XT Series

Electrode Steam Humidifier

Installation, Operation, and Maintenance Manual

DRISTEEM®

from the Humidification Experts

ATTENTION INSTALLER

Read this manual before installing humidifier.

Leave manual with product owner.

DRISTEEM technical support

800-328-4447

WARNING!

This product must be installed by qualified HVAC and electrical contractors and in compliance with local, state, and federal codes. Improper installation may cause property damage, severe personal injury, or death as a result of electric shock, burns, and/or fire.

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Table 2-1:
XT Series specifications

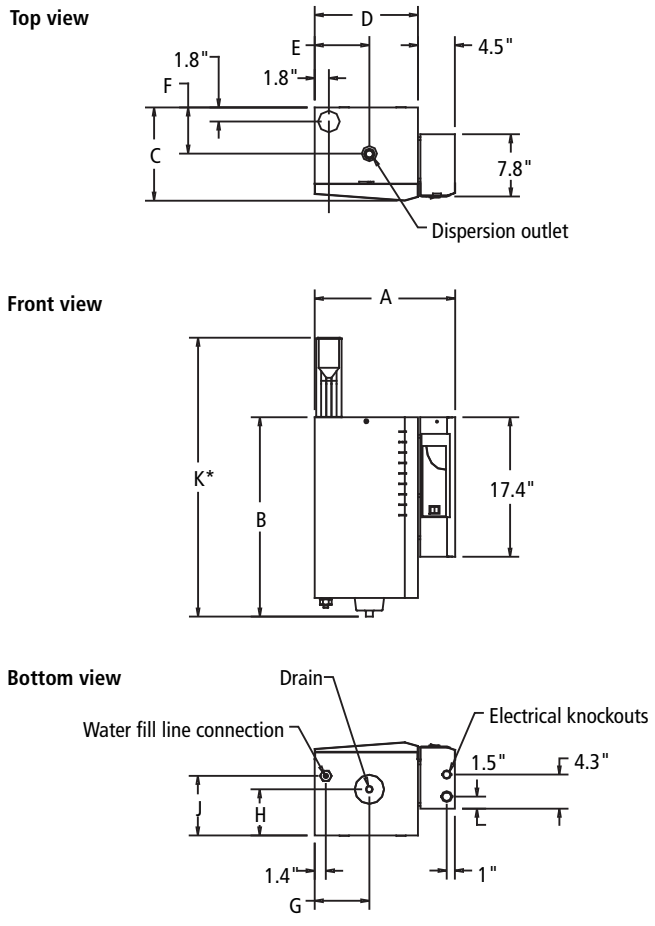
Model number	kW	Maximum steam capacity		Current draw (amps)				Shipping weight		Maximum operating weight	
				Single-phase		Three-phase					
		lbs/hr	kg/h	208V	240V	208V	480V	lbs	kg	lbs	kg
XT-10	3.4	10	4.5	16.2	14.0	9.4	—	27.6	12.5	28.3	12.8
XT-20	6.7	20	9.1	—	—	18.6	8.1	29.8	13.5	37.8	17.1
XT-30	10.1	30	13.6	—	—	28.0	12.1	43.0	19.5	59.8	27.1
XT-50	16.8	50	22.7	—	—	—	20.2	43.0	19.5	62.0	28.1

Table 2-2
Dimensions by model number

Callout	XT-10 XT-20		XT-30 XT-50	
	inches	mm	inches	mm
A	14.5	368	17.4	441
B	22.9	581	24.9	632
C	8.4	213	11.7	295
D	10.0	254	12.8	324
E	5.5	140	6.9	175
F	4.0	102	5.8	146
G	5.5	140	6.6	168
H	4.0	102	5.8	146
J	4.0	102	7.5	191
K	32.9	836	34.9	886

Note:
* Dimension K includes 10" (254 mm) for a fill cup extension. A fill cup extension is standard on models XT-30 and XT-50, and is a required component for models XT-10 and XT-20 when connected to a Rapid-sorb or Ultra-sorb dispersion assembly.

Figure 2-1:
Dimensions



Choosing a location for the humidifier

When selecting a location for the humidifier, consider the following:

- **Proximity to duct**
  Install the humidifier near the air duct system where the dispersion assembly will be located. The maximum recommended length for vapor hose connecting a single humidifier to a dispersion assembly is 10' (3 m). The maximum recommended developed length for tubing or pipe connecting a single humidifier to a dispersion assembly is 20' (6 m). See the dispersion section of this manual for more information about installing dispersion assemblies.
- **Elevation of the installed dispersion assembly**
  The recommended installation location for the dispersion assembly is at an elevation higher than the humidifier. However, if the dispersion assembly must be installed at an elevation lower than the humidifier, install a drip tee and drain as shown in Figure 25-1. Before installing a dispersion assembly or interconnecting piping, review all pitch requirements in the dispersion section of this manual.
- **Required clearances** (see Figure 3-1)
- **Electrical connections**
  Electrical power supply connections are made at the lower right corner of the unit. The system wiring is inside the cover of the control cabinet. See the field wiring instructions starting on Page 8.
- **Supply water and drain piping connections**
  Water supply piping connections are made on the bottom left side of the unit. Drain piping connections are made at the bottom center of unit. See the field piping illustration and instructions starting on Page 6.
- **Exterior wall insulation**
  Do not install the humidifier on an exterior wall unless that wall is properly insulated.

Choosing a location for the dispersion assembly and control devices

See Page 22 for recommended installation locations for the dispersion assembly. See Page 10 for recommended installation locations for control devices such as humidistats and transmitters.

Important:

Install humidifier only in locations that meet the following temperature and relative humidity (RH) requirements:

Maximum ambient temperature:
104 °F (40 °C)

Minimum ambient temperature:
41 °F (5 °C)

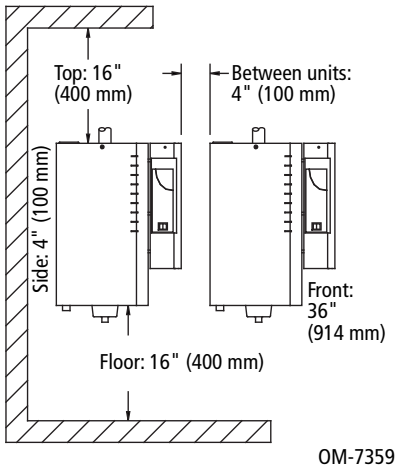
Maximum ambient humidity:
80% RH (non-condensing)

Note:

To open the humidifier electrical access door, rotate the screw counter-clockwise ¼ turn. The door pivots toward the front of the unit from the bottom of the door. To close the electrical access door, position screw slot so that it is horizontal and then push the door shut. Make sure sides of painted door go outside stainless steel enclosure.

To open the humidifier steam cylinder access door, rotate the screw counter-clockwise ¼ turn, lift door out of position, and remove ground wire. Replace door in reverse order of these instructions.

Figure 3-1:
Recommended minimum clearances



WARNING!

Mount humidifier per the instructions in this manual and to a structurally stable surface. Improper mounting of humidifier may cause the humidifier to fall off the wall resulting in severe personal injury or death.

Prepare humidifier for mounting

Unpack unit from shipping carton and remove steam cylinder door. Disconnect electrode and high water sensor connectors from steam cylinder. Remove fill cup extension kit (if applicable) from steam cylinder enclosure. Pull pins from brackets that retain steam cylinder. Remove steam cylinder from drain valve body.

Mount humidifier

Mount the humidifier so that it is plumb. See Figure 6-1 for an installation overview.

When mounting on a wood stud wall (studs 16" [406 mm] on center), locate studs and attach spanner board so that each of the screws centers on a stud. Mark hole locations per Table 4-1 and predrill 1/8" (3 mm) diameter pilot holes. Secure cabinet to spanner board with screws provided.

When mounting on a metal stud wall, locate the studs (16" [406 mm] on center) and drill a ¼" (6 mm) hole through the studs and wall. Mount spanner board with ¼" (6 mm) bolts through the wall, studs, and a backing plate on the backside of the wall and secure with a nut and washer.

If 16" (406 mm) on-center studs are not available, mount spanner boards on the wall, spanning two studs. If two horizontal boards are used, locate one at the top of the cabinet for the mounting screws and the other board located 3.5" (89 mm) on center from the bottom of the cabinet.

For hollow block or poured concrete wall mounting, mark mounting holes per Table 4-1. Drill pilot holes sized for the supplied anchors. Secure cabinet in place using the four supplied screws and anchors.

Figure 4-1:
Mounting keyhole locations by model number

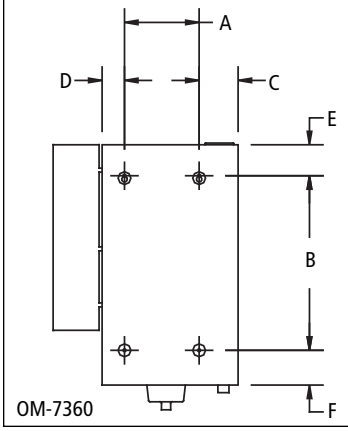


Table 4-1
Dimensions

	XT-10 XT-20		XT-30 XT-50	
	inches	mm	inches	mm
A	3.9	100	7	180
B	14	355	16.3	415
C	3	75	3.6	92
D	3	75	2	52
E	2.8	70	3	75
F	3.7	95	3.2	80

Install fill cup extension kit (if applicable)

A fill cup extension kit is required with all Rapid-sorb and Ultra-sorb dispersion assemblies used with models XT-10 and XT-20. A fill cup extension is a standard component on models XT-30 and XT-50.

