators, spotlights etc), cooling, exterior walls or draughts.
- The humidistat/sensor must not be located in the area of steam flow from the steam humidifier.

Failure to do so may result in a system that is not fit for purpose and is inefficient in its operation.

Stage 1 – Unit positioning and mounting

Wall mounting

Use the keyholes located on the back panel of the humidifier.

Before proceeding to wall mounting, remove the Evaporation chamber sub assembly (see Servicing section). Check the strength of the chosen support or wall (bricks, concrete, stud partition wall, etc) on which the humidifier will be mounted.

Drill holes for the upper anchors (holes with reinforcement) into the support or wall as per dimensions specified in the table.

The dimensions for the hole (diameter and depth) should be in accordance with the recommendations of the chosen anchors.

Install the bolt anchors, if required.

Screw-on the 2 or 3 upper screws (holes with reinforcement) of a minimum diameter of #10 (6mm) (screws are not supplied).

Leave a clearance between head screws and wall in order to permit the mounting of the humidifier.

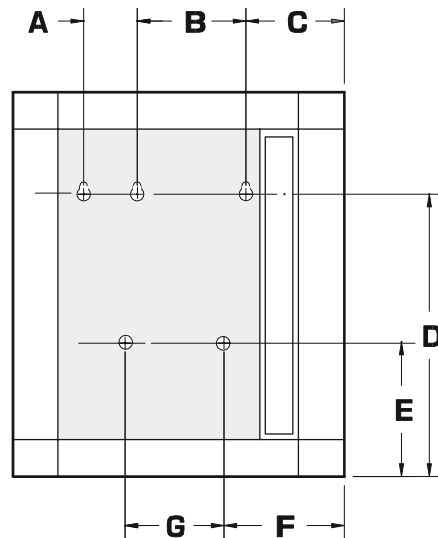
Use the keyholes located on the back panel of the humidifier.

Hang on the humidifier on the 2 or 3 screws; it is preferable leave the front door open during this operation.

You may need a second person to assist you, depending on the size and weight of the humidifier.

When the humidifier is positioned on the upper screws, tighten the screws to secure the humidifier.

If applicable, install and secure lower screws



(Illus. 8)

Model	Dimensions (mm)						
	A	B	C	D	E	F	G
SKE05	-	202	165	516	-	-	-
SKE10	-	254	203	625	276	203	254
SKE20	-	254	203	625	276	203	254
SKE30	-	254	203	625	276	203	254
SKE40	-	254	203	625	276	203	254
SKE50	-	254	203	625	276	203	254
SKE60	102	305	265	698	276	576	-
SKE80	102	305	265	698	276	576	-

Stage 2 – Steam Distribution Pipes Positioning

Planning the Position of Steam Pipes

The position of the steam distribution pipe(s) MUST be determined PRIOR to installation and the following points should always be considered to ensure correct humidification of the duct air:

- Steam evaporation distance
- Minimum downstream clearances
- Position of the steam pipe(s) within the duct, horizontal or vertical
- Sensor position within the duct
- Access to the steam pipes

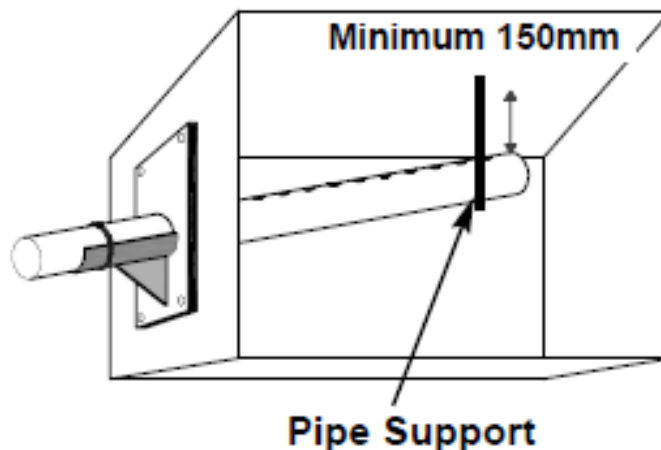
General Positioning

Steam requires a certain distance to be absorbed. Please contact your JS representative to calculate steam evaporation distance and sensor position or refer to details given in Calculating Steam Evaporating Distance.

1. Whenever planning a steam pipe position, always ensure that the steam cannot impinge on any downstream surrounding surfaces or on objects within the air handling unit such as duct-work constrictions, sensors, fan casings or attenuators as condensation may result.
2. The steam pipe must be mounted and secured through the side of the air handling unit and provision should be made for safe accessibility, ideally with an observation light and window. Steam must not be injected into circular or oval ducts.
3. Check that the construction of the duct wall is suitable enough to support the steam pipe for the duration of the installation life.



4. **CAUTION.** Always ensure that a minimum gap of 150mm is allowed above the far end of the steam pipe.



(Illus. 9)

5. Always ensure that the end of the steam pipe is supported adequately and that the slope towards the steam inlet is maintained.
6. The steam pipe should be orientated such that steam holes face vertically up or a slightly into airflow direction.
7. Steam distribution pipes must not be used in ducts with an air flow rate in excess of 10m/s.
8. Maximum/minimum duct pressure +/-1250Pa (Without pressure balance system)

Stage 2 – Steam Distribution Pipes Positioning

Calculating the Steam Absorption Distance



CAUTION - In order to determine the correct position of the steam pipe(s) the evaporation distance must be calculated prior to install.

The steam requires a certain distance to be absorbed by the air so that it is no longer visible as steam. This distance is referred to as Humidification Distance (HD) and serves as a basis for the calculation of the minimum distances from other components in the system.

The calculation of the humidification distance (HD) is dependent on several factors. For an approximate estimation of the humidification distance the following table may be used. Recommended values listed in this table are based on a supply-air temperature range of 15°C to 30°C.

If your air velocity exceeds 2.5m/s or you have a critical application, please contact JS Humidifiers for advice on evaporation distances.

Note: If the humidification distance has to be reduced for technical reasons, the amount of steam per basic unit must be divided between multiple steam distribution pipes or a Multisteam manifold installed.

Humidity at inlet (%rh)	Humidification distance (HD) (m)					
	40%rh	50%rh	60%rh	70%rh	80%rh	90%rh
5	0.9	1.1	1.4	1.8	2.3	3.5
10	0.8	1.0	1.3	1.7	2.2	3.4
20	0.7	0.9	1.2	1.5	2.1	3.2
30	0.5	0.8	1.0	1.4	1.9	2.9
40		0.5	0.8	1.2	1.7	2.7
50			0.5	1.0	1.5	2.4
60				0.7	1.2	2.1
70					0.8	1.7

Example:

Given: Inlet = 30%rh, outlet = 70%rh

Humidification distance (HD): 1.4m



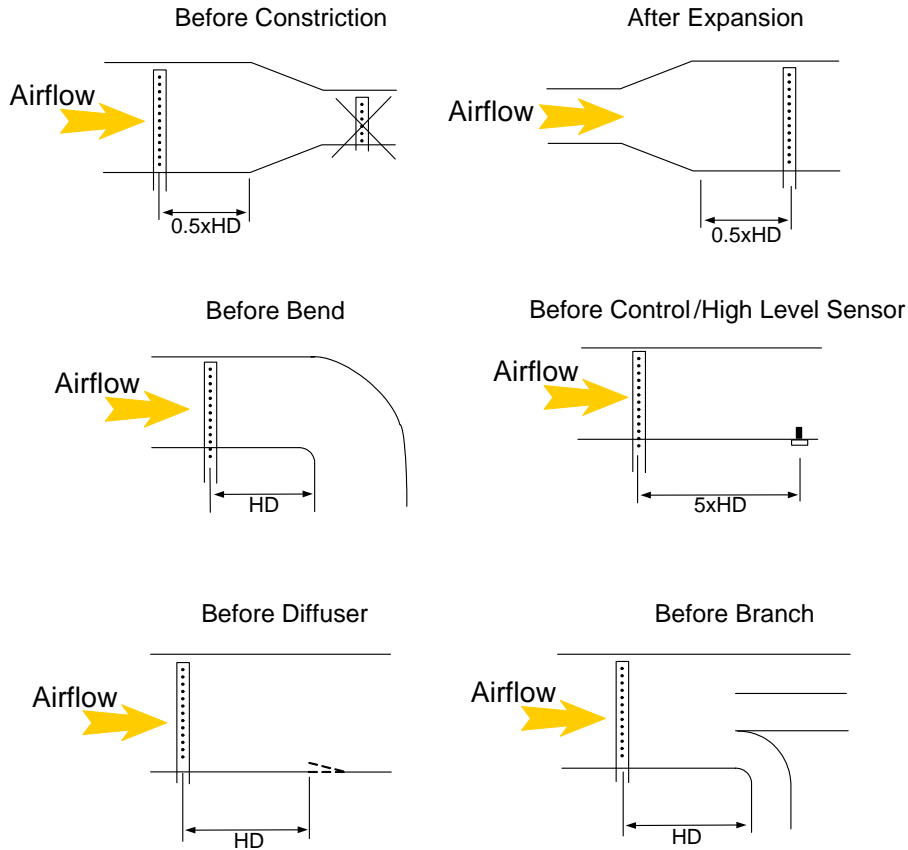
CAUTION- A wrongly positioned steam distribution pipe will cause the application not be humidified correctly and wetting of the duct/AHU, or excessive condense in the pipe-work, which may damage the application.

CAUTION - Where multiple steam pipes are required, calculate evaporation distance as above but refer to Multiple Steam Distribution pipes section for layout of pipes.

Stage 2 – Steam Distribution Pipes Positioning

Minimum downstream distances

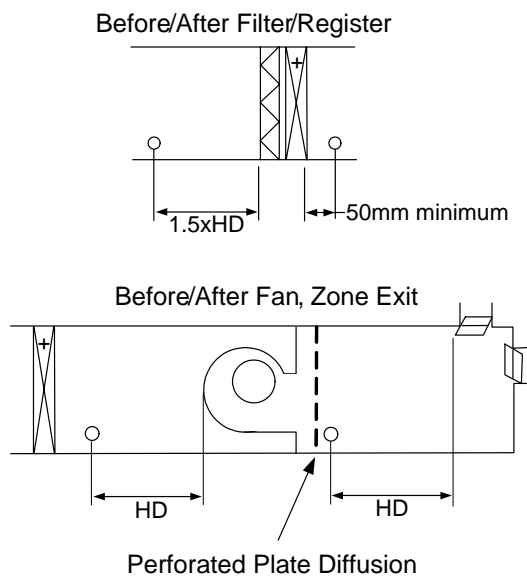
To prevent the steam from the distribution pipe condensing on downstream components, obstructions or changes in section a minimum distance to the steam distribution pipe must be observed (the distance is dependent on the humidification distance "HD").



(Illus. 10)



CAUTION. Steam distribution pipes must not be used in ducts with an air flow rate in excess of 10m/s



(Illus. 11)

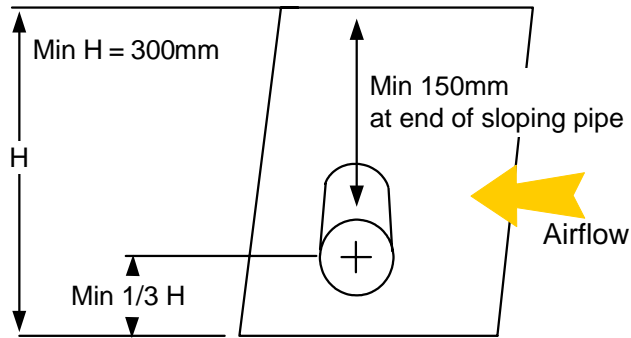
Stage 2 – Steam Distribution Pipes Positioning

Horizontal Steam Pipe Positioning

For single and double steam pipe installations where ducts <800mm in height, use the following guide below. For multiple steam pipe installations use the guide next page.

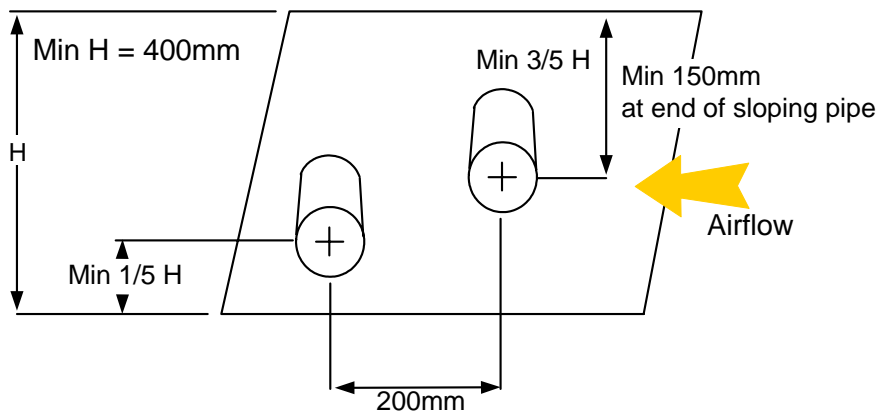
Please note steam pipes slope upward by 7 degrees and require a minimum /of 150 mm clearance at highest point from top of the duct. This is equal to a 12.5mm rise per 100 mm length of the steam pipe.

1x35mm Steam Distribution Pipe



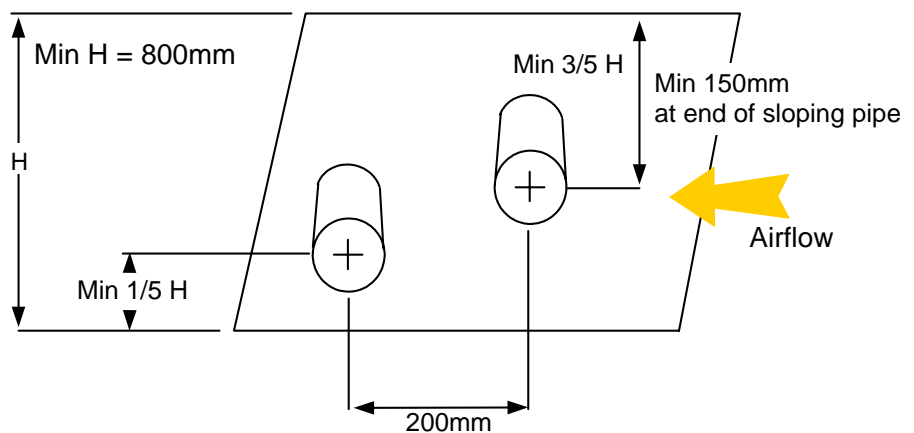
(Illus. 12)

2x35mm Steam Distribution Pipe



(Illus. 13)

2x51mm Steam Distribution Pipe



(Illus. 14)

Stage 2 – Steam Distribution Pipes Positioning

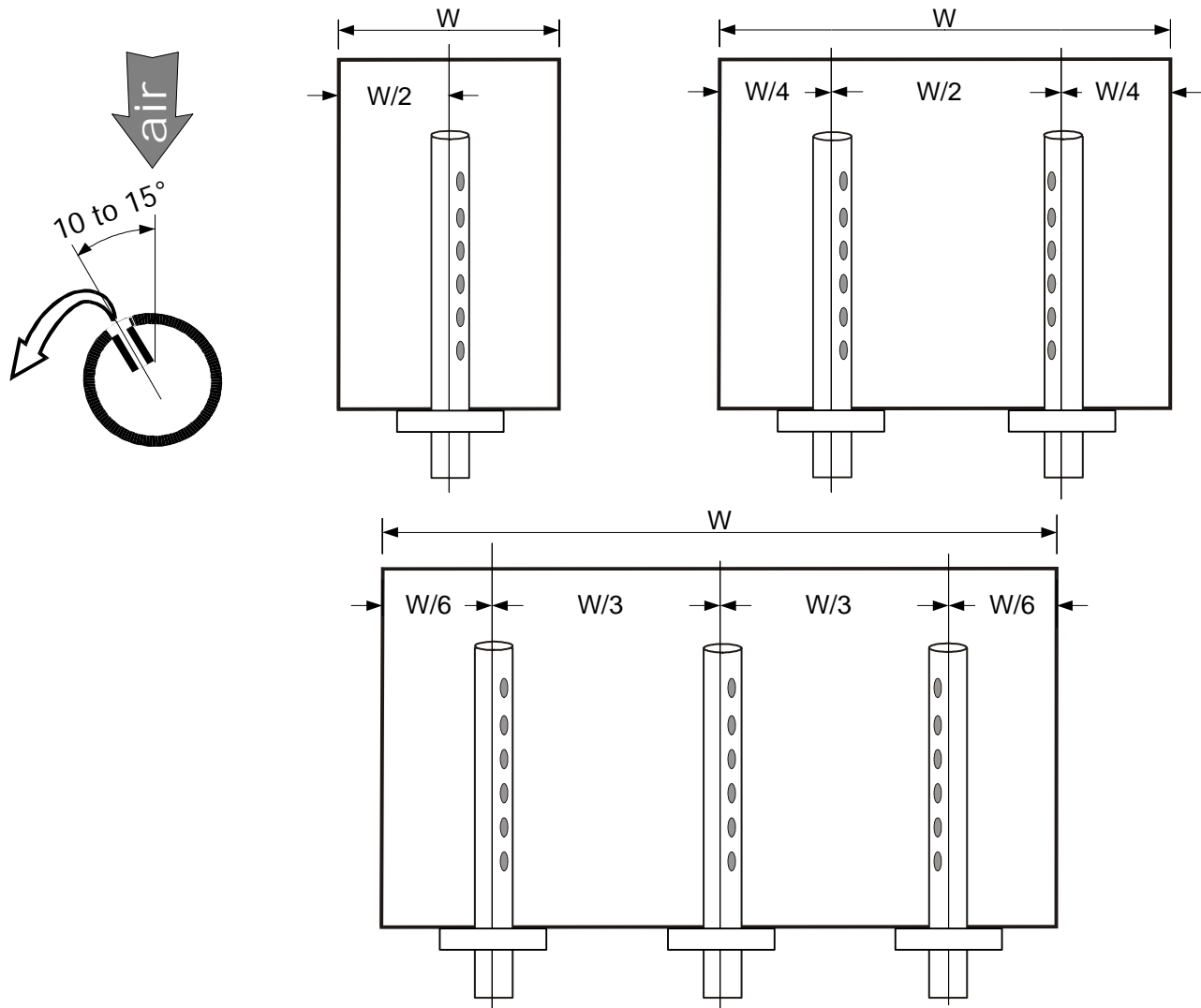
Vertical Steam Pipe Positioning

Steam pipes are designed for either vertical or horizontal orientation.