1. Remove hose clamps attached to fill cup extension bracket.
2. Remove Phillips screw near large opening on top enclosure and retain for use in Step 4.
3. Feed tubes through left rear opening on top of steam cylinder enclosure.
4. Mount bracket with screw from Step 2 (see Figure 5-1).
5. Slip smaller hose clamp (D18) from Step 1 over smaller diameter hose and slide open end of hose onto fill valve body connection. Tighten hose clamp.
6. Slip larger hose clamp (D21) from Step 1 over larger diameter hose (the one attached to cone bottom of fill cup) and slide open end of hose onto drain valve body connection. Tighten hose clamp.
7. Place overflow tube with elbow into hole of drain cup plate.

Replace steam cylinder

1. Slide steam cylinder (with warning label facing toward operator) into drain valve body while making sure side tabs engage brackets.
2. Reconnect electrode and high water sensor connectors to steam cylinder (refer to unit wiring diagram located in electrical enclosure).

Figure 5-1:
Fill cup extension installation

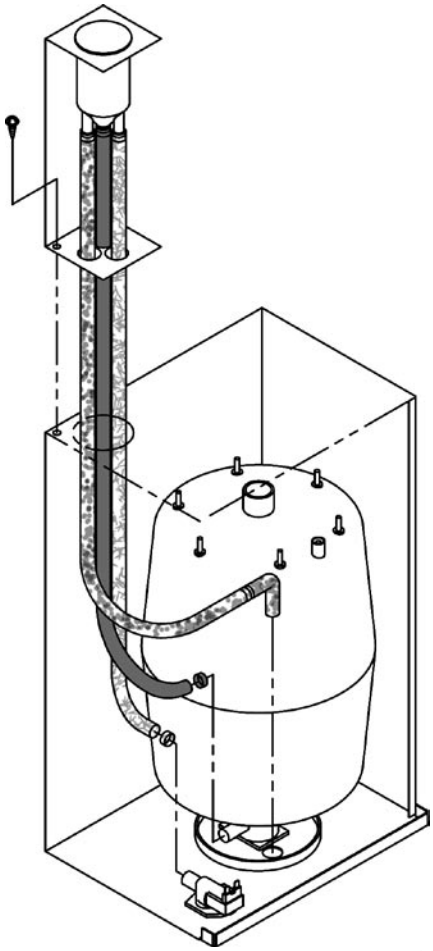
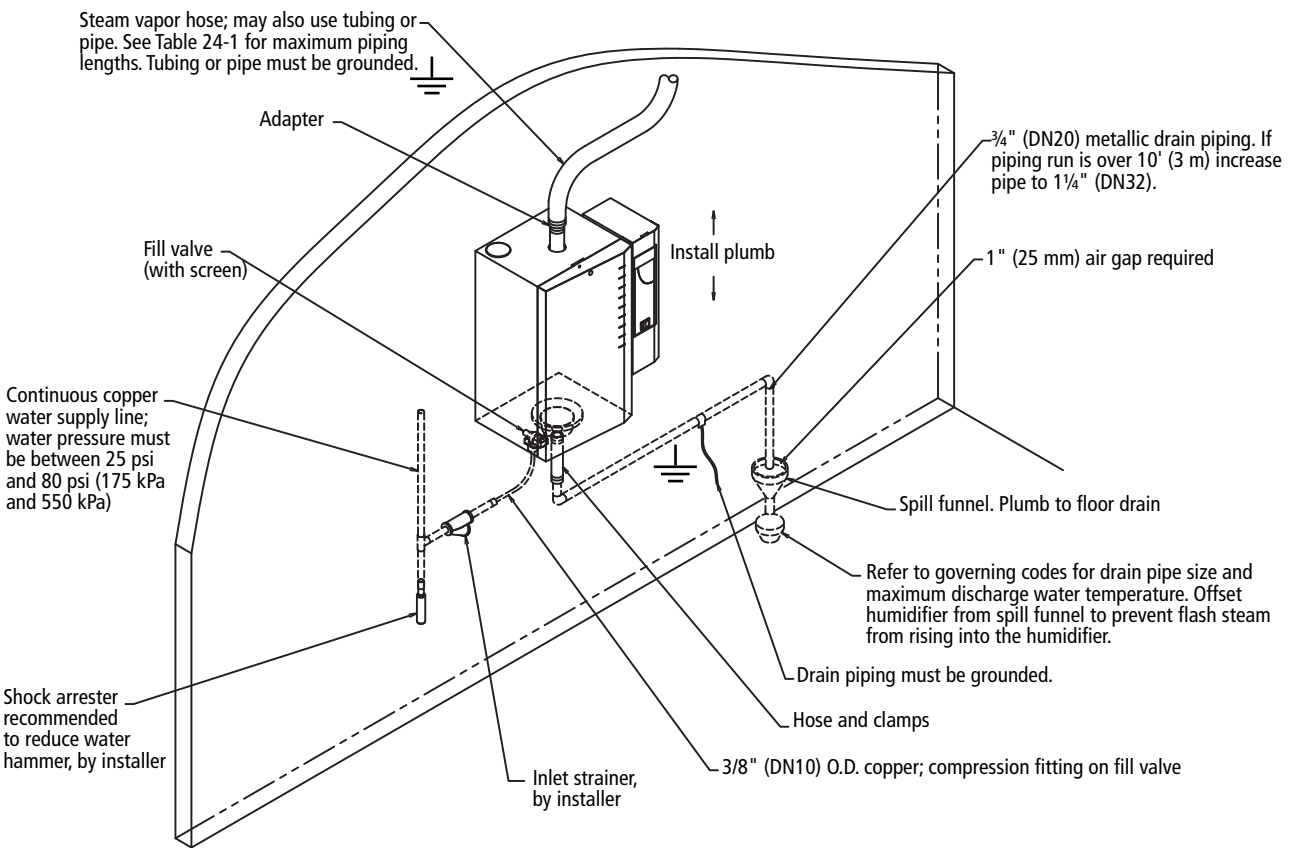


Figure 6-1:
Field piping overview



WARNING!

Drain piping surface may be hot. Touching or contact with hot pipe may cause severe personal injury.

Important: Thoroughly flush the supply water piping to remove pipe residue and stagnant water before connecting piping to the humidifier. Pipe residue and stagnant water in the water supply piping can cause the humidifier to not reach required steam capacity.

Supply water quality

XT Series humidifiers use normal tap water or softened water to generate humidification steam. Water conductivity must be within the range of 125 to 1250 µS/cm (which, in many cases, is roughly equivalent to 3.4 to 36.3 grains/gallon). Demineralized water cannot be used because it is not conductive. Do not use heated supply water because unheated supply water is required for drain water tempering.

Supply water piping

Use only copper for supply water piping—do not use rubber or plastic. A strainer is recommended to be installed in the supply piping before the fill valve. The fill valve connection size is a 3/8" (DN10) compression fitting. In cases where water hammer may be a possibility, consider installing a shock arrestor. Water pressure must be between 25 psi and 80 psi (175 kPa and 550 kPa).

Humidifier drain piping

Drain piping must be code-approved copper or steel rated for 212 °F (100 °C) minimum. The final connection size is ¾" (DN20) copper for the steam cylinder drain. Do not reduce this connection size.

WARNING!

Drain piping must be properly grounded to minimize personal injury if an electrical fault should occur.

See Figure 6-1 for typical installation dimensions and requirements.

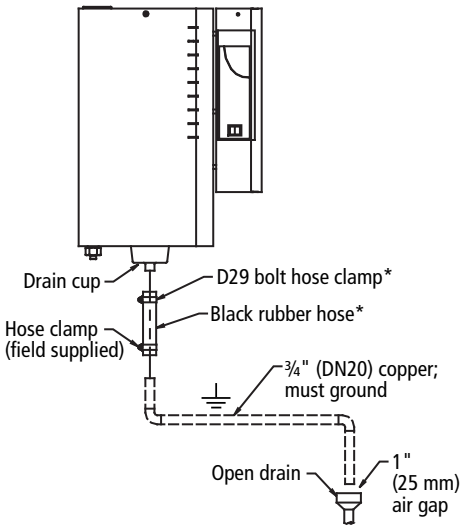
If drainage by gravity is not possible, use a reservoir pump rated for 212 °F (100 °C) water.

A 10" (254 mm) piece of hose is provided to function as the flexible connection from the drain cup to the field installed drain plumbing. A D29 hose clamp is provided to secure the drain hose to the drain cup.

See Figure 7-1 for drain piping detail.

If the equivalent length of pipe from the humidifier drain to the plumbing system drain is more than 10' (3 m), increase the pipe size to 1¼" (DN32).

Figure 7-1:
Drain piping detail



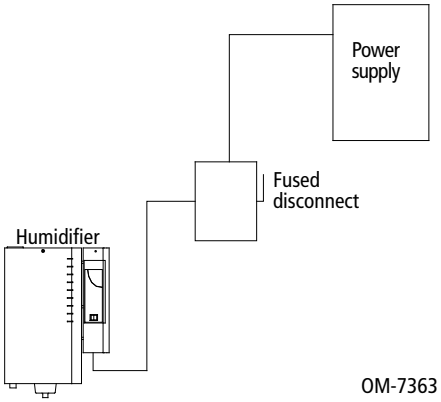
Note:
* A D29 bolt hose clamp and black rubber hose ship with each humidifier. These parts can also be ordered from DRISTEEM. See the replacement parts section of this manual for part numbers.

OM-7379

WARNING!

Only qualified electrical personnel should perform field wiring installation procedures. Improper wiring or contact with energized circuits may cause property damage, severe personal injury, or death as a result of electric shock and/or fire.

Figure 8-1: Field wiring requirements



Notes:
- Control wiring and power wiring must be run in dedicated or separate earthed metal conduit, cable trays, or trunking.
- Separate the line voltage wiring from low voltage control circuit wiring when routing electrical wiring inside the humidifier cabinet.
- Do not use chassis or safety grounds as current-carrying commons. Never use a safety ground as a conductor or neutral to return circuit current.

Humidifier field wiring

All wiring must be in accordance with all governing codes and with the unit wiring diagram. The unit wiring diagram is inside the electrical control cabinet. Power supply wiring must be rated for 105 °C.

When selecting a location for installing the humidifier, avoid areas close to sources of electromagnetic emissions such as power distribution transformers.

Do not loop power wiring.

Do not use aluminum wire.

Field wiring connections and requirements

Conduit knockouts are provided on the bottom of the electrical control cabinet. Control wiring knockouts are on the bottom front; power wiring knockouts are on the bottom rear.

CAUTION! Adding alternate conduit connections is not recommended; however, if making holes and knockouts in the humidifier cabinet, protect all internal components from debris and vacuum out cabinet when finished. Failure to comply with this caution can damage sensitive electronic components and void the DRISTEEM warranty.

Control component placement

Follow the guidelines on Page 10 for placing humidistats, transmitters, and airflow proving switches.

More on the next page ►

Below are field wiring connection instructions:

- **Connect to line power.**
  Refer to the wiring diagram or the data plate on the outside of the cabinet for wire sizing amperage.
- **Connect to control signal wiring**
  from a humidistat, transmitter, or signal by others. See the control wiring diagrams on pages 16-18.
- **Connect remote signal wiring.**
  When wired to a remote signaling device, two relays indicate if there is a fault with draining, filling, or water level control functions of the humidifier, or if a required maintenance interval has been reached. See the control wiring diagrams on pages 16-18. To enable the remote signaling device, connect wiring to control terminals 9 (N.O.), 10 (N.C.), 11 (C) for Relay 1, and connect wiring to control terminals 26 (N.O.), 27 (N.C.), and 28 (C) for Relay 2.
- **Connect to the duct airflow proving switch and duct high limit humidistat wiring** (recommended optional devices).

WARNING!

DRISTEEM strongly recommends installing a duct airflow proving switch and a duct high limit humidistat. These devices prevent the humidifier from making steam when there is no airflow in the duct or when the RH level in the duct is too high. Failure to install these devices can result in excessive moisture in the duct, which can cause bacteria and mold growth or dripping through the duct.

Grounding requirements

A safety grounding system that meets national, state, and local electrical codes is required. The ground connection must be made with solid metal to metal connections. Ground wire should be the same size as power wiring.

Control input wiring

XT Series humidifiers accept RH or demand signals from DRISTEEM control components or from a signal by other. For wiring connection requirements, first determine which control scenario applies. Then, refer to the corresponding control input wiring diagram shown on the following pages, or located inside the accessory box.

Proper wiring prevents electrical noise.

Electrical noise can produce undesirable effects on electronic control circuits, which affects controllability. Electrical noise is generated by electrical equipment such as inductive loads, electric motors, solenoid coils, welding machinery, or fluorescent light circuits. The electrical noise or interference generated from these sources (and the effect on controllers) is difficult to define, but the most common symptoms are erratic control or intermittent operational problems.

Important:

- For maximum EMC effectiveness, wire all humidity, high limit, and airflow controls using multicolored shielded/screened plenum-rated cable with a drain wire for the shield/screen. Connect the drain wire to the shield/screen ground terminal with wire less than 2" (50 mm) in length.
- Do not ground shield at the device end.

Humidistat and transmitter placement

Humidistat and transmitter locations are critical

Humidistat or transmitter location has a significant impact on humidifier performance. In most cases, it is recommended that you do not interchange duct and room humidity devices. Room humidity devices are calibrated with zero or little airflow; whereas duct humidity devices require air passing across them. Recommended humidistat and transmitter locations (see Figure 10-1):

A This is the ideal sensing location because this placement ensures the best uniform mix of dry and moist air with stable temperature control.

B This location is acceptable, but the room environment may affect controllability such as when the humidistat or transmitter is too close to air grilles, registers, or heat radiation from room lighting.

C This location is acceptable because it provides a good uniform mixture of dry and moist air, but if an extended time lag exists between moisture generation and sensing, make sure the control contractor extends the sampling time.

D This location behind a wall or partition is acceptable for sampling the entire room if the sensor is near an air exhaust return outlet. This location is also typical of humidistat or transmitter placement for sampling a critical area.

E These locations are not acceptable because they may not represent actual overall conditions in the space.

F These locations are not acceptable. Do not place humidistats or transmitters near windows, door passageways, or areas of stagnant airflow.

G This is the best location for a duct high limit humidistat or humidity transmitter.

Figure 10-1:
Recommended humidistat and transmitter locations

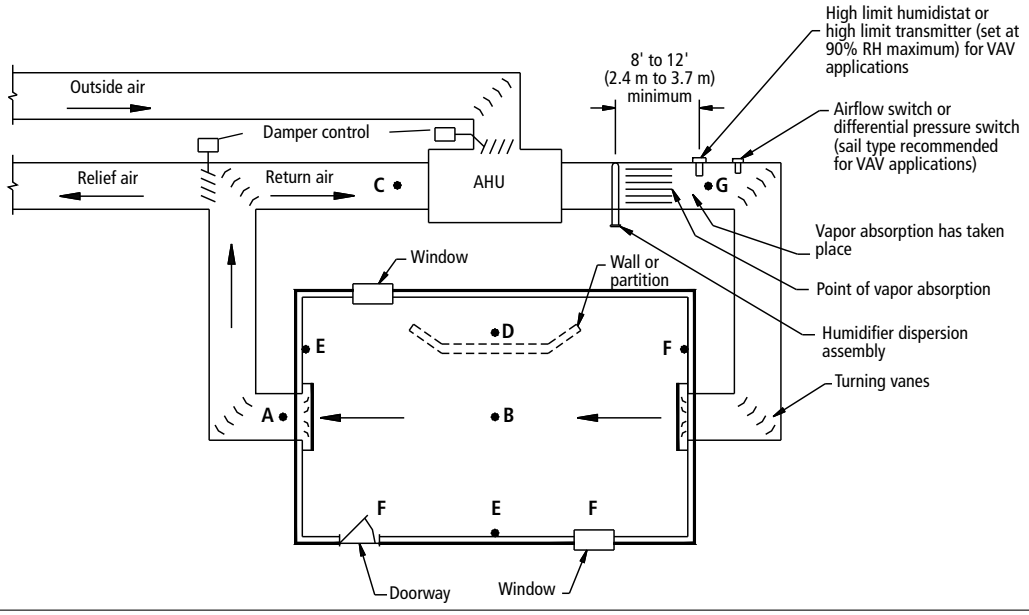


Figure 11-1:
Unit wiring diagram for Model XT-10 208 V single phase and 240 V single phase