Steam pipe holes should always be aligned at approximately 10 - 15 degrees towards the airflow.

If possible, steam pipes should be installed on the discharge side of the fan (max duct pressure +1250 Pa).

If there is no option but to install the Steam Distribution Pipes on the suction side of the fan, maximum suction should not exceed -1250 Pa.



(Illus. 15)

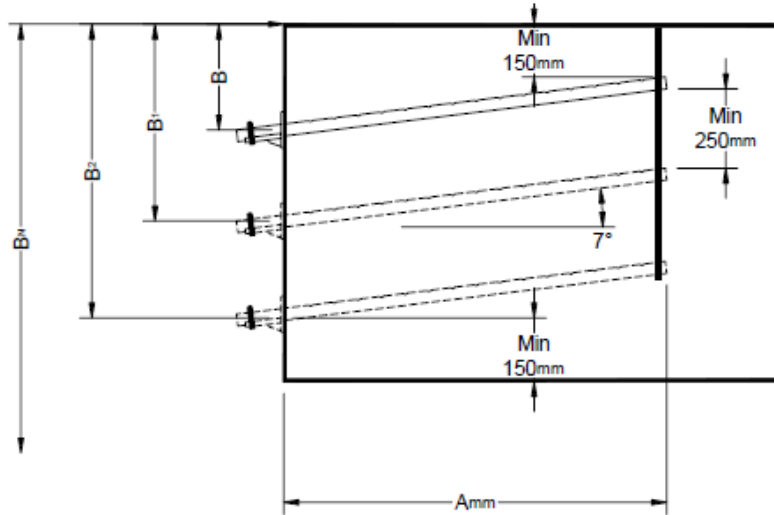


CAUTION. Risk of Flooding. When installed in vertical duct, steam distribution pipe must always be positioned so that steam holes are positioned on top (distributing steam from down to up), in order to avoid condensate to fall by gravity.

Stage 2 – Steam Distribution Pipes Positioning

Calculating Multiple Relative Steam Pipe Positions

For multiple steam pipe installations use the following guide below.
Always consult JS Humidifiers if in doubt!



$$B = [150\text{mm}] + [0.13 \times \text{Amm}]$$

$$B_1 = B + 250\text{mm}$$

$$B_2 = B_1 + 250\text{mm}$$

$$B_n = B_{n-1} + 250\text{mm}$$

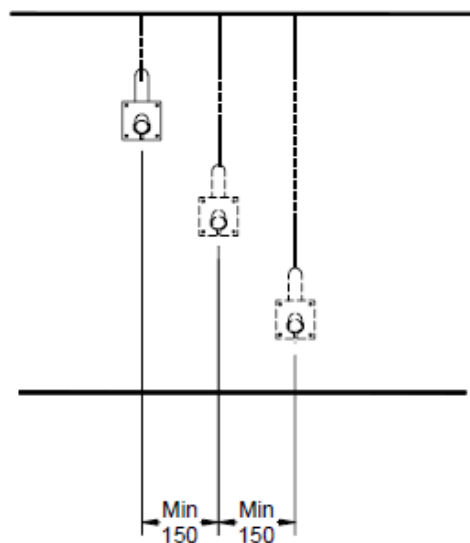
(Illus. 16)

Where

0.13 = Slope Constant

B = Minimal distance from the top of duct to the centre of the hole for the steam distribution pipe.

Always ensure that a minimal distance of 150mm is allowed for above the top and below the bottom of the steam distribution pipe.

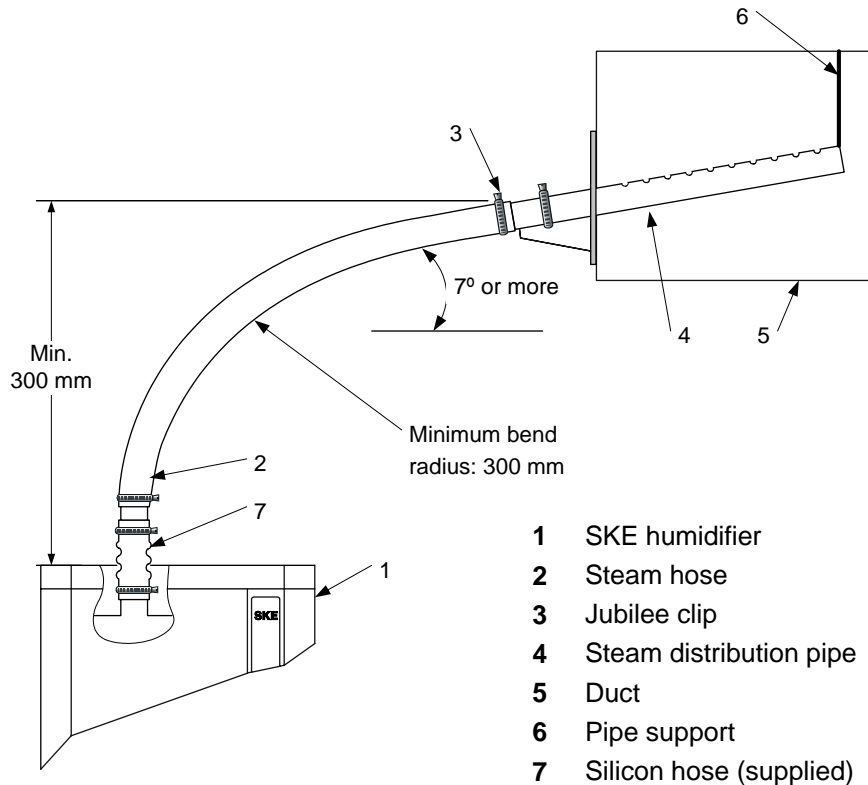


(Illus. 17)

Stage 3 – Steam Distribution Pipe Installation



CAUTION: Any type of installation (including rigid copper pipes) **MUST** have at least 300mm of flexible steam hose on the steam outlet of the humidifier to enable disconnection from the evaporation chamber for maintenance.



(Illus. 18)



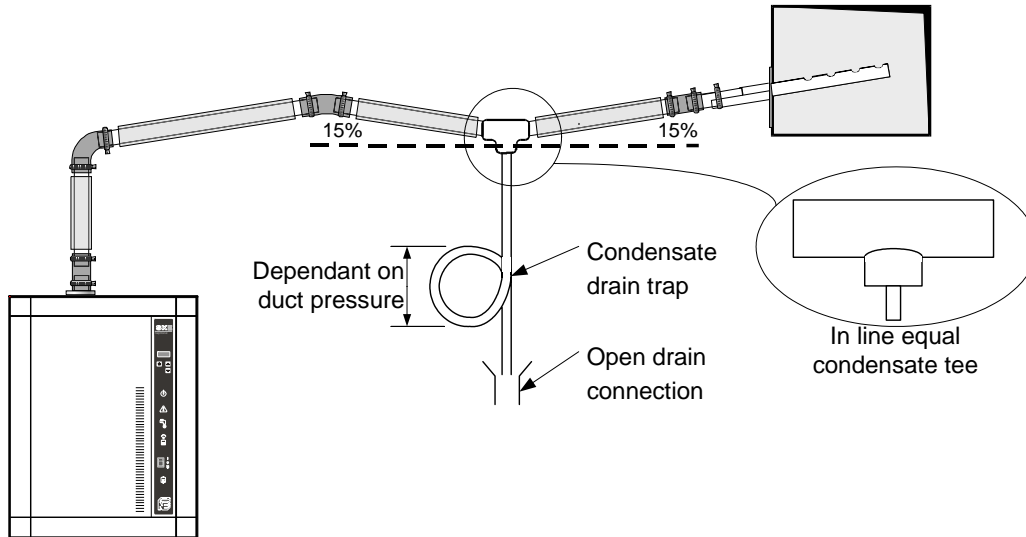
WARNING: Incorrect steam pipe installation may lead to excessive condensate. This may cause violent water hammer in the steam pipe work which can cause damage to the humidifier or injury.

The following general rules must be followed in order to avoid build up of static pressure and also to avoid any condensation accumulation.

1. Steam must not be injected into circular or oval ducts.
2. Steam hose can be used for internal installations only. All external installs must be installed in copper pipe and insulated.
3. The slope of the steam hose (rigid or flexible) should not be less than 70 in order to ensure continuous drainage of condensation back to humidifier or to a drain via a steam trap. Under no circumstances must a steam pipe (rigid or flexible) be fitted in a horizontal plane.
4. Total length of the pipe run between the humidifier and the steam distribution pipes should not exceed 5 meters. Flexible steam hose may be used on installations with a maximum of a 3 meter steam. If the humidifier is located within 3m and 5m away from the steam distribution /pipes then rigid insulated copper pipe must be used.
5. Pipe work from humidifier must be initially led with a slope for the first 300mm using flexible steam hose. This is imperative to allow access to the evaporation chamber during maintenance.
6. Rigid copper pipes must be insulated to reduce condensation build up. Minimum 25mm for inside or 50mm for external.
7. Steam pipe must be installed such that sagging cannot occur. Where sagging of the steam pipe is unavoidable a condensate tee with a suitable steam trap must be fitted to drain the condensate.
8. Always ensure that the end of the steam pipe is supported adequately and that the slope towards the steam inlet is maintained.

Stage 3 – Steam Distribution Pipe Installation

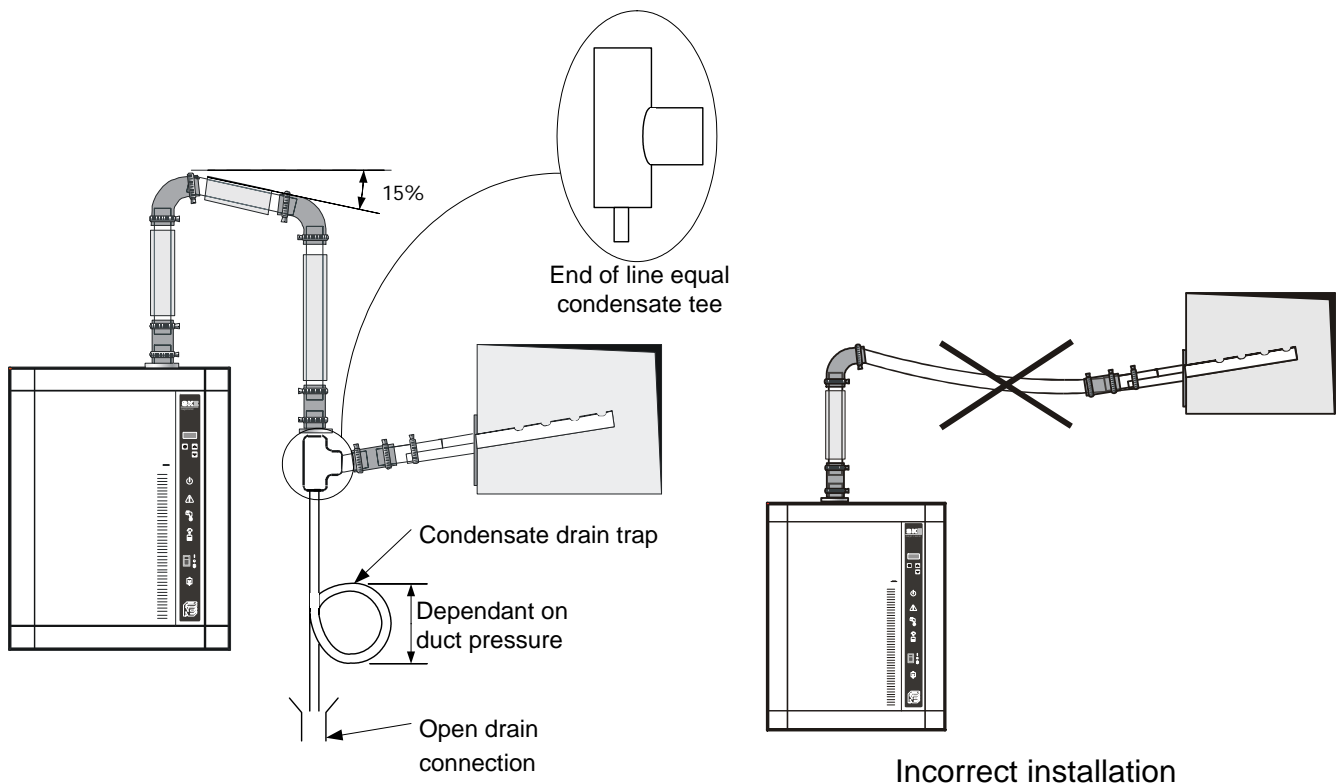
If the steam distribution pipe is fitted below the height of the humidifier steam output then it will be necessary to fit a condensate tee at the lowest point, and the condensate hose must be trapped as shown with a minimum loop of 250mm. This trap must be filled with water before putting the humidifier into operation.



(Illus. 19)



WARNING: Failure to fit a condensate trap allowing condensate to accumulate in steam pipe, which can cause damage to the humidifier or injury.



(Illus. 20)

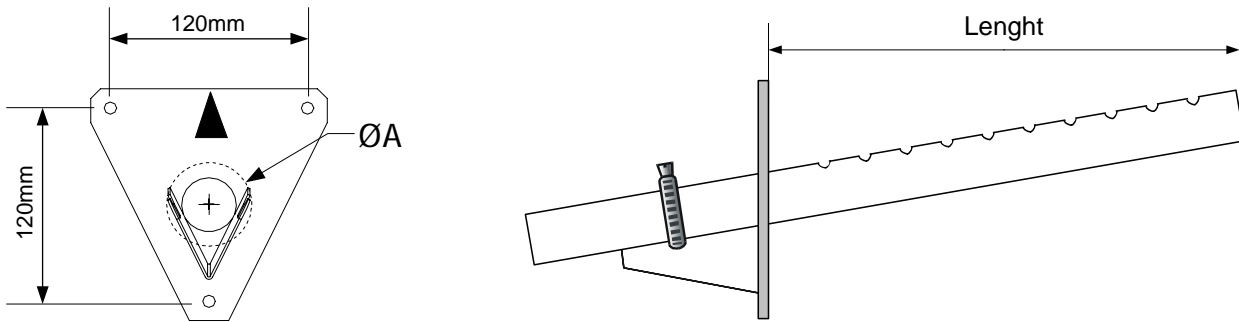
(Illus. 21)



WARNING: If steam hose is used to connect between humidifier and the steam distribution pipe it must not be installed such that it is able to sag or bed and thus accumulate condensate, which can cause damage to the humidifier or injury.

Stage 3 – Steam Distribution Pipe Installation

Steam Distribution Pipe Dimensions



(Illus. 22)

Hole size A:

The installation of a 35mm steam distribution pipe will require a 51mm hole in the duct wall.
 The installation of a 51mm steam distribution pipe will require a 78mm hole in the duct wall.
 Please note, the fixing bracket and fittings supplied are Zinc plated steel (not Stainless Steel)

Maximum steam capacity per Steam pipe type

Steam Pipe	Length (mm)	Max Steam Output (kg/h)
Sam1800BE2	1800mm	72
Sam1500BE2	1500mm	59
Sam1350BE2	1350mm	52
Sam1200BE2	1200mm	46
Sam1050BE2	1050mm	40
Sam900BE2	900mm	34
Sam750BE2	750mm	24
<hr/>		
Sam1500AE2	1500mm	56
Sam1350AE2	1350mm	52
Sam1200AE2	1200mm	39
Sam1050AE2	1050mm	34
Sam900AE2	900mm	30
Sam750AE2	750mm	28
Sam600AE2	600mm	21
Sam450AE2	450mm	12
Sam300AE2	300mm	7

Condensate Formation

The volume of condensate formed is a function of steam hose runs and the ambient conditions and the insulation of the steam pipe work. It is almost impossible to estimate for every particular install, however it can be estimated that in normal operation the following can be used as a guide.