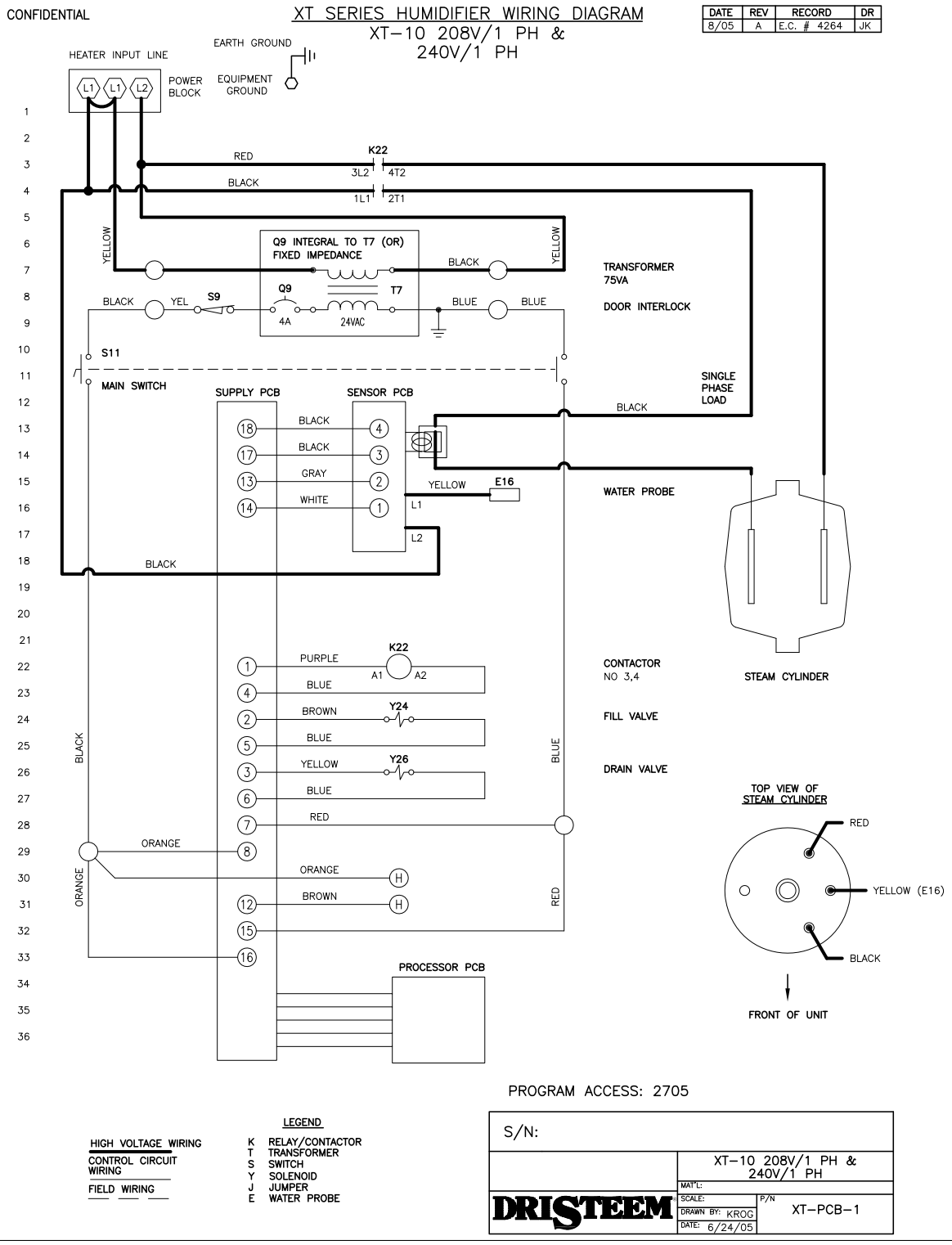


Figure 12-1:
Unit wiring diagram for Model XT-10 208 V three phase, Model XT-20 208 V three phase, or Model XT-20 480 V three phase

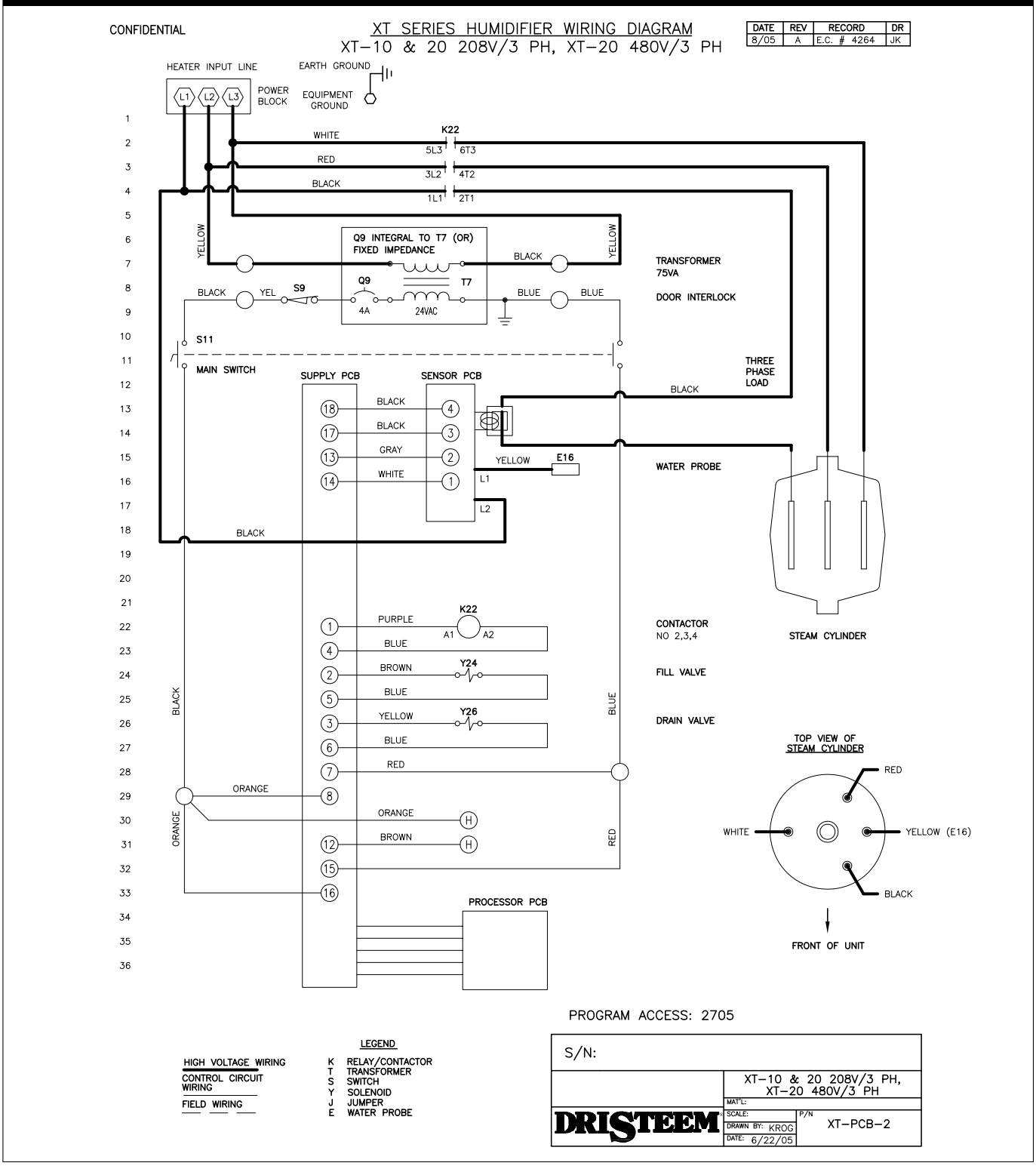


Figure 13-1:
Unit wiring diagram for Model XT-30 480 V three phase

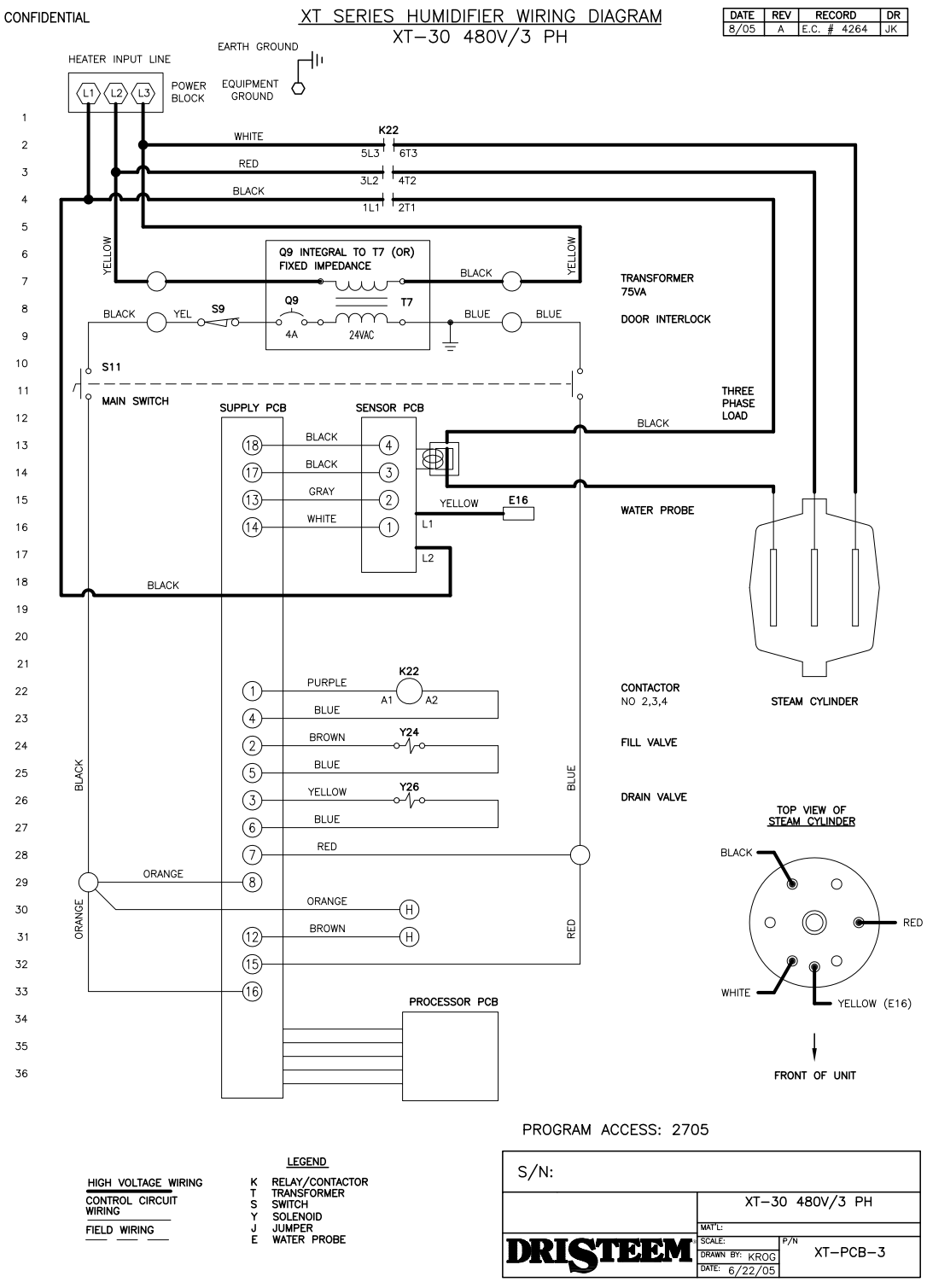


Figure 14-1:
Unit wiring diagram for Model XT-30 208 V three phase

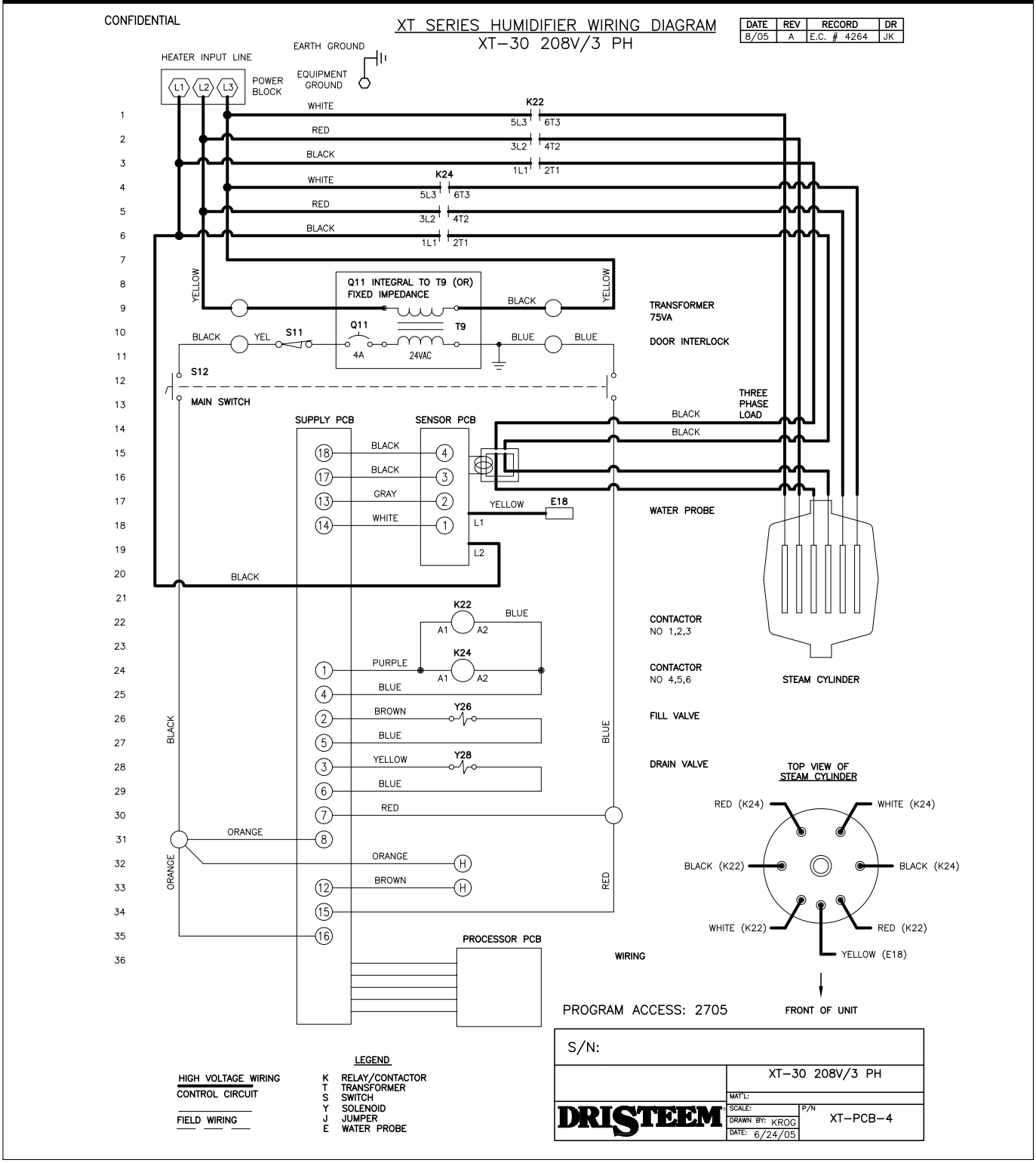


Figure 15-1:
Unit wiring diagram for Model XT-50 480 V three phase

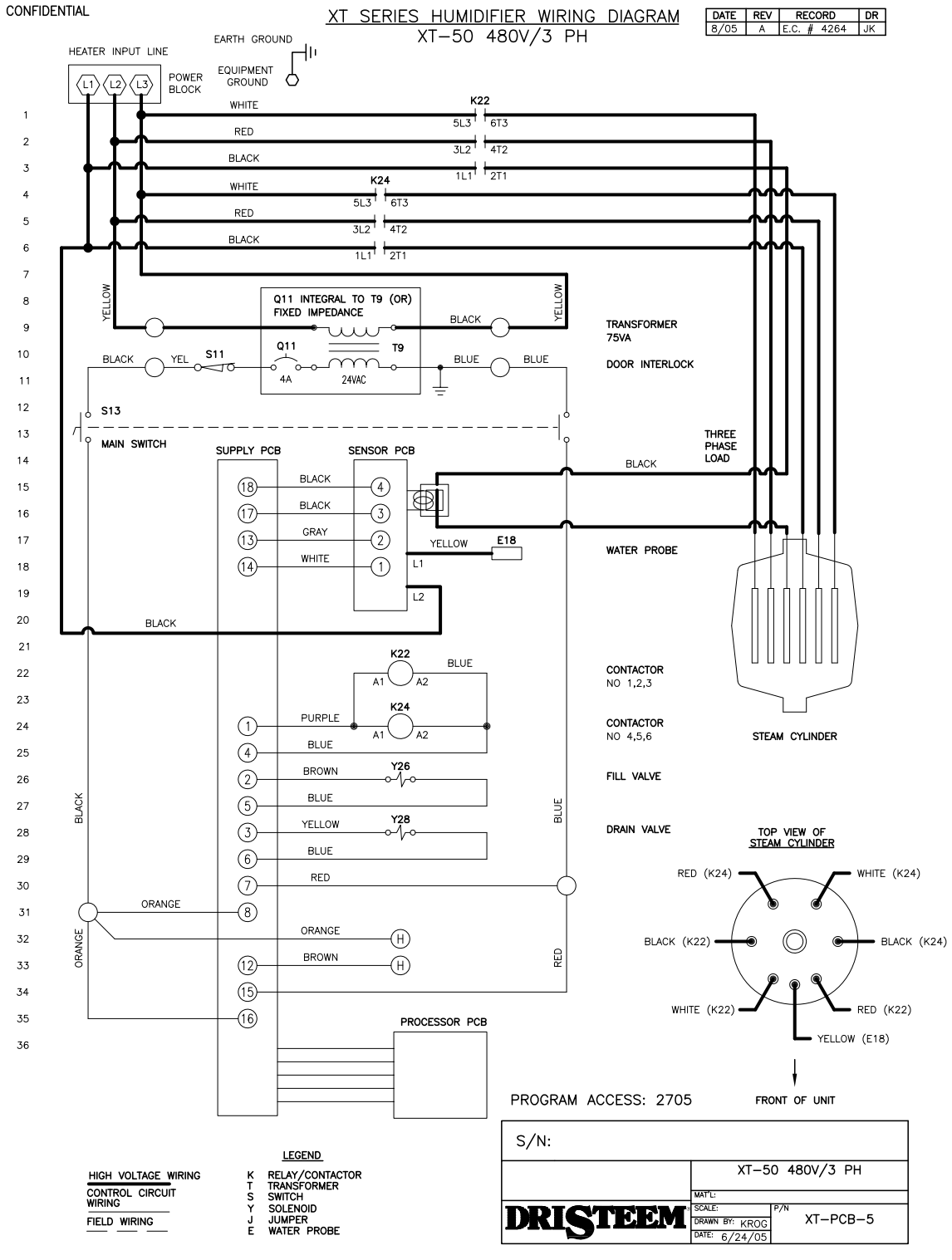


Figure 16-1:
Control wiring diagrams for humidity transmitter external connections to XT Series humidifiers