- Steam hose 1-2% per meter run in excess of 3 meter
- Copper with 25mm insulation 2% per meter run in excess of 5 meter
- Steam distribution pipes 1.2-2.4% of duty

On start up all steam humidifiers produce condensate, the volume can be up to 45% of system duty, for the first few minutes, as the pipe work heats up. The duration for the excessive condensate formation is the time taken for the steam pipe work and steam distribution system to reach operating temperature.

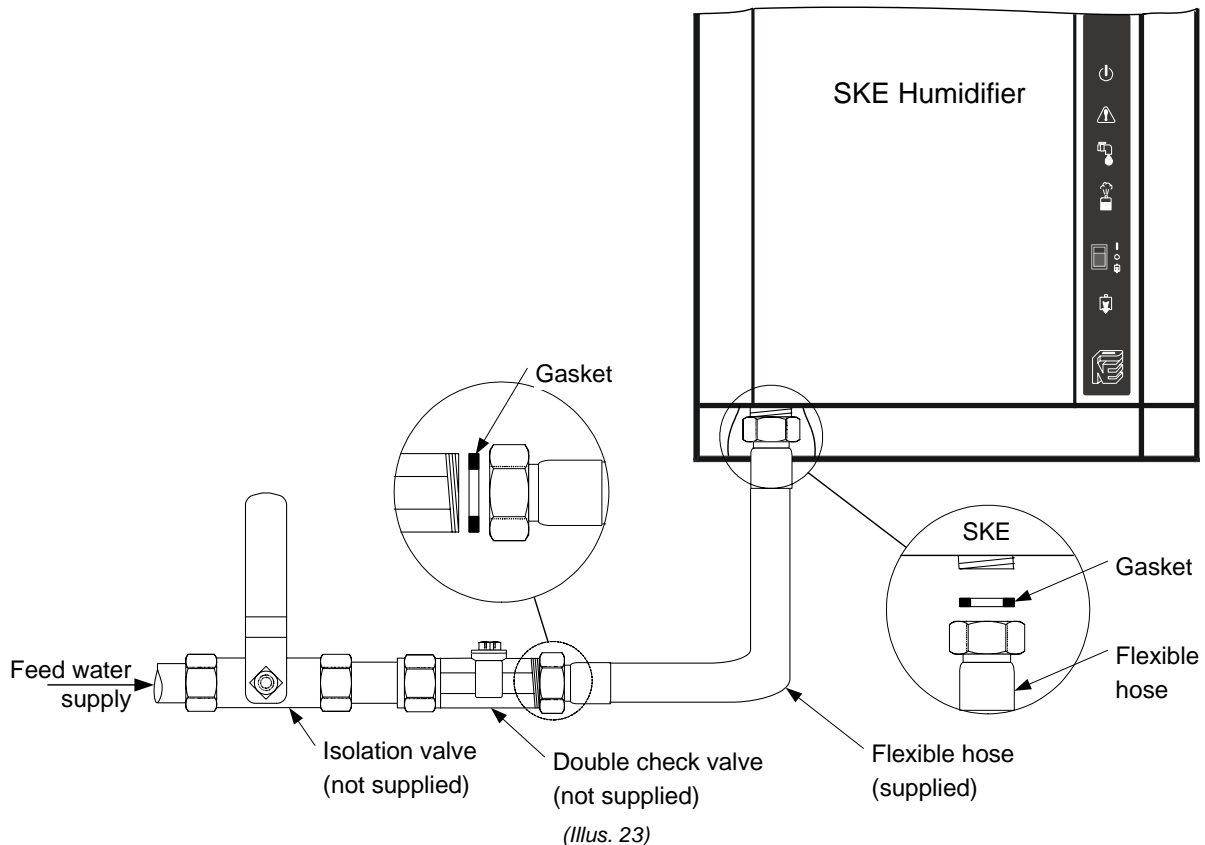


WARNING. Incorrect steam pipe installation may lead to excessive condensate. This may cause violent water hammer in the steam pipe work which can cause damage to the humidifier or injury.

Stage 4 – water supply installation

Water Inlet Connection

Any installation work must be carried out by qualified personnel. The customer is responsible for ensuring their suitability.



CAUTION: Do not over tighten hose fittings as this may cause the seals to become damaged.

1. Fit double check valve to 15mm water supply pipe before connecting flexible hose between the double check valve and humidifier. Ensure the rubber sealing washers are fitted & hand tight. Take care to ensure that the connection onto the humidifier is not cross-threaded.
2. An isolation valve (not supplied) must be installed in the water line close to the humidifier to facilitate maintenance and servicing. Ideally a pressure gauge should be fitted for commissioning and maintenance purposes.
3. Before connecting the feed water pipe-work to the humidifier, ensure the water line has been thoroughly flushed.

Water Supply

The SKE Humidifier will operate with a wide range of water qualities including demineralized water, reverse osmosis water and partially softened water.

The SKE Steam Humidifier is available in two versions, depending on the quality of the water supply.

- Standard version of SKE humidifier is suitable for use with inlet water qualities of 1-750ppm (<1 M/Ohm) .
- Ultra version of SKE humidifier is suitable for use with inlet water qualities of less than 1ppm (1-26M/Ohms)

Water inlet supply specification is as follows:

- Inlet water supply TDS level of: 1-750ppm
(Ultra version) (<1ppm)
- Minimum inlet water pressure of: 0.7 bar
- Maximum inlet water pressure of: 4.8 bar
- Maximum inlet water temperature of: 30°C .
- Minimum Ø of supply water pipe work is: 15mm

Stage 5 – Water Drain Connections

Drain Connections

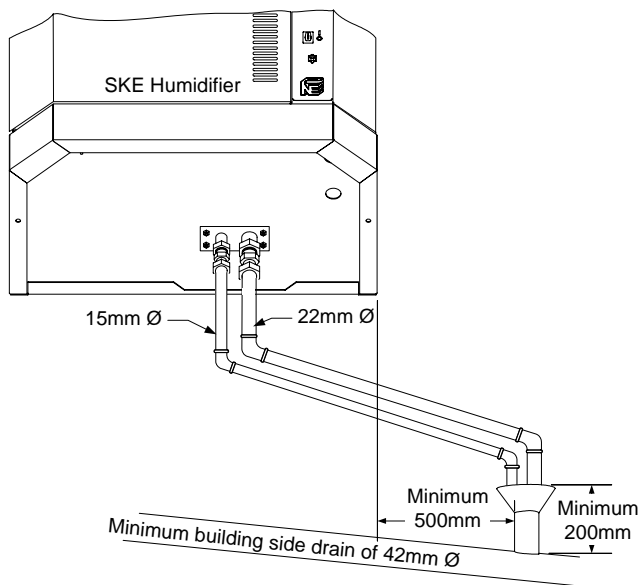
Any installation work must be carried out by qualified personnel. The customer is responsible for ensuring their suitability

The SKE Humidifier has two separate drains.

The main drain outlet located on the right side is the main hot water drain from the evaporation chamber. This is a 22mm connection.

The second drain is for the humidifier cabinet. This is to facilitate drainage of any spillage from the evaporation chamber during a service. This is the 15mm connection on the left hand side.

Standard drain arrangement



(Illus. 24)
Recommended fall angle: 2.5°

The SKE drain must be installed with a permanent air gap. Where a tundish is installed a minimum up stand of 200mm is required to stop splashing. All drains must slope away from the humidifier.

The tundish must be offset by a minimum of 500mm

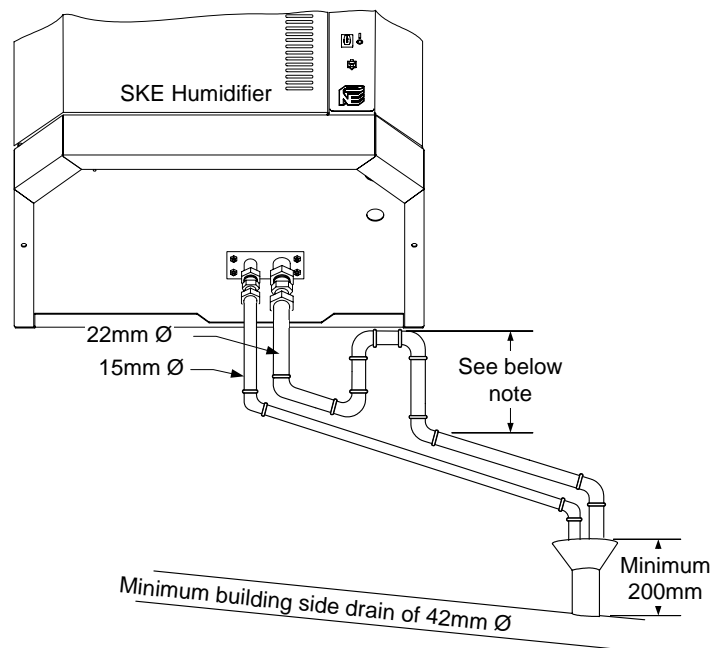


WARNING: Risk of flooding. Never connect drains to a closed pipe work. A tundish must always be installed as shown to provide a suitable air gap.



WARNING: Hot water discharge. Use only high temperature resistant materials. Drain water temperature can be between 60 - 100°C.

Drain arrangement when duct pressure exceed 1250 Pa (along with Pressure balance kit)



(Illus. 25)
Recommended fall angle: 2.5°

If the duct pressure exceed 1250Pa either positive or negative it will be necessary to install a trap in the main drain. The size of the drain trap required is dependant upon the duct pressure.

The trap must be 1mm deep for every 10Pa of pressure. i.e. 2000Pa = 200mm

The SKE drain must be installed with a permanent air gap. Where a tundish is installed a minimum up stand of 200mm is required to stop splashing. All drains must be sloped away from the humidifier.

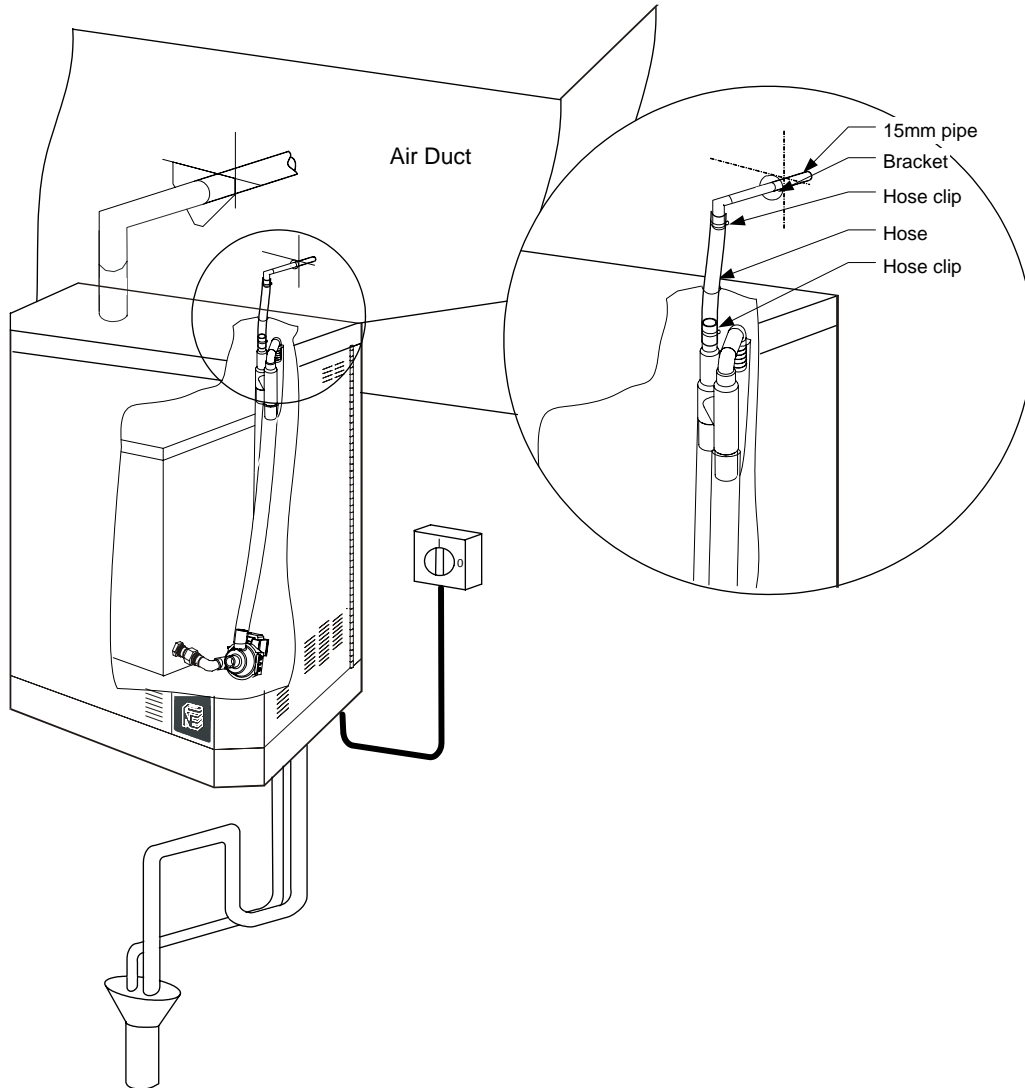
The tundish must be offset by a minimum of 500mm.

Stage 5 – Pressure balancing pipe work installation

(Only required for high pressure installations)

Where duct pressure exceeds the normal operational limit of 1250 Pascal it will be necessary to fit a pressure balancing system to compensate. 2500 Pa peaks are experienced in ducts on normal operating pressure of 1250 Pa.

As shown in the diagram below, a 15mm pipe is to be installed into the upstream duct using the bracket provided. This 15mm pipe work is then connected to the top of the water filling circuit inside the humidifier.



(Illus. 26)

Drain pipe work for higher duct pressure

Wherever duct pressures exceed the normal operational limit of 1250 Pascal it will also be necessary to adjust the minimum drain trap depth of the main drain and any condensate drains.

When sizing the required drain trap size the normal running duct pressures should be doubled to take into consideration any pressure surge upon start up of the AHU.

Running Duct Pressure (Pascal)	Maximum Duct Pressure (Pascal)	Drain trap size (mm)
1250	2500	250
2000	4000	400
2500	5000	500
3000	6000	600

Stage 6 - Electrical Supply Connection



WARNING. Risk of electric shock. Isolate all power supplies before Installation and maintenance of the SKE Humidifier.

All work concerned with the electrical installation must be carried out by skilled and qualified personnel (e.g. electrician with appropriate training). The customer is responsible for ensuring their suitability. Please observe local regulations concerning the provision of electrical installations.

Electrical Power Supply

As part of the electrical installation, the electrician/installer must ensure the following:

1. All incoming power supplies must be externally fused for over-current protection.



WARNING: Do not use re-wire able or cartridge fuses on individual phases

2. The size of the power conductors must be suitable for the maximum current supplied. The conductor size selected should be as per recommendations in BSEN60204.
3. The conductor size must be of a higher current rating than the overload protection.
4. The electrical supply must be isolated within one meter of the humidifier for the purposes of emergencies and maintenance.



WARNING: Failure to fit an electrical power isolator and MCB as part of the electrical installation significantly increases the risk of electric shock, which can be fatal.

5. The incoming power cables are secured through the unit electrical cabinet via suitably sized cable gland. Cable(s) MUST enter cabinet through entry point provided in base of electrical enclosure.



WARNING: Do not drill through cabinet as swarf may fall onto electrical components and cause dangerous operation. Always use cable entry points provided.

6. That each terminal connection is secured firmly with a cable ferrule. It is also recommended that after 50 running hours that the electrical terminals are checked and re-tightened

The SKE Humidifier requires a single 400V 3 phase power supply. Both the SKE05 and SKE10 are also available for a 230V single phase supply.