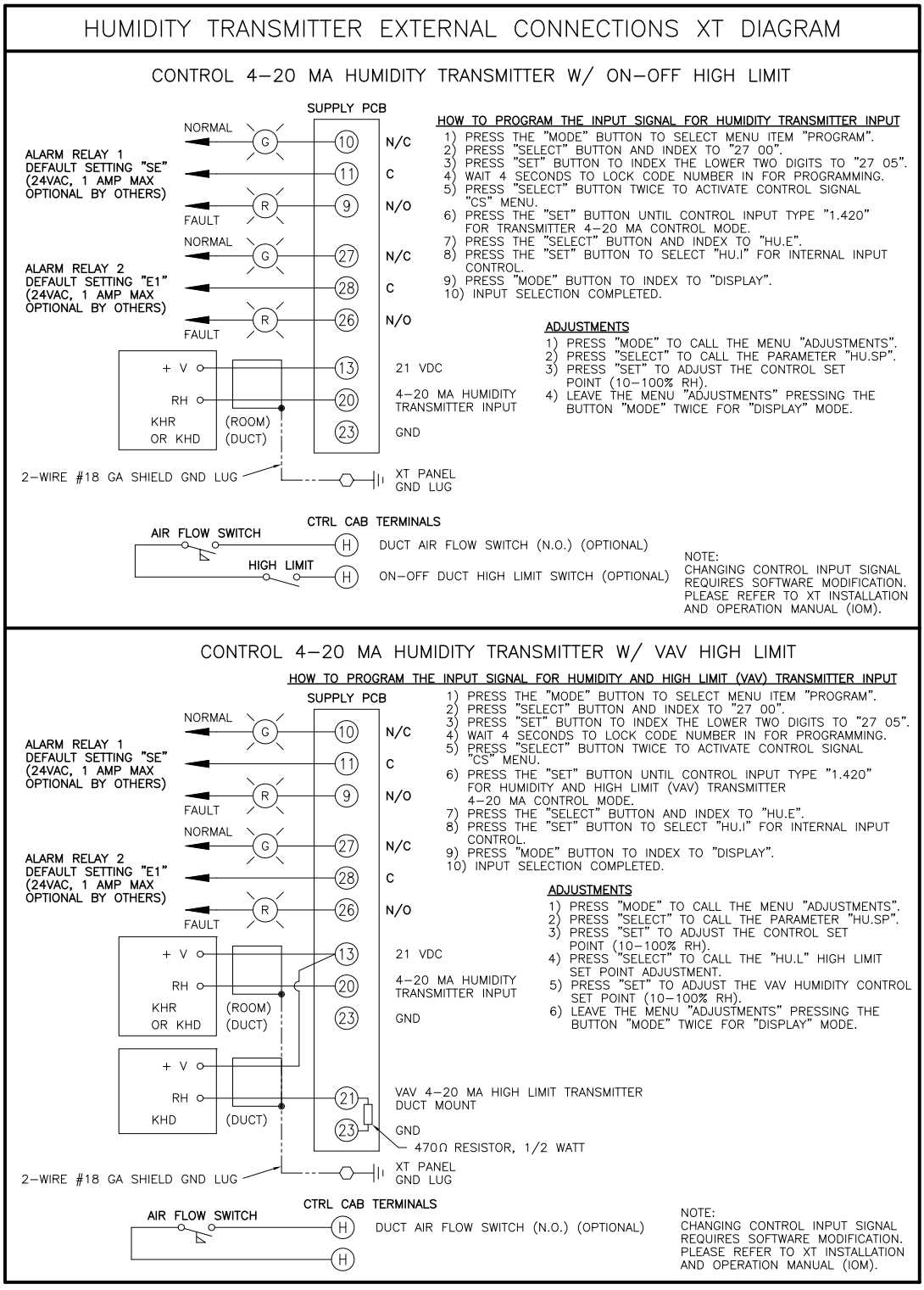


Figure 17-1:
Control wiring diagrams for humidistat external connections to XT Series humidifiers

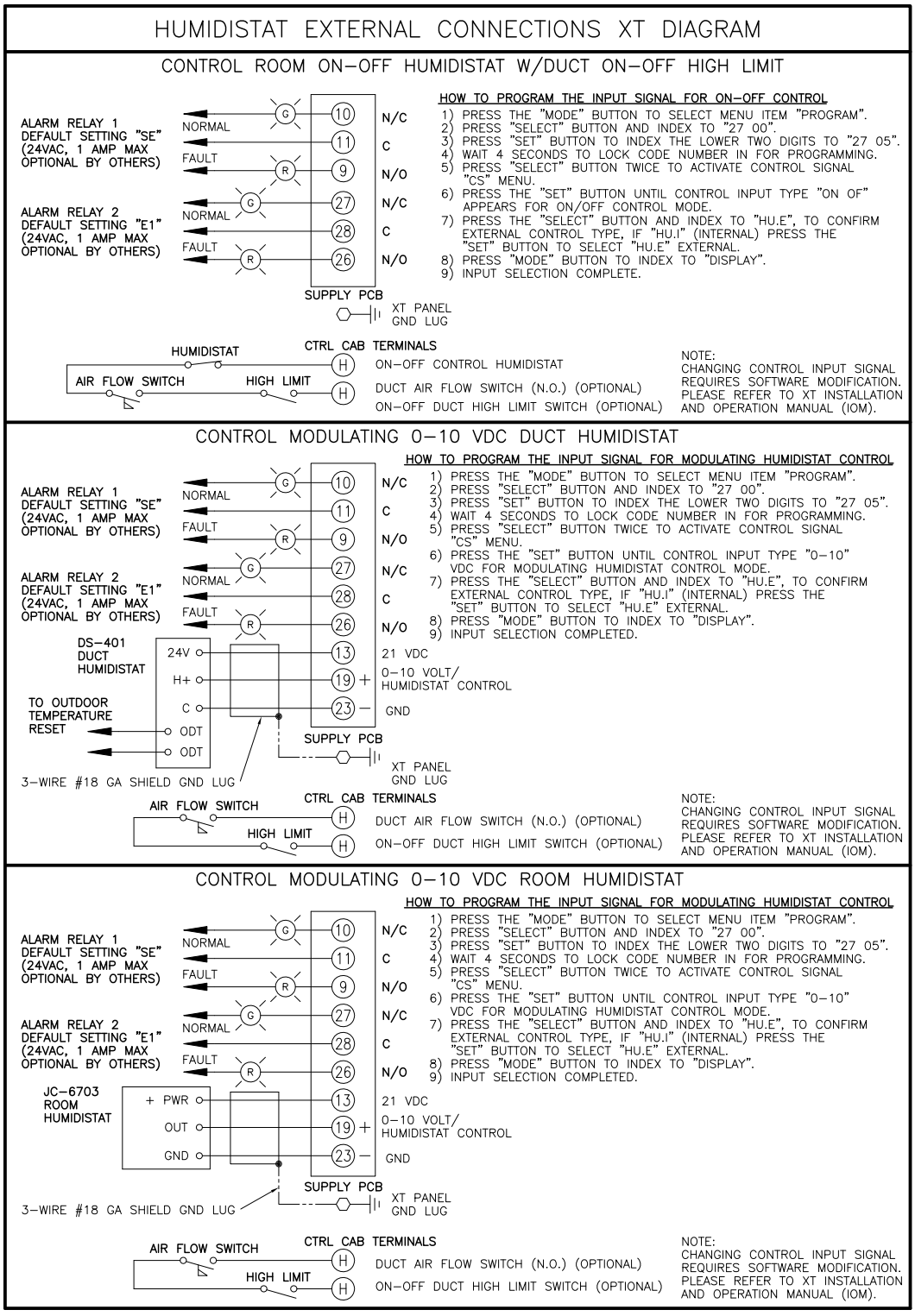


Figure 18-1:
Control wiring diagrams for signal by others external connections to XT Series humidifiers

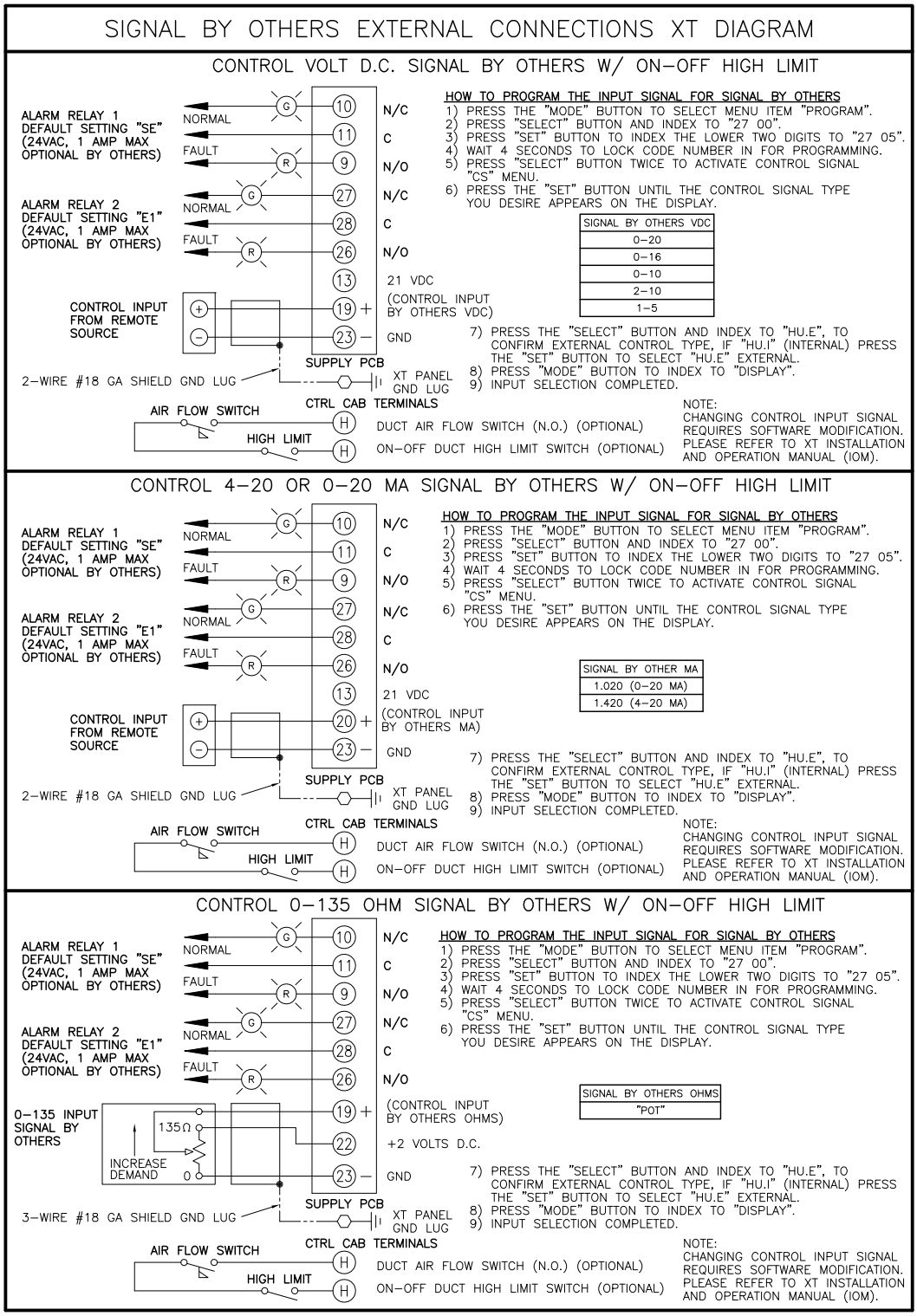


Figure 19-1:
Wiring diagram for sequenced XT Series humidifiers with a modulating duct humidistat

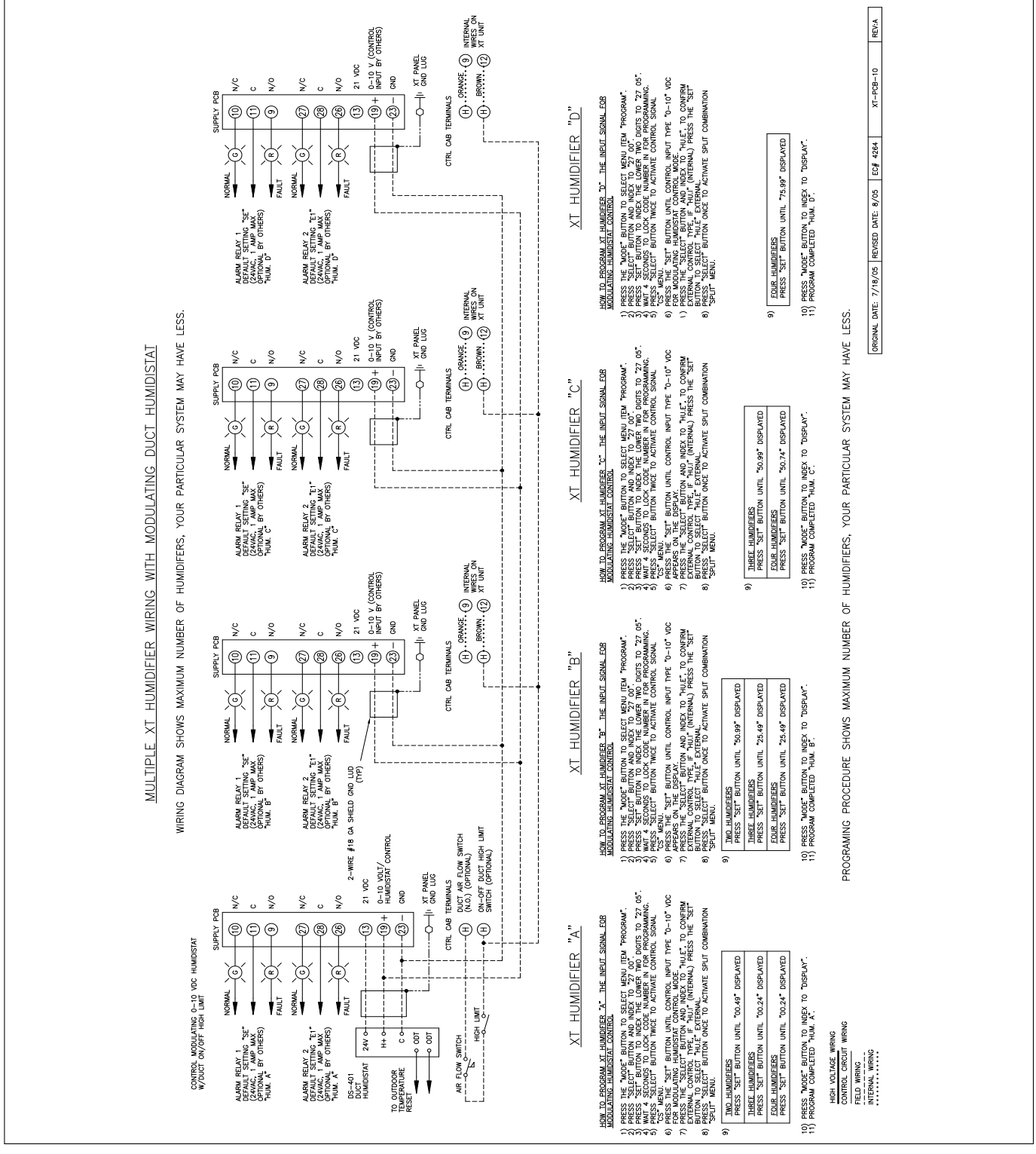


Figure 20-1:
Wiring diagram for sequenced XT Series humidifiers with a modulating room humidistat

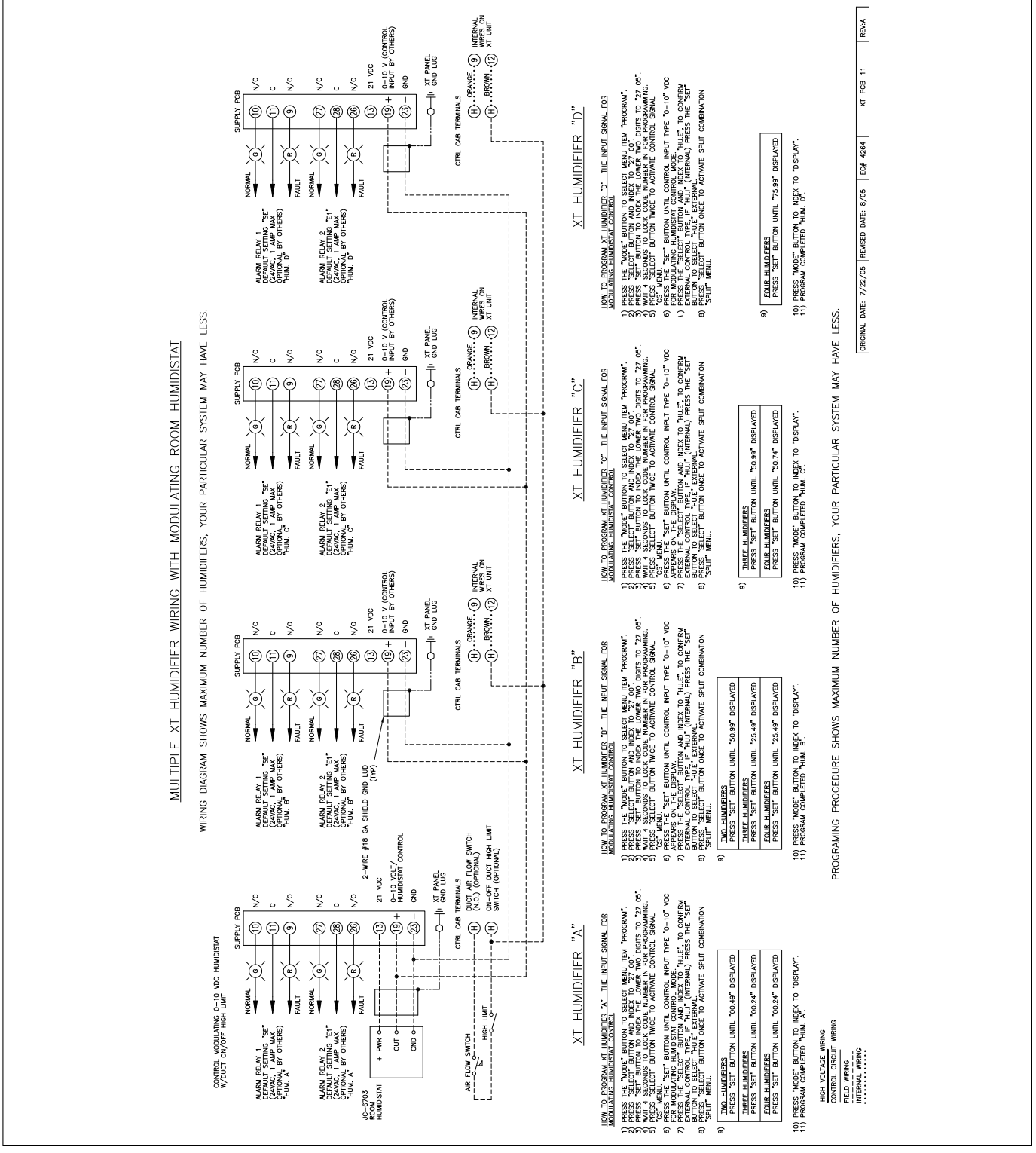
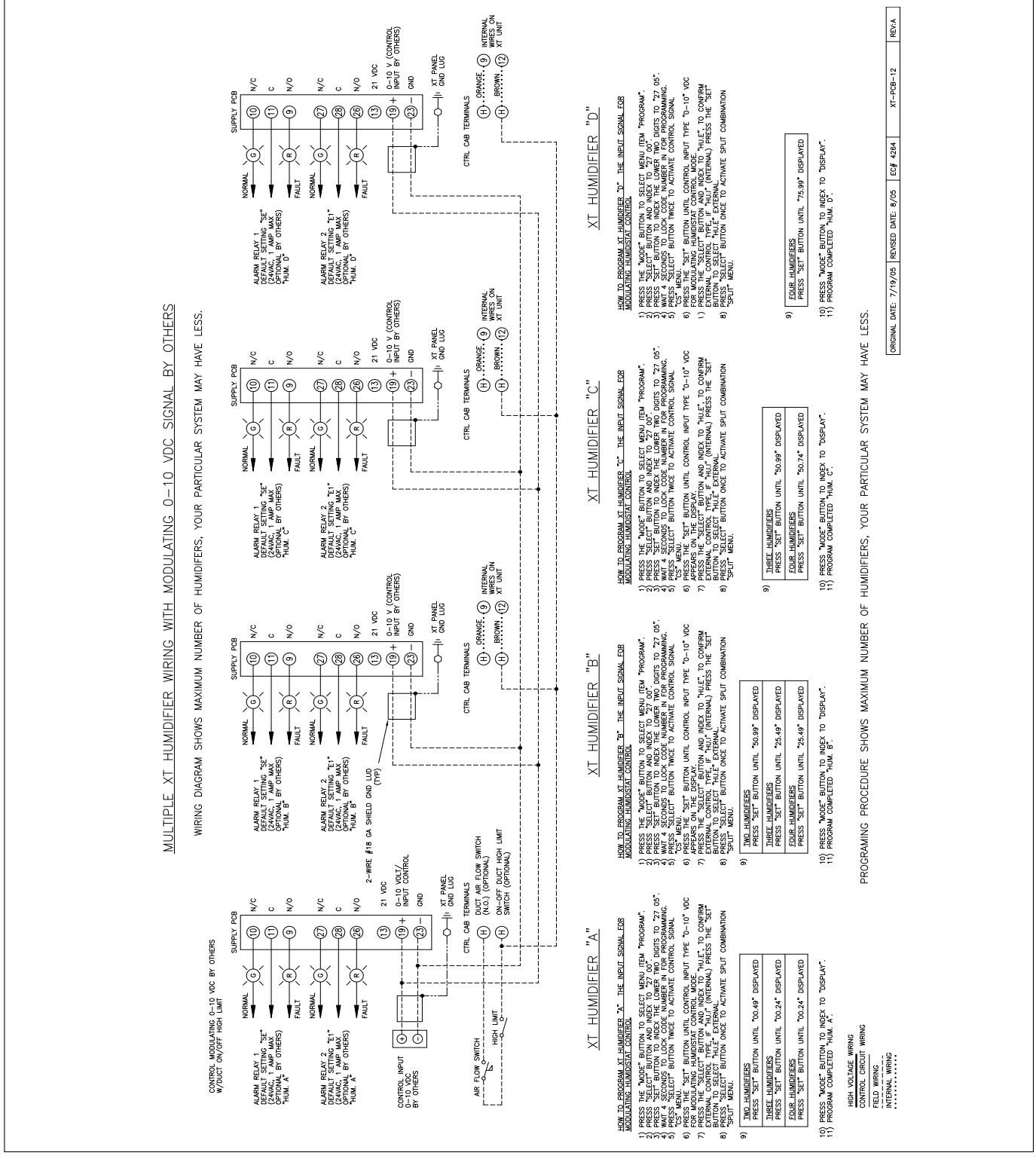