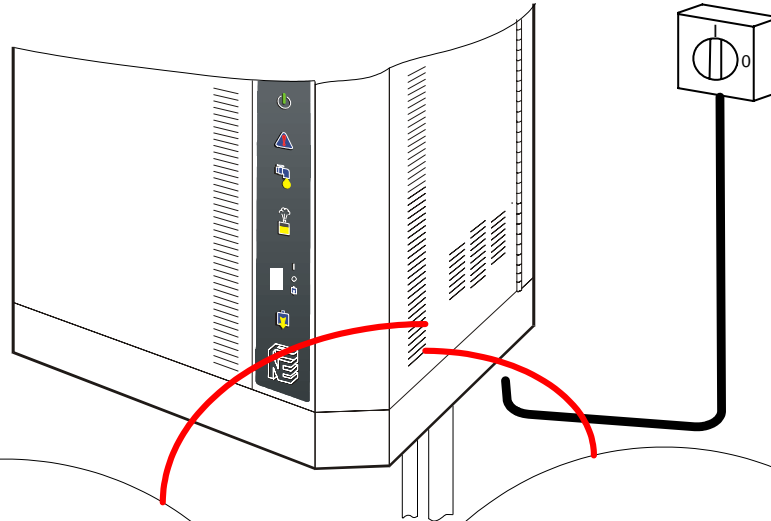
Model	Voltage	Power (kW)	Current (Amps)	Fuse rating (Amps)	Conductor size
SKE05	230V-1ph	3.7	16	20	4mm ²
	400V-3ph	3.7	5.5	10	1.5mm ²
SKE10	230V-1ph	7.5	33	40	10mm ²
	400V-3ph	7.5	11	16	2.5mm ²
SKE20	400V-3ph	15	22	25	6mm ²
SKE30	400V-3ph	22	33	40	10mm ²
SKE40	400V-3ph	30	44	50	16mm ²
SKE50	400V-3ph	36	53	63	16mm ²
SKE60	400V-3ph	44	64	80	16mm ²
SKE80	400V-3ph	60	87	100	35mm ²

Stage 6 - Electrical Supply Connection

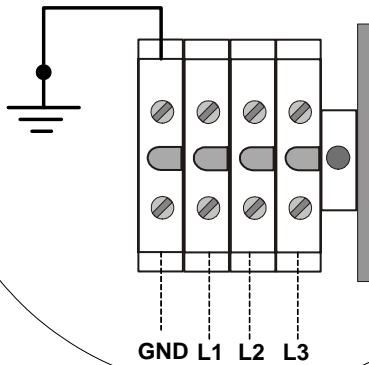
Electrical Connection



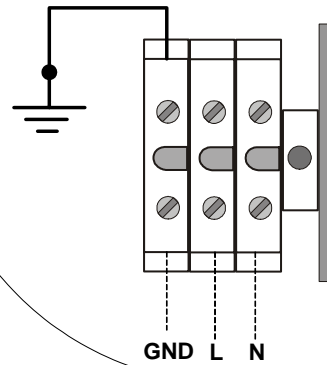
WARNING. Risk of electric shock. Isolate all power supplies before Installation and maintenance of the SKE Humidifier.



Electrical Power Connection for 400V 3ph SKE Humidifier



Electrical Power Connection for 230V single phase SKE Humidifier



(Illus. 27)

Stage 7 – Electrical Control Connections



WARNING. Risk of electric shock. Isolate all power supplies before installation and maintenance of the SKE Humidifier.

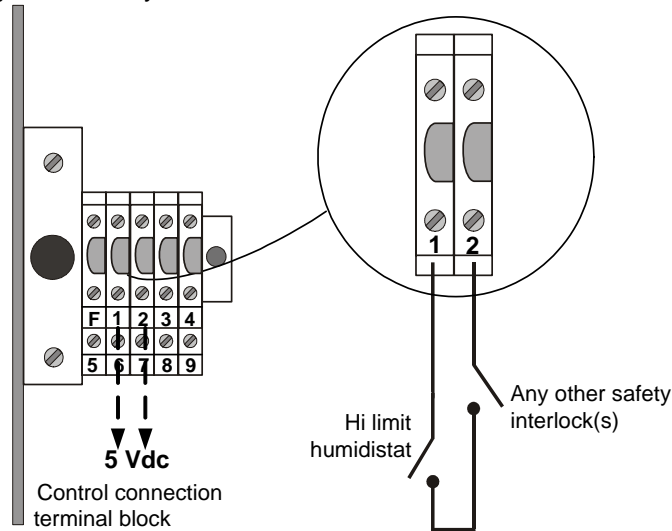
Electrical Control Connections - safety interlocks

The SKE Steam Humidifier has a modulating control system and requires interlock/enable contacts and analog control signal.

SKE humidifier requires a closed contact between terminals 1 and 2 to enable operation.

This is a 5Vdc circuit.

High level humidistat and any other safety interlock should be wired in series in this circuit.

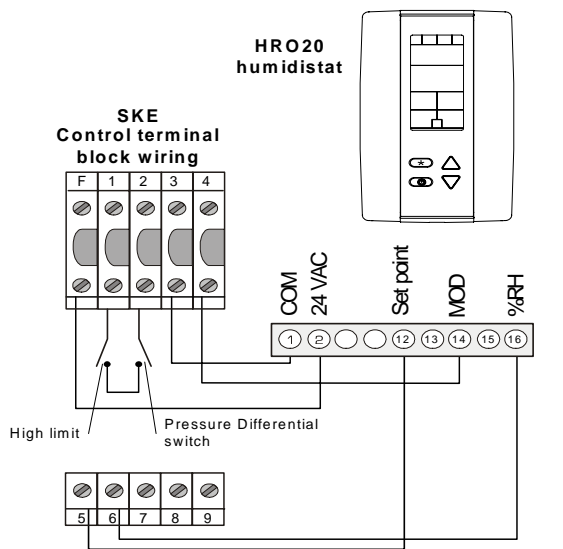


(Illus. 28)

Humidity controller connection

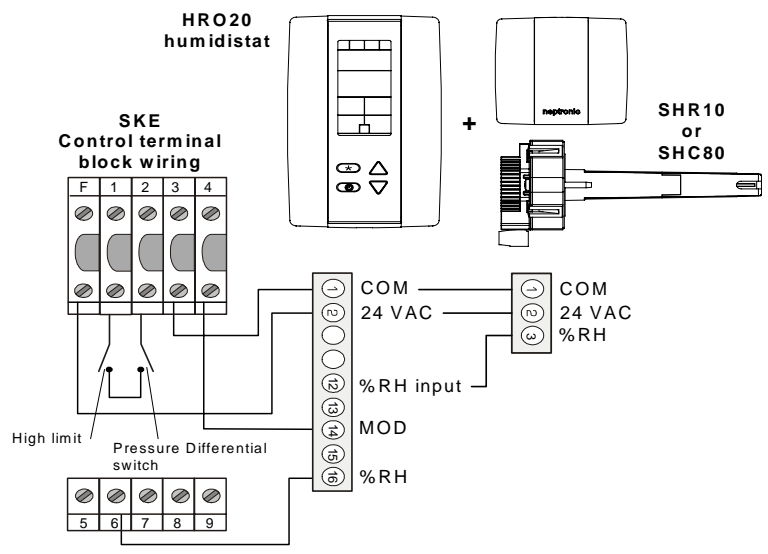
SKE Humidifier can be controlled using a HRO020 - Room humidity controller or with same HRO020 in conjunction with SHR10 - Room humidity sensor or SHC80 - Duct humidity sensor.

Control wiring should be done using a suitable 5 core screened cable, minimum 0.25 mm², and maximum length: 50 meter.



(Illus. 29)

Connection with Room humidity controller HRO



(Illus. 30)

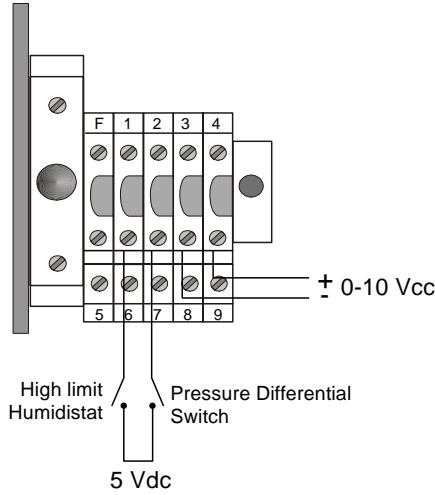
Connection with Room humidity controller HRO in conjunction with Room humidity sensor (SHR) or Duct humidity sensor (SHC)

Stage 7 – Electrical Control Connections

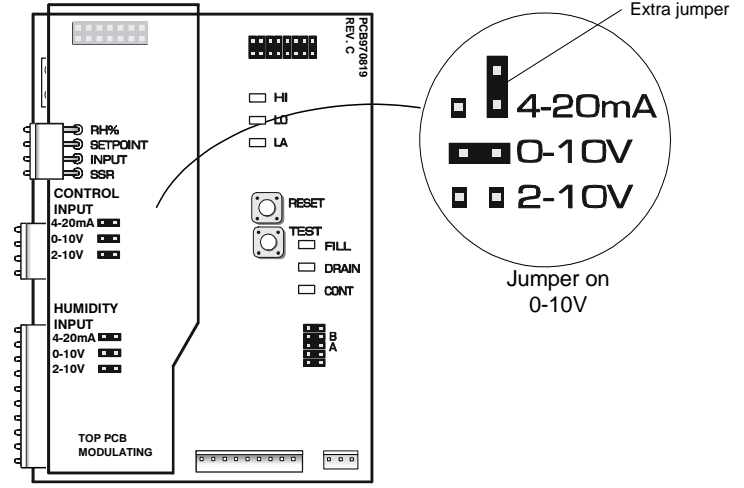
Terminal Block

Modulating Printed Circuit Board

Set-up for Control signal 0-10 Vdc

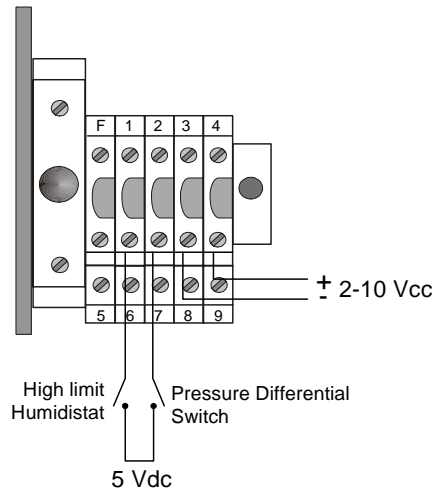


(Illus. 31)

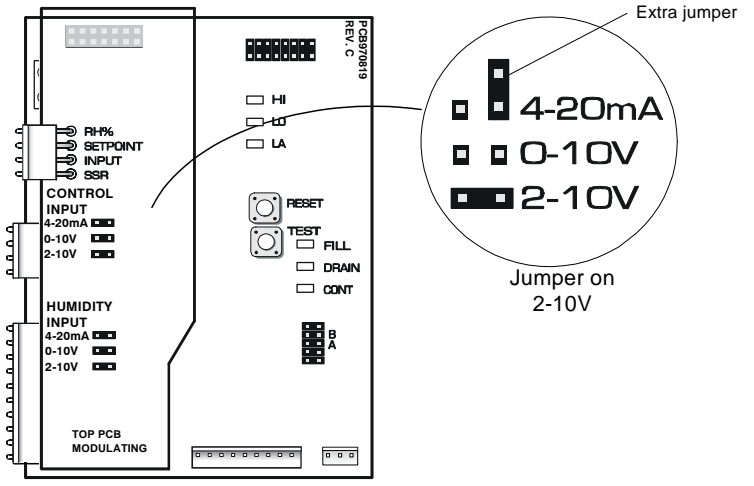


(Illus. 32)

Set-up for Control signal 2-10 Vdc

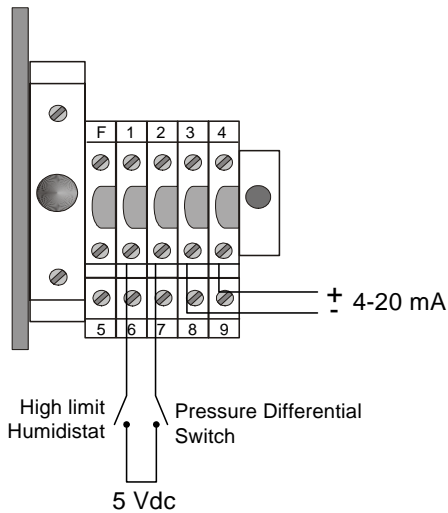


(Illus. 33)

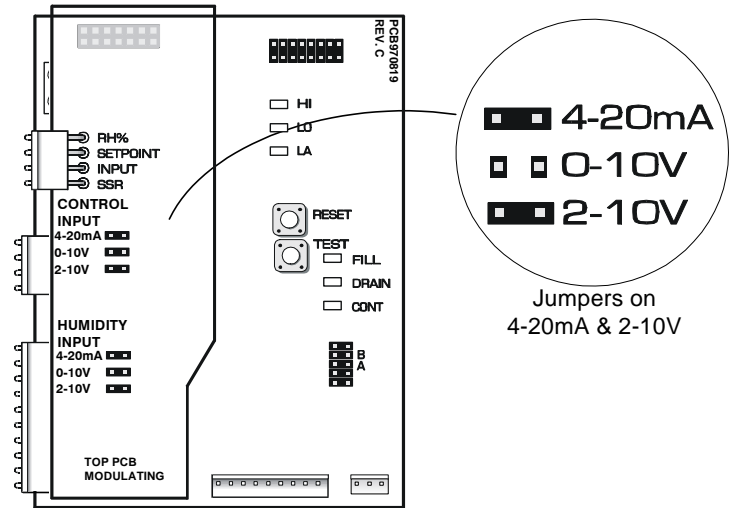


(Illus. 34)

Set-up for Control signal 4-20 mA



(Illus. 35)

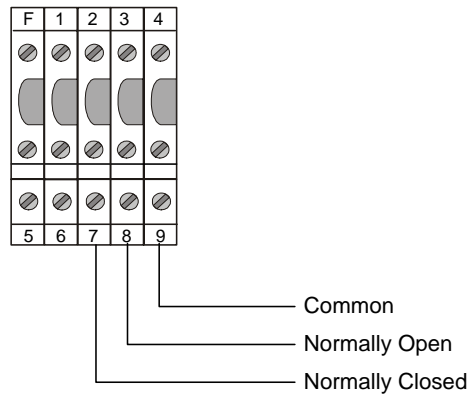


(Illus. 36)

Stage 8 - Common Alarm Connections

Volt Free Contact Alarm

A volt free contact is provided in the form of both a normally open and normally closed contact that will switch in the event of an alarm on the SKE humidifier



(Illus. 37)

Wherever possible it is recommended to use the normally closed contact. This contact will open in the event of a humidifier fault.

These contacts should be used to switch a low voltage, ideally 24V, with a switching current of no more than 3 Amps

Controls Placement (steam dispersed into a duct or AHU)

Typical humidifier control system should include along with the humidifier:

- A wall or return duct humidistat
- A high limit duct humidistat,
- An air proving switch.

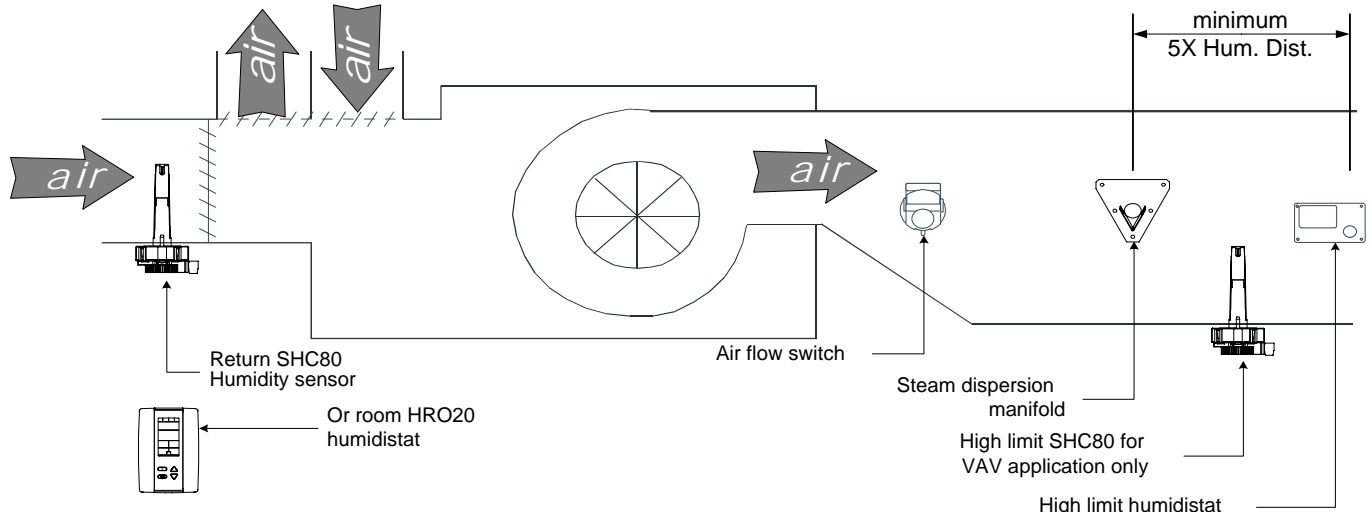
Placement of these devices is critical to proper operation of the overall system.

The return duct humidistat must always be located before any outside air intake, in order to ensure accurate sensing of the air from the humidified space.

Alternatively a room humidistat can be used. The room humidistat should be located on an inside wall or column. It should not be near any discharge air from supply ducts or sources of heat or cold.

The airflow switch must be positioned to accurately open on a loss of air flow, to prevent the humidifier from running when there is no air to absorb humidity.

The high limit humidistat must be positioned far enough – typically 5 times the humidification distance (ref to stage 2 of this manual) - downstream of the steam dispersion manifold(s) to prevent it from getting wet, but still allows it to accurately prevent over humidification of the duct that could result in condensation.



(Illus. 38)

Start-up procedure



WARNING: All work concerned with commissioning must be carried out by skilled and qualified personnel (e.g. technician with appropriate training). The customer is responsible for ensuring their suitability.



DANGER: Risk of electrical shock, disconnect humidifier from electric supply before to open electrical panel.



WARNING: Risk of burning or scalding. Evaporation chamber and its content can be extremely hot.



CAUTION: You will need to contact JS Humidifiers for the **start up password** in order to start your SKE Humidifier.

Please call JS Customer Services +44 (0)1903 858649.

JS recommends strictly following this start-up procedure to avoid problems that may be caused by a newly installed system.

In the event of a problem or discrepancy refer to the troubleshooting section.

1. Make sure that mechanical, electrical and plumbing connections are as detailed in the installation section of this manual.
2. Ensure that the humidifier has been enabled via the low voltage control circuit (Terminals 1 and 2).
3. Turn on the water supply to the humidifier and check for any leaks.
4. Turn on the power supply to the humidifier. The POWER on indicator should go on.
5. Switch the front panel rocker switch into AUTO. The first time the humidifier is operated you will be asked for a password. Enter the password obtained from JS Humidifiers Customer Services.
6. Push the TEST button located on the main PCB. This PCB is located in the electrical compartment.
7. This will start up a pre-programmed start-up cycle. This start-up cycle will test functions of the humidifier and will flush out the humidifier and supply lines. This cycle will last about 1 hour.

Note:

- a) The front panel rocker switch will not affect operation during the start-up cycle.
 - b) In the case of a modulating humidifier, there must be a demand signal of at least 50% for the start-up cycle to operate correctly.
 - c) To bypass the start-up cycle and to proceed directly into normal operation, press the RESET button located on the main PCB.
8. The front panel rocker switch may be left in the AUTO position during the start-up cycle. This will result in normal operation of the humidifier as soon as the start-up cycle is finished.
 9. Your humidifier is now fully operational



CAUTION: The humidifier should not be electrically isolated during steam production. The humidifier should be switched off at the switch on the cabinet first. Failure to observe this shutdown procedure may result in an "Overheat" fault.

Operation



(Illus. 39)

1: Alphanumeric Display

Indicates all operation parameters and any error messages. See the display section for more details.

2: Buttons (Up) and (Down)

These buttons are used to access the program mode

Button * means Menu. This button allows access to the program section. Buttons Up ▲ and ▼ Down are used to change the parameters.

3 POWER indicator

The humidifier is connected to the power supply when illuminated.

Warning: As long as the main power of the unit is connected, the "POWER" indicator will be lit, irrespective of the position of the rocker switch.

4 CHECK indicator

The "CHECK" indicator will illuminate or flash as a warning against abnormal conditions of operation. For details consult the Alphanumeric Display.

5 FILL indicator

Indication that the water supply (fill) valve is open.

6 STEAM PRODUCTION indicator

ON/OFF model, the STEAM indicator lights when the contactor is closed and steam is being generated.

MODULATING model, the STEAM indicator blinks ON and OFF in proportion to the percentage of steam output the humidifier is generating. The percentage is displayed on the alphanumeric display.

7 Rocker Switch AUTO/OFF/DRAIN

Position AUTO: The humidifier will generate steam based on demand from the humidistat or control signal.

Position OFF: Humidifier will shut off.

Position DRAIN: Humidifier will stop operating and the evaporation chamber will drain the water out. This will be done typically during a regular service.

8 DRAIN Indicator

Drain pump is open, whether as a result of an automatic drain cycle or because the front panel switch is manually set to DRAIN.

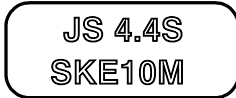
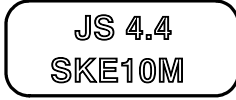


SKE Humidifier

Commissioning

Alphanumeric display

OFF mode



When the rocker switch is in the "OFF" position, the display shows the model of the unit and the software version number.

Option S: The letter 'S' indicates the option of Service, If the letter 'S' is displayed the humidifier will shutdown if the running hours exceed the programmed service hours (see programming section). If the 'S' is not displayed the unit will not shut down even if the running hours exceed the programmed service hours. (operating the unit in this mode without maintenance will invalidate the warranty and might lead to expensive repairs).

Scroll Mode

When the rocker switch is in the auto position, the display scrolls the following information every 6 seconds:

Display	Description	Details
	Percent of Relative Humidity.	Only on modulating humidifiers, if feedback humidity signal is connected to terminal #6.
	Quantity of steam produced by the humidifier	i.e.: The actual output of the unit at that moment is 8 kg/hr
	No water level is detected in evaporation chamber	Water supply valve is ON, when water level is detected this message will automatically reset

Programming mode

To enter the programming mode, press and hold the up ▲ and down ▼ buttons at the same time, followed by the * button. Press the * button twice to move to the next function. Use the arrow ▲ ▼ buttons to change values.

Display	Description	Comment
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center;"> SET POINT 40% RH </div>	STEP 1 Set point control of the sensor	Available only on Modulating models where terminal 5 of the humidifier is connected terminal 9 of HRO/HDM humidity controller. To enable set point on humidifier display: <ul style="list-style-type: none"> • Go to "Running Hrs" page • Push the test button on the main PCB until the display clears. • Re-enter the menu where the first display will be Set point. Choose the initiation of a drain cycle for 1 to 24 hours.
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center;"> DRAIN 4 HRS </div>	STEP 2 Drain frequency. From 1 to 24 hours Default setting 4 hours	Factory setting is 4 hours. In general, the harder the water is, more often the drain cycle should be. The drain cycle may only be disabled if the humidifier is running on RO water. To do this, access this parameter and press and hold the test button the main PCB for 5 seconds. The drain cycle can be re-activated in the same way.
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center;"> RUNNING 645 HRS </div>	STEP 3 Number of running hours	e.g. the unit has operated 645 hours since the last service. After a service has been done reset the number of hours of operation to zero. To do this access this menu option and simultaneously press Up & Down arrow buttons for 30 seconds.
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center;"> SERVICE 1000HRS </div>	STEP 4 Hour span between servicing. From 400 to 1500 hours Default setting 1000 hours	You can set the number of hours of operation before the humidifier will call for service (blinking of CHECK light every 4 seconds) from 400 to 1500 hours. In general, the harder the water is, the lower the number of hours of operation before service should be.
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center;"> LOCK ON 100% PWR </div>	STEP 5 Output Span From 0-100% Default Value 100%	This option is available on the modulating version only to set the upper limit of steam output in relation to the maximum capacity of the unit.

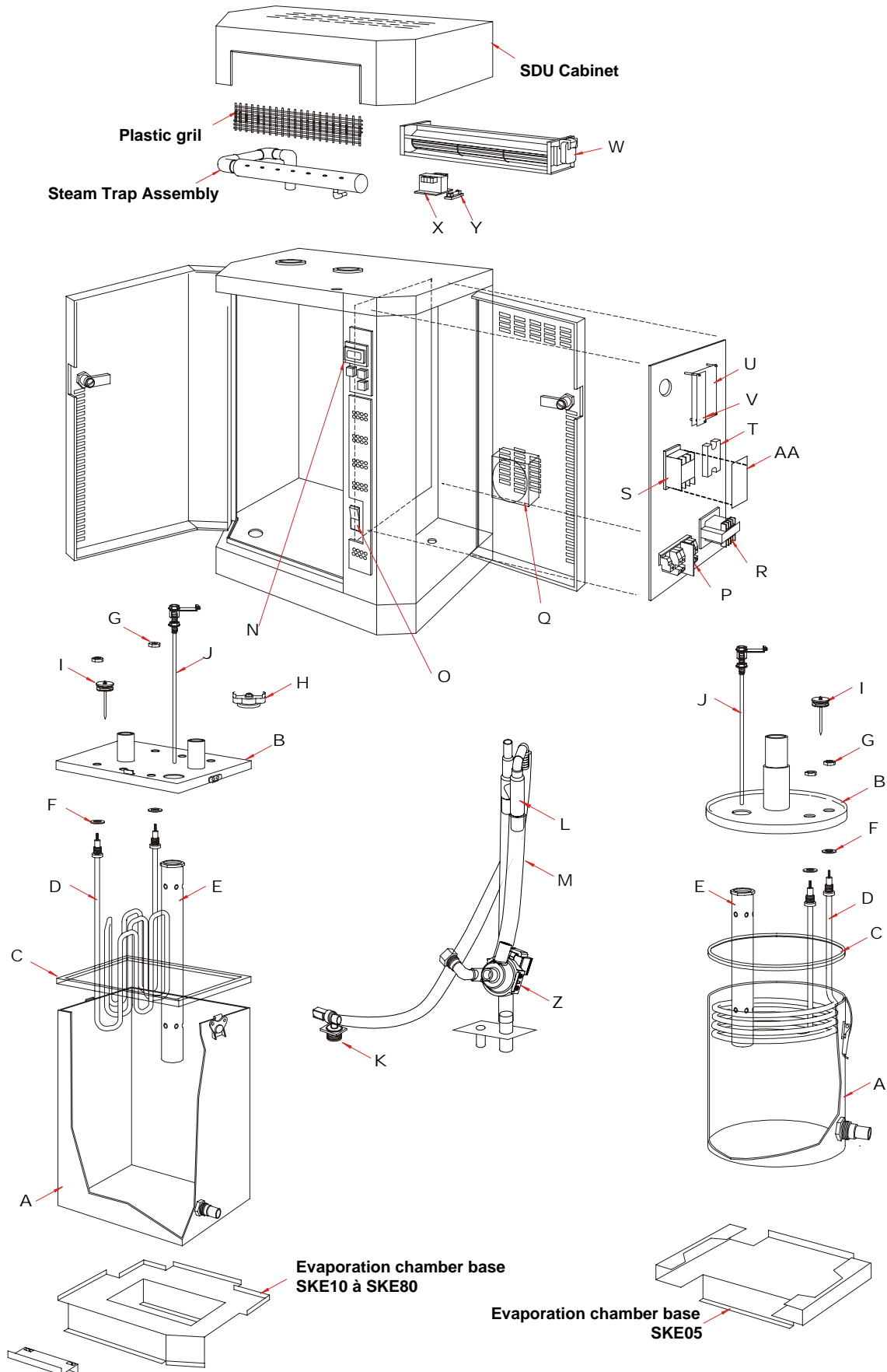
Software options



CAUTION: Water dilute settings (steps 6 to 9) are only to be enabled for humidifier application requiring close humidity control and using reverse osmosis or demineralised water supply. These settings should only be set by qualified or suitable trained personnel.

Display	Description	Comment
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center;"> W-DILUTE 20 MIN </div>	STEP 6 Water Dilution Span. From 3 to 120 min. Default setting 20 mins	The water dilution cycle is an alternative method of controlling the level TDS (Total Dissolved Solids) within the evaporation chamber. Rather than a complete drain the water dilution cycle will drain small amounts more frequently. To enable this function, access this parameter in the menu and press and hold the test button on the main PCB. This parameter determines the frequency of drains. Refer to Step 7 to set the duration of the drain
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center;"> OPEN-DRN 15 SEC </div>	STEP 7 Duration of drain pump opening. From 0 to 21 seconds Default settings SKE05,10 - 1secs SKE20,30,40 - 4secs SKE50,60,80 - 8secs	You can set the duration of drain pump opening during water dilution cycle from 0 to 21 sec. Factory setting is 15 sec. The duration of drain pump opening should be so that the water level in evaporation chamber will never be below "LO" in order to avoid any stoppage in the steam production.
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center;"> FILL ON 6 SEC </div>	STEP 8 Pulsed fill time of inlet water valve. Only applicable when water dilution cycle is enabled. Default settings SKE05 - 0.7secs SKE10,20,30 - 1secs SKE40 - 1.2secs SKE50,60,80 - 1.6secs	When the water dilution cycle is enabled the humidifier will pulse the inlet water valve to limit the intake of cold water and thus attain closer control. The duration of Fill valve opening should be so that the water level in evaporation chamber will never be below "LO" in order to avoid any stoppage in the steam production. If the water level reaches LO a complete fill cycle will occur until the HI level has been reached.
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center;"> FILL OFF 4 SEC </div>	STEP 9 Pulsed fill time of inlet water valve. Only applicable when water dilution cycle is enabled. Default settings SKE05,10 - 10secs SKE20,30,40 - 7secs SKE50,60,80 - 6secs	When the water dilution cycle is enabled the humidifier will pulse the inlet water valve to limit the intake of cold water and thus attain closer control. The duration of Fill valve closing should be so that the water level in evaporation chamber will never be below "LO" in order to avoid any stoppage in the steam production. If the water level reaches LO a complete fill cycle will occur until the HI level has been reached.
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center;"> SHUTDOWN DRAIN ON </div>	STEP 10 Drain or no drain Default value t: No drain	You can select the execution of a complete drain of the evaporation chamber when there is no RH% demand.
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center;"> STANDBY DISABLE </div>	STEP 11 Water Heating when humidifier on standby Default value: Disabled	You can select to maintain the water temperature in the evaporation chamber at 70°C when the humidifier is not in operation.
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center;"> FILLCOMP 0% </div>	STEP 12 Fill Compensation Default: 0%	Fill compensation is to be used on very close control applications. You can increase the power to the elements by a percentage during a fill cycle to compensate for the effect of the cold water.
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; text-align: center;"> Tcy 99C </div>	STEP 13 Evaporation chamber temperature	Display of the temperature reading of the evaporation chamber. Indication only.

Exploded view



(Illus. 40)



SKE Humidifier

Maintenance

Parts list

Note: Add suffix **in bracket** (P or DI) where applicable for humidifier with **ULTRA** option

Item	Description	Model	Part number
A	Container of evaporation chamber	SKE05	SW CONTSMA-ASSY(P)
		SKE10 to SKE40	SW CONTMED-ASSY(P)
		SKE50 to SKE80	SW CONTLAR-ASSY(P)
B	Cover of evaporation chamber	SKE05 (1 phase)	SP 4018-M(P)
		SKE05 (3 phases)	SP 4019-M(P)
		SKE10 & SKE20	SP 4183A(P)
		SKE30 & SKE40	SP 4183B(P)
		SKE50 & SKE60	SP 4186(P)
		SKE80	SP 4185A(P)
C	Evaporation chamber gasket	SKE05	SP 1008
		SKE10 to SKE40	SP 1021
		SKE50 to SKE80	SP 1022
D	Heater element	See detailed table next page	
E	Level sensor chamber	SKE05	SP 4196-M
		SKE10 & 20	SP 4197-M
		SKE30/40/50/60/80	SP 4198-M
F	Element gasket	SKE05 to SKE80	SP 1005
G	S/S hex. Jam nut (elements)	SKE05 to SKE80	SP 2330
H	High temperature switch (klixon)	SKE05 to SKE80	SP 3035
I	Foam sensor	SKE05	SW FOAMSM-ASSY
		SKE10 to SKE40	SW FOAMMED-ASSY
		SKE50 to SKE80	SW FOAMLG-ASSY
J	Water level sensor	SKE05	SW PROBSM-ASSY(DI)
		SKE10 & 20	SW PROBMD-ASSY(DI)
		SKE30/40/50/60/80	SW PROBLAR-ASSY(DI)
K	Water supply valve	SKE05 to SKE80	SP 6003
L	Fill and drain trap assembly	SKE05	SW TRAPSMA-J
		SKE10 to SKE40	SW TRAPMED-J
		SKE50 to SKE80	SW TRAPLAR-J
M	Silicone tubing	SKE05 to SKE80	SP 1023
N	Alphanumeric display	SKE05 to SKE80	SW SK300DISPLAY
O	"AUTO/OFF/DRAIN" rocker switch	SKE05 to SKE80	SP 3037
P	Terminal block and high voltage connectors	SKE05 to SKE80	/
Q	Cooling fan	SKE05 to SKE80	SP 3007
R	Transformer	See detailed table next page	
S	Contactora	See detailed table next page	
T	Solid State Relay	See detailed table next page	
U	Main Printed circuit board	SKE05 to SKE80	NW SKEJSMAN
V	Modulating Printed circuit board	SKE05 to SKE80	NW SK300MODULSS
W	SDU fan	SDU I	SP 3008
		SDU II	SP 3006
		SDU III	SP 3010
X	Transformer	See detailed table next page	
Y	Fuse inside SDU	SDU I and SDU III	SP 5105
Z	Drain pump	SKE05 to SKE80	SP 6010
AA	Contactora shield	See detailed table next page	



SKE Humidifier Maintenance

Parts list

Item	SKE05		SKE10		SKE20	SKE30	SKE40	SKE50	SKE60	SKE80
	230V/1~	400V/3~	230V/1~	400V/3~	400V/3~	400V/3~	400V/3~	400V/3~	400V/3~	400V/3~
D Heater element	SE 5937 (1X)	SE 5980 (3X)	SE 5983 (3X)	SE 5981 (3X)	SE 5982 (3X)	SE 5983 (3X)	SE 5955 (3X)	SE 5984 (6X)	SE 5983 (6X)	SE 5955 (6X)
<i>Add suffix P for humidifier with ULTRA option</i>										
R Transformer	SP 3366	SP 3367	SP 3366	SP 3367				SP 3374		
S Contactor	SP 3082 (1X)	SP 3080 (1X)	SP 3083 (1X)	SP 3080 (1X)	SP 3100 (1X)	SP 3100 (1X)	SP 3027 (1X)	SP 3027 (1X)	SP 3100 (2X)	SP 3081 (2X)
T SSR	SP 3102A (1X)	SP 3104A (2X)	SP 3102A (1X)	SP 3104A (2X)	SP 3102A (2X)	SP 3103A (2X)		SP 3103A (4X)		
X SDU Transformer	SP 3375	SP 3373	SP 3371	SP 3376		SP 3370		-	-	-
AA Contactor shield	SP 5460 (1X)							SP 5460 (2X)		

Recommended Spares list

JS humidifier does recommend replacing the following parts as a preventative maintenance program:

Spare part	When to replace it
Evaporation chamber gasket Item C	At least once a year or if gasket show sign of leakage or if material became hard and show signs of crack.
Element gasket Item F	If and when heating element is replaced or if there is sign of leakage or crack in material
Foam sensor gasket	If and when Foam sensor (item I) is replaced (gasket is supplied with replacement foam sensor) or if there is sign of leakage or crack in material
Water level sensor gasket	If and when Water level sensor (item J) is replaced (gasket is supplied with replacement water level sensor) or if there is sign of leakage or crack in material
Heating element Cable harnesses	If there is sign of overheating or crack in insulation jacket of wires.
Insulation boot on heating element	If there is sign of overheating or crack in material.

Routine maintenance

Maintenance Contract

Comprehensive maintenance contracts are available from JS Humidifiers Plc. Services include:

- Commissioning
- Planned maintenance contracts
- Breakdown response
- Technical advice and back up
- Product training
- Spares on demand

It is strongly recommended that 1 month after commissioning, and 6 months after commissioning, an inspection and review of the system is made by a suitably qualified engineer. This is necessary in order to check that the unit is functioning correctly and to make any minor adjustments that maybe required.

Contact the customer service department for more information.

Customer Service Hotline: 01903 858649

Spares Hotline: 01903 858618



WARNING. All work concerned with electrical installation **MUST** only be performed by skilled and qualified technical personnel (e.g. electrician or technicians with appropriate training). The customer **MUST** be responsible for ensuring their suitability.

Routine Inspection/Service Schedule

The SKE humidifier requires both a service and inspection at regular intervals.

The frequency is dependent upon several factors including water quality, steam output and hours run.

Electrical Connections

For new humidifier installations, **after 50 hours** of operation, check and tighten all electrical power connections

Determining Service Frequency

500 hours after commissioning it is recommended to inspect and service the evaporation chamber. This inspection is necessary in order to establish what maintenance frequency is required.

Typical service frequency:

Mains supply water >300ppm 1000 running hours

Mains supply water <300ppm 1500 running hours

Partially softened supply water 1500 running hours

This frequency should be re-evaluated at each service according the level of scale within the evaporation chamber. The maintenance frequency in the programming section should be adjusted accordingly.

Service Procedure

1. Remove and clean evaporation chamber. Follow instructions in maintenance section on how the evaporation chamber should be removed.
2. Carry out a full inspection of the humidifier. Check inspection procedure below.

Inspection Frequency

Monthly

Inspection Procedure

1. Check for water leaks.
2. Check for steam leaks
3. Check condensate handling both at steam outlets and drains.
4. Observe operation including steam production.
5. Check drain operation and flow.
6. Check hours run before service requirement.
7. Check all electrical connections are secure

Removing & Cleaning Evaporation chamber



WARNING. All work concerned with electrical installation **MUST** only be performed by skilled and qualified technical personnel (e.g. electrician or technicians with appropriate training). The customer **MUST** be responsible for ensuring their suitability. It is recommended all servicing work is done by JS Humidifiers.

Removing the Evaporation Chamber

It will be necessary to remove the evaporation chamber during the installation and certain maintenance procedures. This should be done as follows

1. Completely drain the humidifier.



WARNING: RISK OF BURNS

Evaporation chamber and its contents may be extremely hot. Drain and refill repeatedly to cool the evaporation tank by utilizing the AUTO/OFF/DRAIN rocker switch on the front of the cabinet.

2. **ENSURE THAT BOTH THE ELECTRICAL AND WATER SUPPLY ARE ISOLATED.**
3. Unplug all the heating elements power connectors from the evaporation chamber. This will include 1-5 brown connectors depending on the size of the humidifier. Check the labeling of these connectors so you can ensure they are returned to the correct sockets upon re-assembly.
4. Remove the water level sensor connection from the PCB on top of the evaporation chamber.
5. Unplug the remaining electrical controls connector.
6. Disconnect the twin filling and drain port by unscrewing the union.
7. If necessary, remove the steam hose from the steam outlets of the evaporation chamber.
8. Check that the transit plate has been removed and for any obstructions. Then lift the evaporation chamber out of the humidifier cabinet

Cleaning the Evaporation Chamber

Do not use any chemicals or cleaning agents when cleaning the evaporation chamber and elements. Any residues left behind may cause excessive foaming during operation.

1. Access to inside the evaporation chamber is made by releasing the hinged latches and removing the chamber lid.
2. Remove the scale from the bottom of the evaporation chamber.
3. The elements should be cleaned as much as possible using only soft materials that will not scratch the surface of the elements.
4. Check and tighten the heating element holding nuts if necessary.
5. Clean or replace the evaporation chamber gasket if necessary
6. Rebuild the evaporation chamber and replace back into the cabinet in the same manner as it was removed.
7. Reset the hours run counter. See commissioning/programming for instructions.
8. Wait for humidifier to produce steam and check for any leaks.



CAUTION: When replacing or renewing gaskets, do not use grease or saponifiable matter on any of the surfaces.

Failure to comply could result in foaming within the boiling vessel and possible humidifier malfunction or equipment failure

Trouble shooting

Message	Meaning	Possible Cause and Solution
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 0 auto;"> <p>OVER HEATED</p> </div>	Temperature inside evaporation chamber has exceeded 106°C	<ul style="list-style-type: none"> • A build up of condensate has occurred in the steam pipes. Check installation is correct and for blockages. • There is a blockage between evaporation chamber and the steam distribution pipe. Check steam distribution pipe for blockage. • There is a loose connection between the water level sensor (Item J) and the plug connector. Check connections and reset the unit as described in the commissioning section. • The water level sensor (Item J) may require cleaning or have been damaged. Remove the water level sensor and Inspect. Clean gently with a soft cloth. Be careful not to damage the Teflon coating. • The humidifier has been shut down incorrectly. The humidifier must not be electrically isolated during steam production.
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 0 auto;"> <p>DRN/PROB BLOCK</p> </div>	Humidifier is unable to drain water from evaporation chamber	<ul style="list-style-type: none"> • The drain pump is blocked. Check operation by ordering Drain with rocker switch. If blockage is confirmed disconnect pump and drain through the pan. WARNING: Risk of burns, water from evaporation chamber can be extremely hot. Refer to Removing & cleaning evaporation section (previous page) on how to proceed. • The drain pump has failed: Replace as necessary. • The PCB may be faulty. Press drain button on front panel and look at PCB inside control panel. The drain LED should be lit. If not the PCB is faulty and should be replaced. • There is a loose connection between the water level sensor (Item J) and the plug connector. Check connections and reset the unit as described in the commissioning section. • The water level sensor (Item J) requires cleaning or has been damaged. Remove the water level sensor and Inspect. Clean gently with a soft cloth. Be careful not to damage the Teflon coating.
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 0 auto;"> <p>PROBE DEFECTED</p> </div>	Water level sensor is defective	<ul style="list-style-type: none"> • There is a loose connection between the water level sensor (Item J) and the plug connector. Check connections and reset the unit as described in the commissioning section. . • The water level sensor (Item J) may be scaled up and require cleaning: Remove the water level sensor and Inspect. Clean gently with a soft cloth. Be careful not to damage the Teflon coating. • The water level sensor (Item J) may be damaged or affected by a piece of debris. Replace if necessary. This should only be done by a qualified engineer.
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 0 auto;"> <p>NO LEVEL</p> </div>	Water level inside evaporation chamber has not yet reached the proper level for operation	<ul style="list-style-type: none"> • The inlet water supply is not connected or has been isolated. Check water supply. . • The water level sensor (Item J) may be damaged or affected by a piece of debris. Replace if necessary.

Trouble shooting

Message	Meaning	Possible Cause and Solution
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 0 auto;"> FOAMING CYCLE </div>	Humidifier has sensed foam in the evaporation chamber and is draining water to reduce/eliminate the foam build up.	<ul style="list-style-type: none"> A high build up of minerals in the evaporation chamber is due to insufficient draining frequencies or durations. Increase drain times as necessary. Grease and /or flux left in the pipe work from a new installation have caused the water to foam. Turn the power supply to the humidifier off and on. The POWER indicator should go on. Switch the front panel rocker switch into AUTO. Push the TEST button located on the main PCB. This PCB is located in the electrical compartment. This will start up a pre-programmed start-up cycle. This start-up cycle will test functions of the humidifier and will flush out any dirt in the humidifier and supply lines. This cycle will last about 1 hour.
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 0 auto;"> SERVICE REQUIRED </div>	Humidifier has reached is preset running hours limit	<ul style="list-style-type: none"> Call JS Customer Services on +44 (0)1903 858649 to arrange for a skilled engineer to service your humidifier
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 0 auto;"> SAFETY OPEN </div>	Humidifier is disabled	<ul style="list-style-type: none"> The humidifiers enable contact on terminals 1 and 2 are open. These are typically connected to the BMS or a high humidistat or air proving switch.
<div style="border: 1px solid black; border-radius: 15px; width: 60px; height: 40px; margin: 0 auto;"></div>	The display is blank	<ul style="list-style-type: none"> Power supply has been isolated. The over temperature protection switch (klaxon) has tripped or been disconnected. Reset as necessary. Check all necessary connectors are securely connected especially the water level connector (item J). On humidifier equipped with SDU, this can be caused by water drops on flat ribbon cable resulting in a short circuit of LCD display PC board.
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 0 auto;"> NO DEMAND </div>	Humidifier receive no humidity demand signal	<ul style="list-style-type: none"> Humidifier does not receive analog signal (between terminals 3 and 4). Verify the connections of the wires to the control terminal blocks Analog signal set up is not properly set. Verify the setting of the humidistat.
	Cooling fan is not operating	<ul style="list-style-type: none"> The cooling fan located in the electrical compartment door is powered from the circuit board. Check the operation of the circuit board and replaced cooling fan or circuit board as necessary.

Resetting a fault alarm

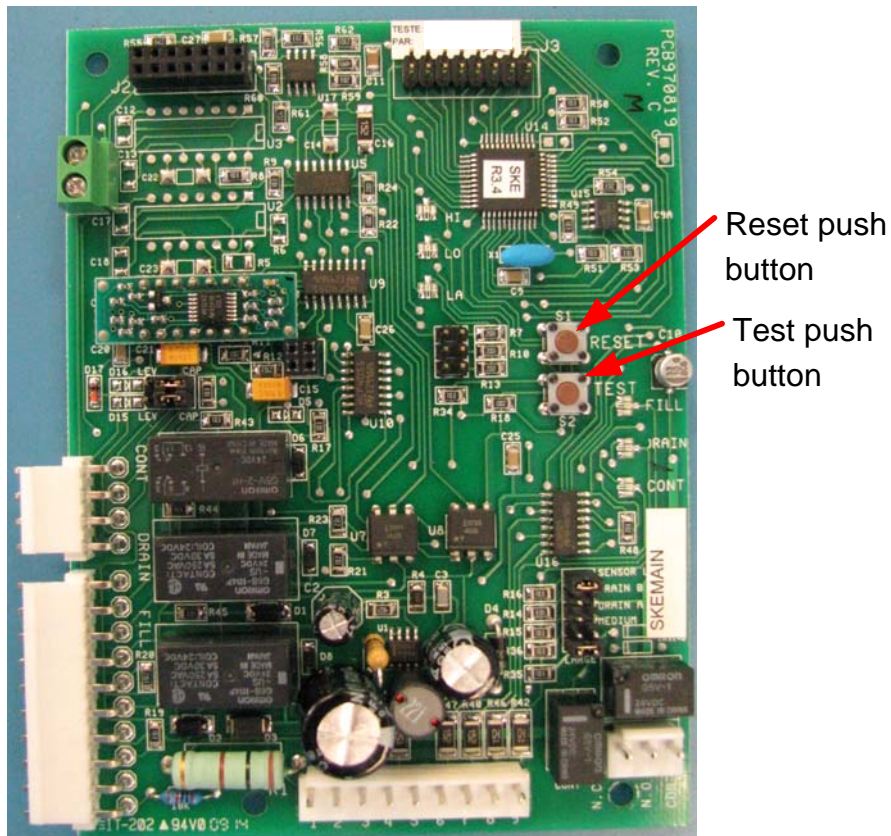


WARNING. Alarm resetting must only be carried out by a suitably qualified engineer.

How to reset an alarm

Once the reason for the fault has been identified and rectified (refer to Trouble shooting section) the fault will have to be reset by following the procedure below.

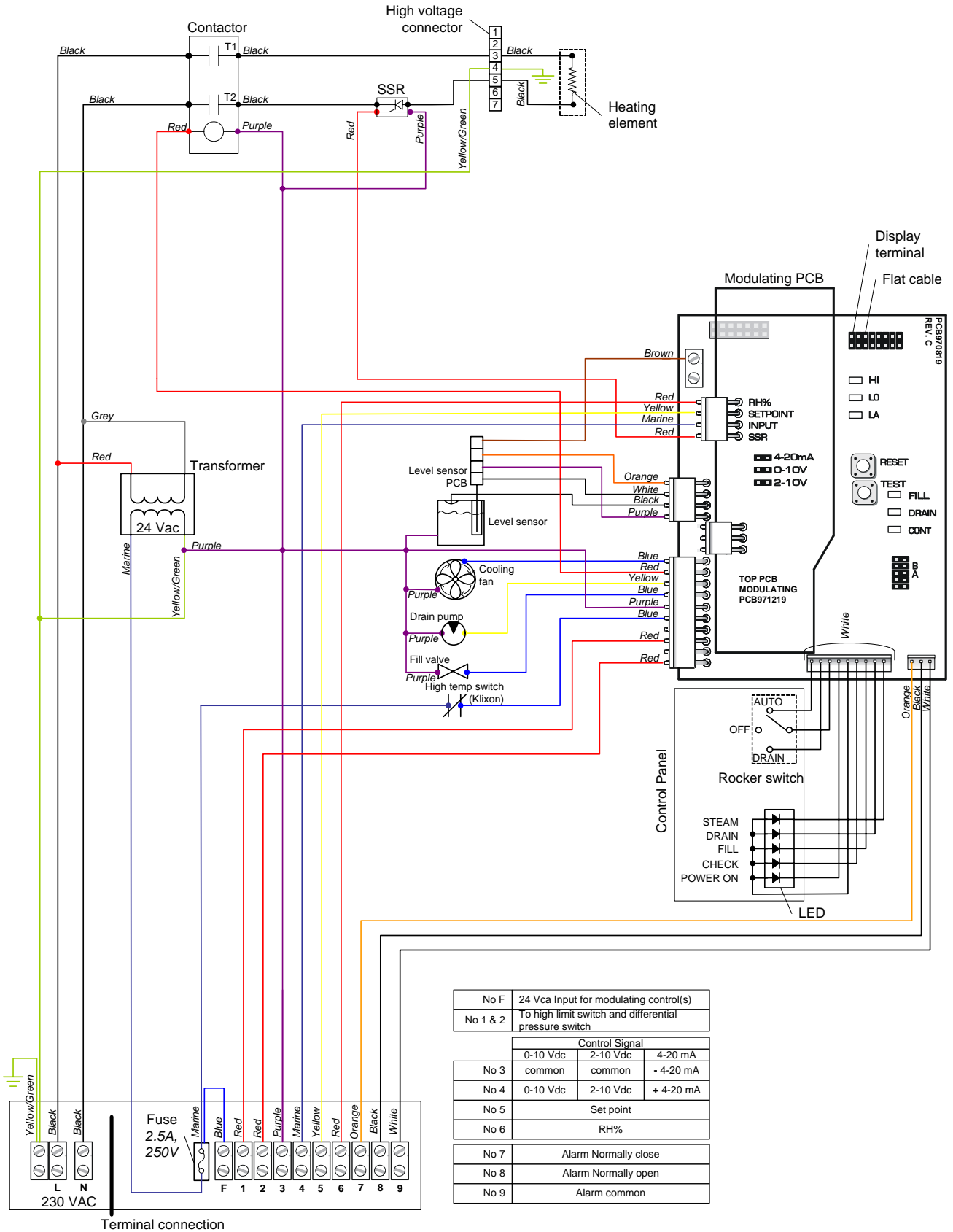
1. Access the Main control PCB inside electrical compartment of the humidifier.
2. Press the TEST button located on the PCB as shown below.
3. Press the RESET button located on the PCB as shown below.



(Illus. 41)

Wiring diagram

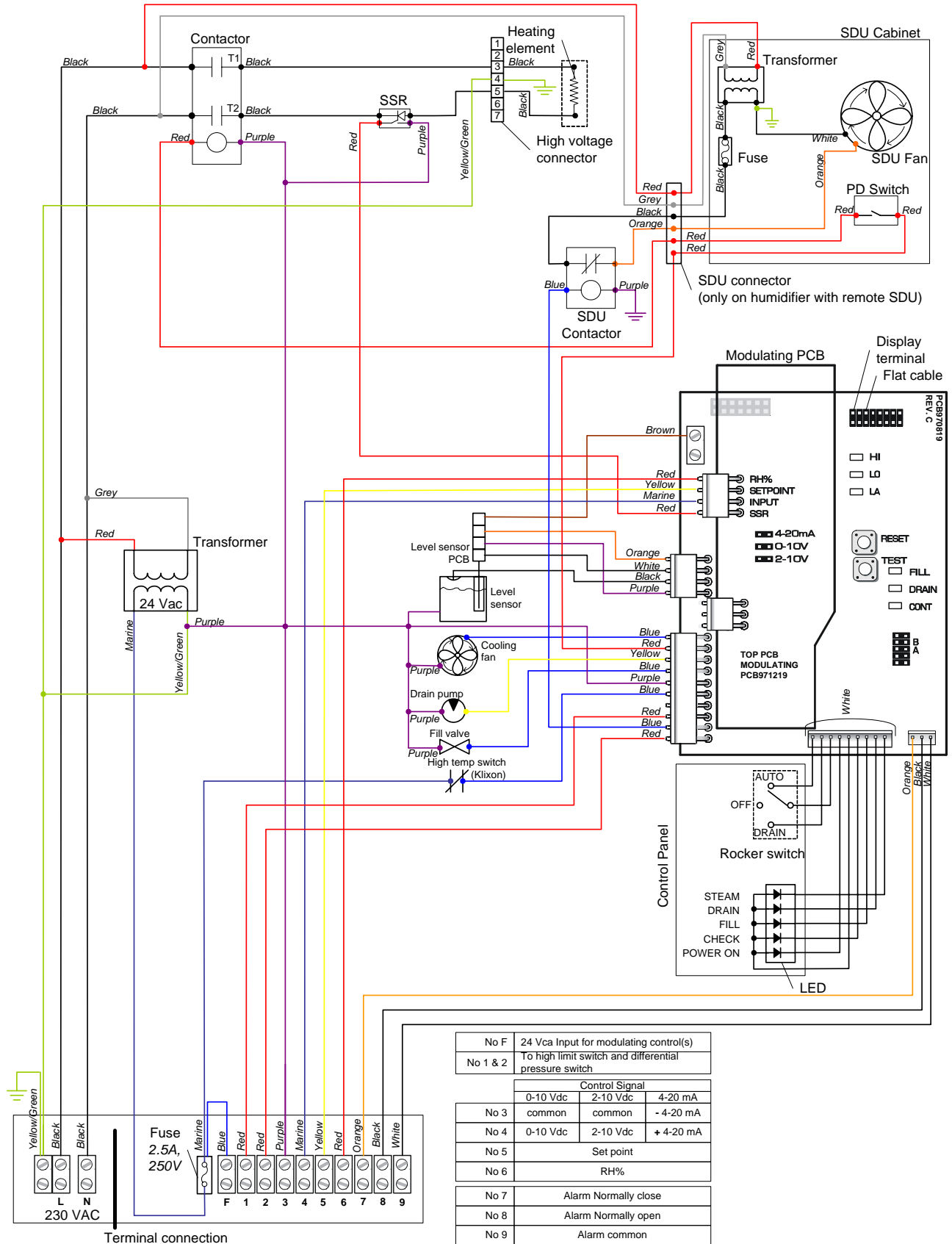
SKE05, 230V 1ph



(Illus. 42)

Wiring diagram

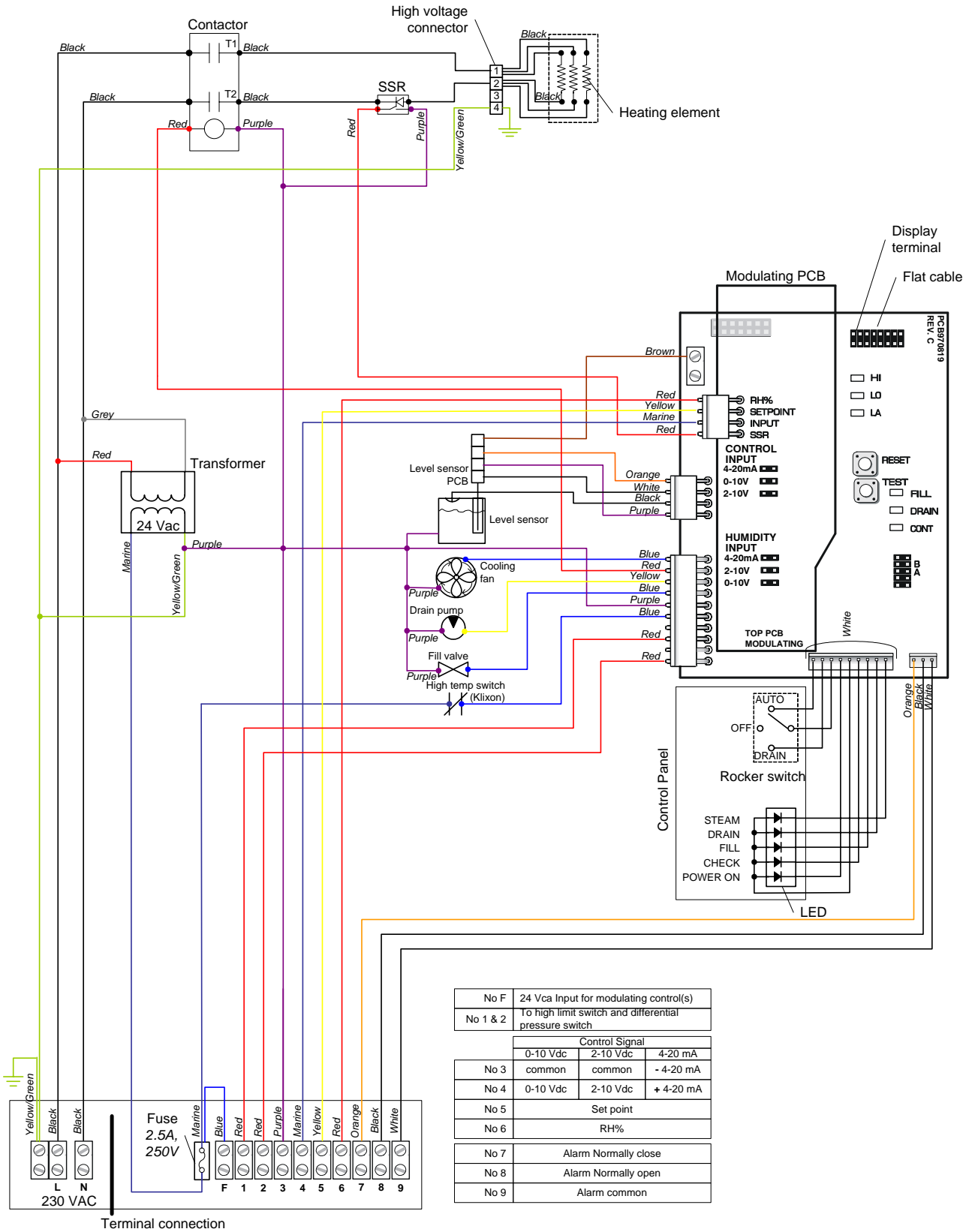
SKE05, 230V 1ph, with SDU



(Illus. 43)

Wiring diagram

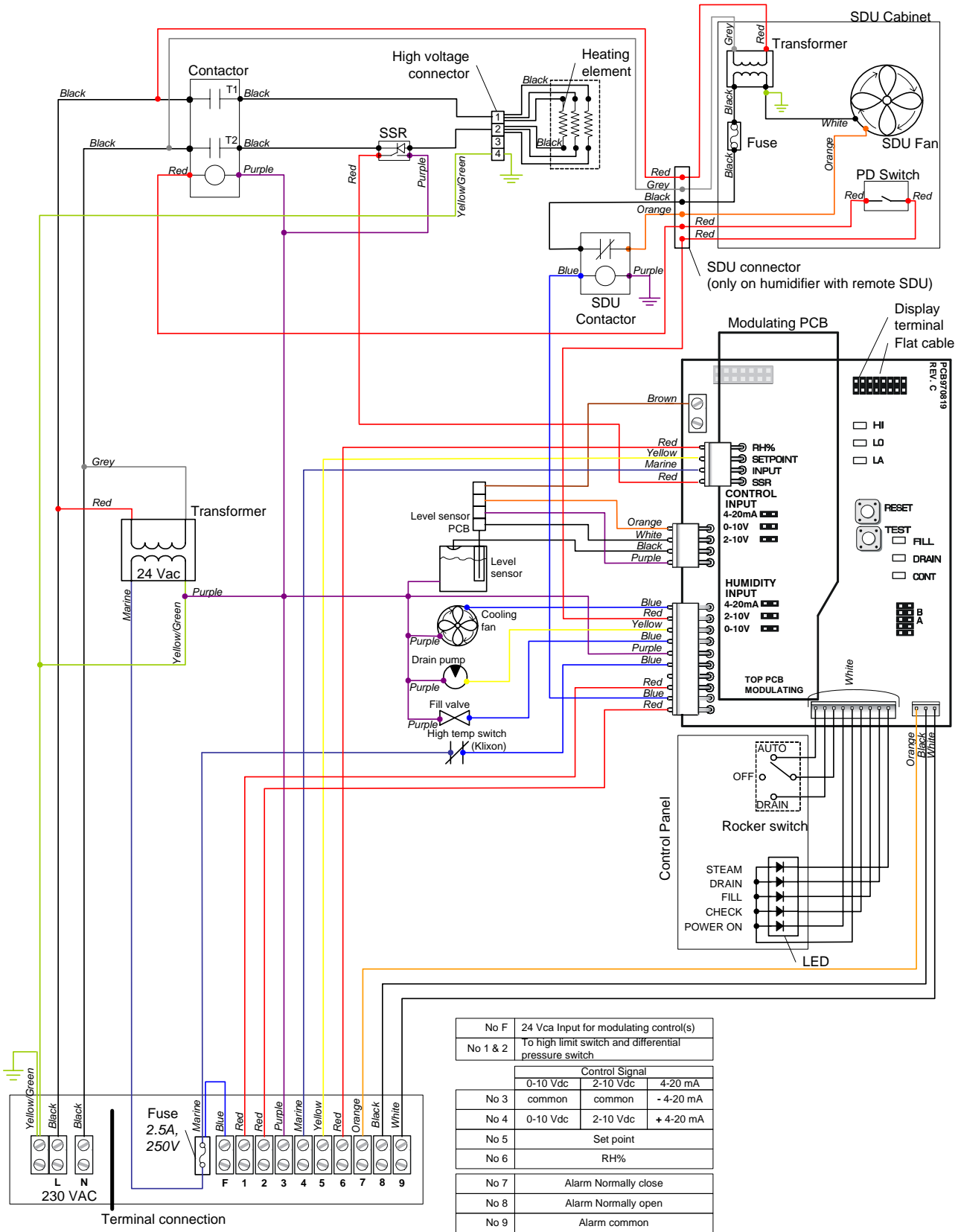
SKE10, 230V 1ph



(Illus. 44)

Wiring diagram

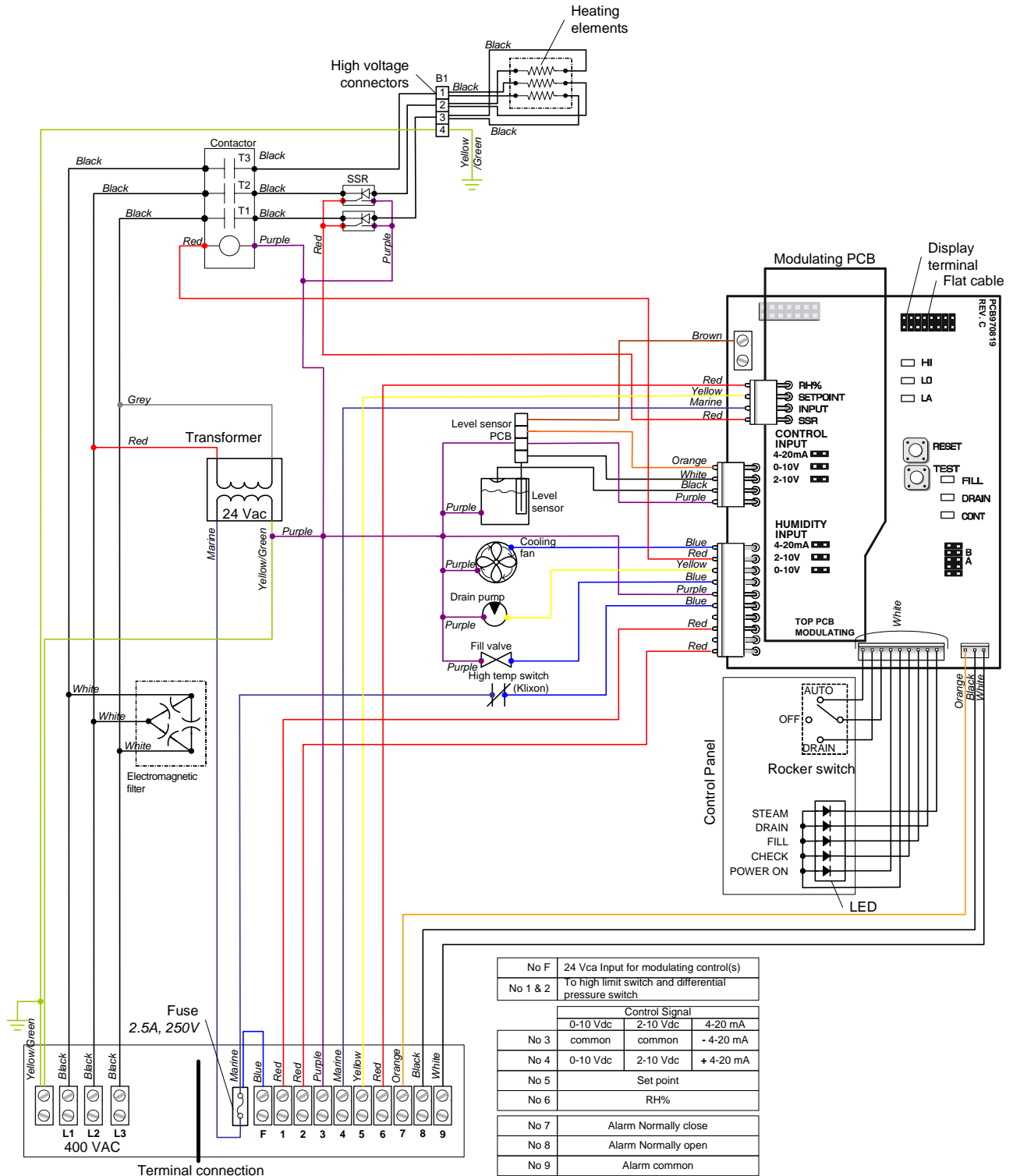
SKE10, 230V 1ph, with SDU



(Illus. 45)

Wiring diagram

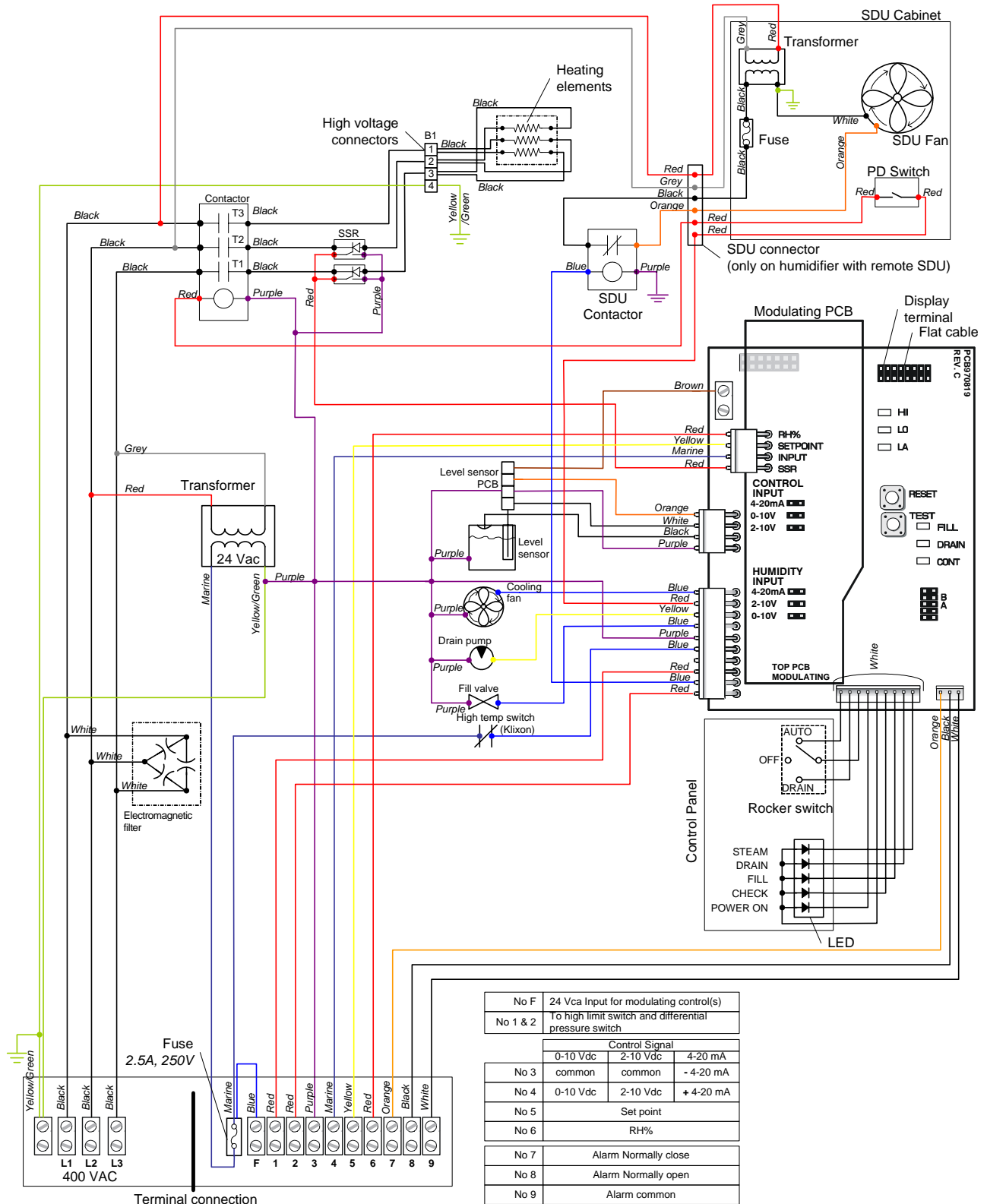
SKE 05/10/20/30, 400V 3ph



(Illus. 46)

Wiring diagram

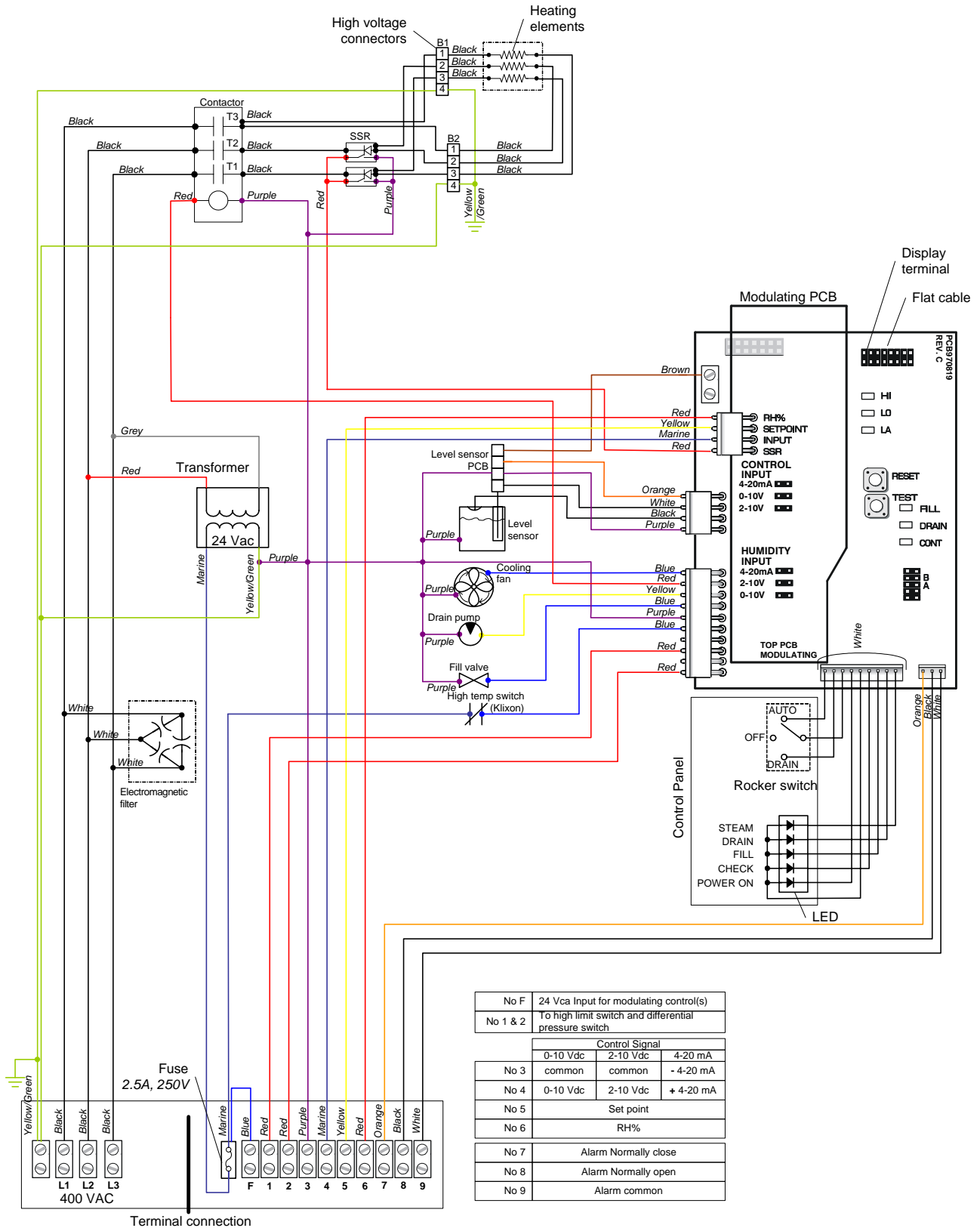
SKE10/20/30, 400V 3ph, with SDU



(Illus. 47)

Wiring diagram

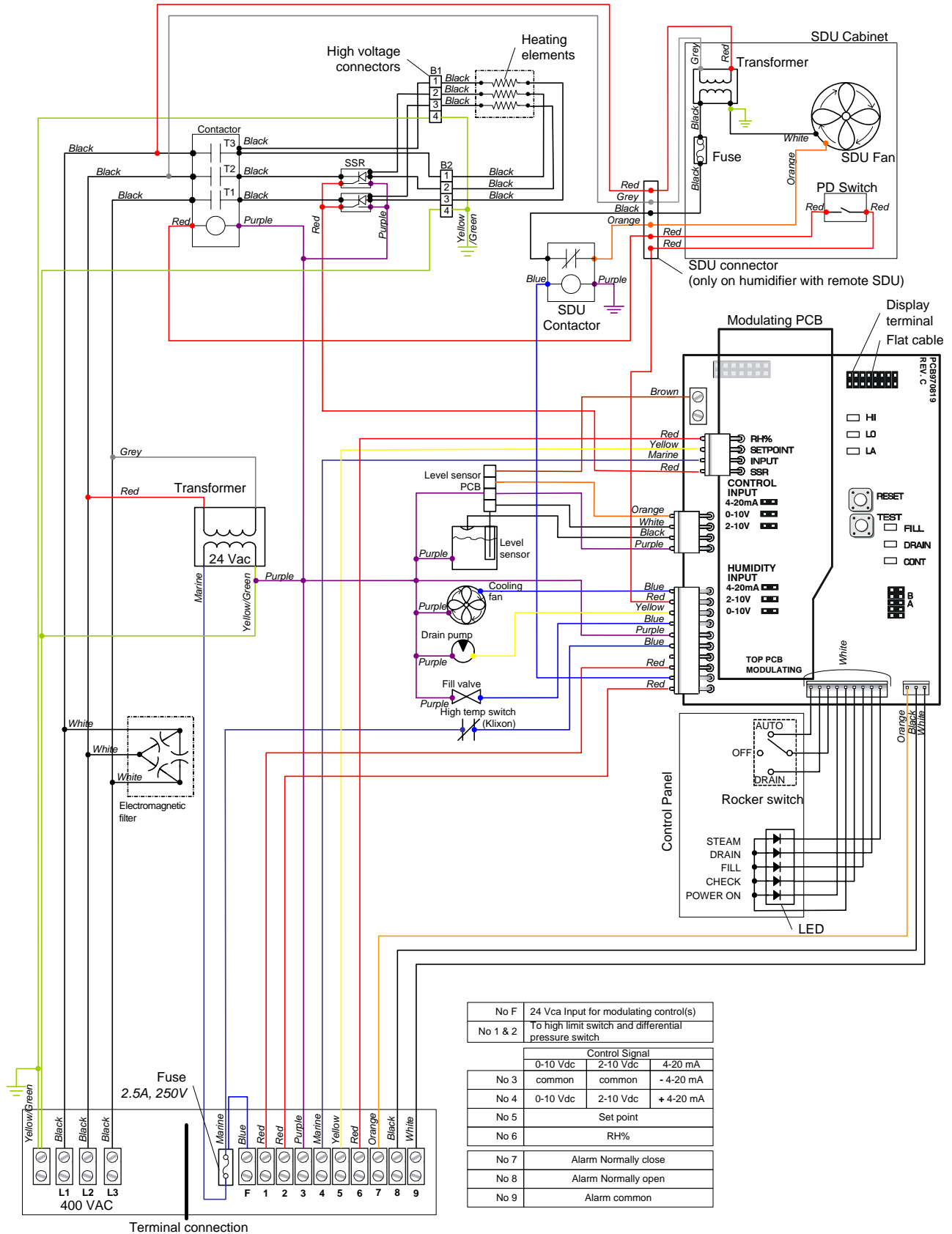
SKE40, 400V 3ph



(Illus. 48)

Wiring diagram

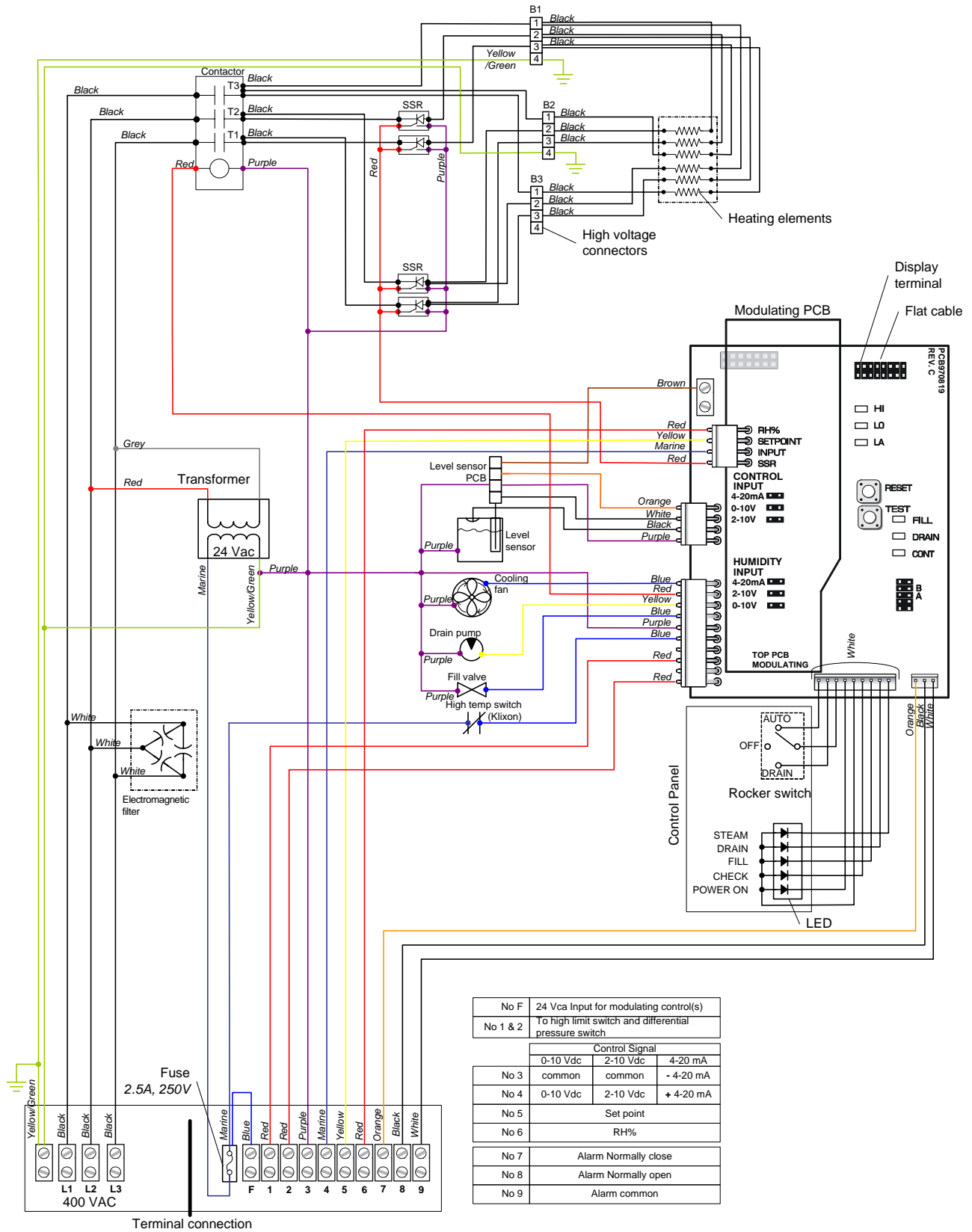
SKE40, 400V 3ph, with SDU



(Illus. 49)

Wiring diagram

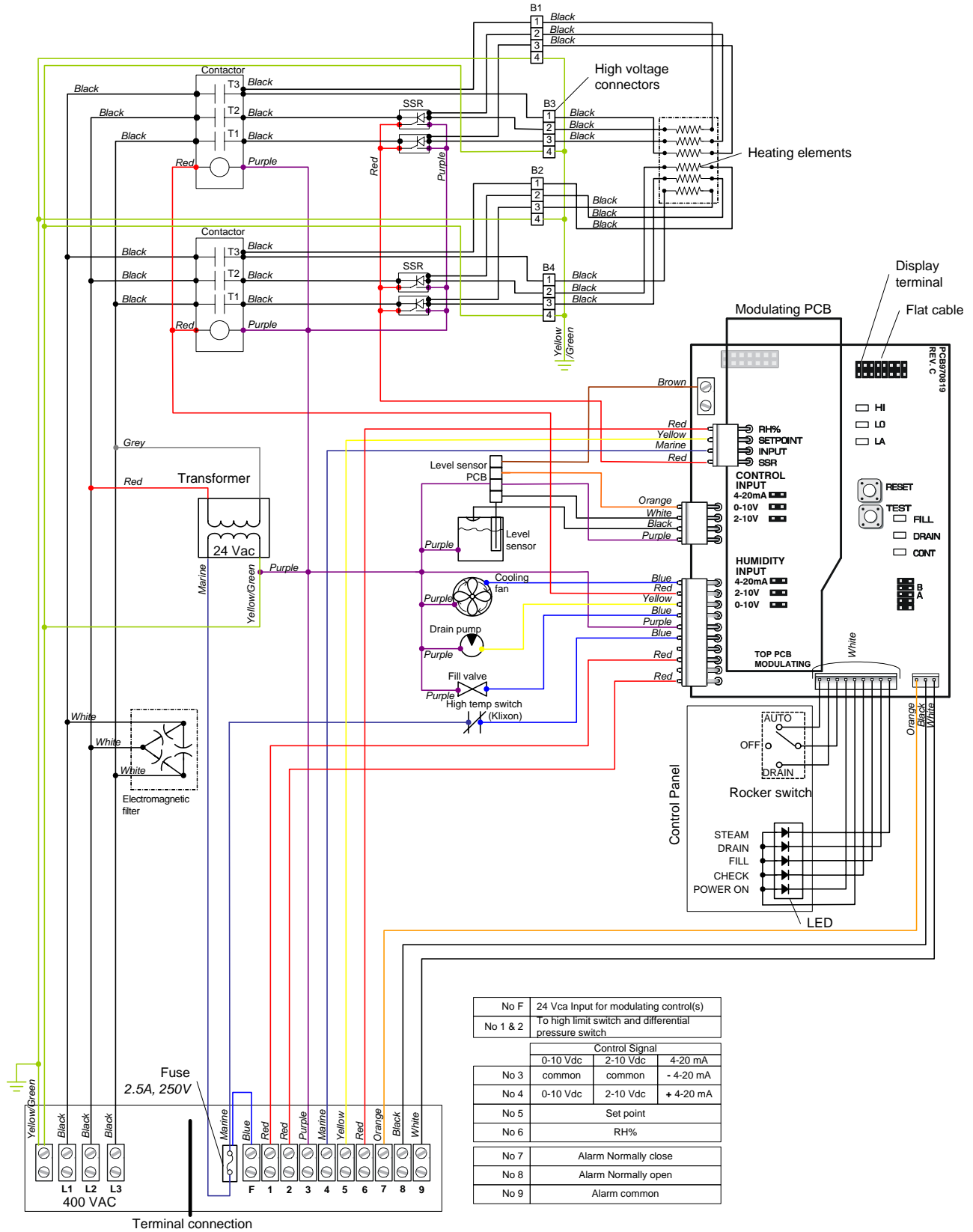
SKE50, 400V 3ph



(Illus. 50)

Wiring diagram

SKE60/80, 400V 3ph



(Illus. 51)

Manufacturer's Name and Address:

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