Figure 21-1:
Wiring diagram for sequenced XT Series humidifiers with a modulating 0-10 VDC signal by others



Where to find more dispersion information

In this document:

- Interconnecting piping and drip tee installation, pages 23-25
- Single Tube and Multiple Tube installation instructions, pages 26-29
- Rapid-sorb® installation instructions, pages 30-36

On our web site:

The following documents can be viewed, printed or ordered from our web site, **www.dristeem.com**

- Catalogs (which include dispersion nonwetting distance graphs):
  - XT Series Humidifier
  - Ultra-sorb®
- Installation, Operation, and Maintenance manuals:
  - Ultra-sorb
- *DRISTEEM Design Guide* (includes steam loss tables and general humidification information)

On Dri-calc:

Dri-calc® is our humidification system sizing and selection software, and may be ordered at our web site, www.dristeem.com. Included in Dri-calc:

- A comprehensive library of installation guide documents, including:
  - Rapid-sorb installation instructions for vertical airflows
  - Recommended dispersion placement within a duct or air handler

Or call us at 800-328-4447

While obtaining documents from our web site or from Dri-calc is the quickest way to review our literature, we'd also be happy to mail to you any literature you need.

Selecting the dispersion assembly location

- For each dispersion device, DRISTEEM documents distances required for absorption to occur. If you have questions about absorption distances, see the absorption tables in the XT Series catalog, available for viewing, printing or ordering at www.dristeem.com
- It is important that the dispersion assembly be positioned where the water vapor being discharged is carried off with the airstream and is absorbed before it can cause condensation or dripping in the duct.
- In general, the dispersion assembly is best placed where the air can most readily absorb the moisture being added without causing condensation at or after the unit. This normally will be after the heating coil or where the air temperature is highest.
- Place the dispersion assembly such that absorption will occur before the intake of a high efficiency filter. The filter can remove the visible moisture and become waterlogged.
- Place the dispersion assembly such that absorption will occur before coming in contact with any metal surface.
- Place the dispersion assembly such that absorption will occur before fire or smoke detection devices.
- Place the dispersion assembly such that absorption will occur before a split in the duct. Otherwise, the dispersion assembly may direct more moisture into one duct than the other.
- When draining dispersion condensate to an open drain, provide a 1" (25 mm) gap between the condensate drain piping and the drain. Locate air gap only in spaces with adequate temperature and air movement to absorb flash steam, or condensing on nearby surfaces may occur.

IMPORTANT:

Failure to follow the recommendations in this section can result in excessive back pressures on the humidifier. This will result in unacceptable humidification system performance such as water siphoning from the steam cylinder, blown water seals, erratic water level control, and spitting condensate from the dispersion tube(s).

Connecting humidifier to dispersion assembly with vapor hose

- Always support vapor hose to prevent sags or low spots.
- When vapor hose is connected to a single tube dispersion assembly, maintain a minimum pitch of 2"/ft (15%) back to the humidifier.
- See the maximum steam carrying capacity table on the next page.
- Use DRISTEEM vapor hose. Other manufacturers of vapor hose may use unacceptable release agents or material mixes that can affect humidifier system performance adversely. Using hose from alternative manufacturers increases the possibility of foaming in the steam cylinder. Foaming can cause water level control inaccuracies and reduced steam production.
- Do not use vapor hose in outdoor applications.
- Do not insulate vapor hose. Insulation causes accelerated heat aging, causing the vapor hose to become hard and susceptible to failure due to cracks.
- The steam outlet on the humidifier is sized to the output of the humidifier. DO NOT use hose with an inside diameter (ID) smaller than 1½" (DN40).
- If the humidifier must be located above the dispersion assembly, use the recommend installation as shown on Page 25.
- For Single Tube applications, see the hose kit sizing chart on Page 26.
- **To avoid cracking the steam cylinder outlet, use the bolt hose clamp when attaching white braided hose to the steam cylinder** (see Figure 23-1). Use the worm-drive hose clamp for clamping white braided hose to the stainless steel adapter.

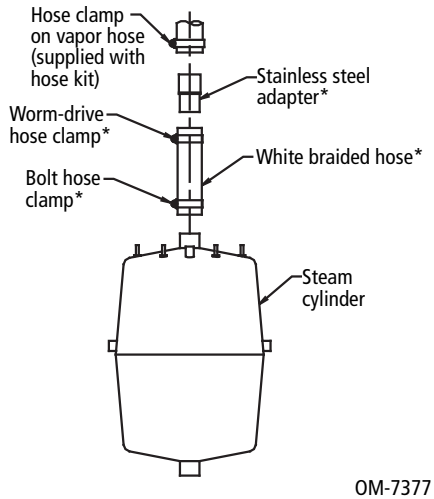
Connecting humidifier to dispersion assembly with tubing or pipe

- See the table on Page 27 for interconnecting tubing and pipe pitch requirements for single tube and multiple tube applications. See the table on Page 31 for interconnecting tubing and pipe pitch requirements for Rapid-sorb applications.
- The steam outlet on the humidifier is sized to the output of the humidifier. DO NOT use interconnecting tubing or pipe with an inside diameter (ID) smaller than 1½" (DN40). REDUCING THE INSIDE DIAMETER OF THE INTERCONNECTING PIPING WILL RESULT IN THE INTERNAL HUMIDIFIER SYSTEM PRESSURE EXCEEDING THE PARAMETERS FOR ACCEPTABLE PERFORMANCE.
- Hose cuff kits are available from DRISTEEM to connect tubing or pipe to the stainless steel adapter and the dispersion assembly.
- 90° elbows are not recommended; use two 45° elbows, 1' (0.3 m) apart.
- Thin wall tubing heats up faster and causes less start-up loss than heavy wall pipe.

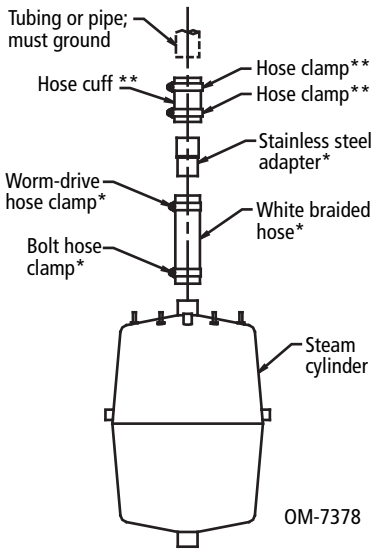
More on the next page ▸

Figure 23-1: Steam outlet connections

Vapor hose connection



Tubing or pipe connection



Notes:

* A stainless steel adapter, white braided hose, and two hose clamps ship with each humidifier. Hose clamps shipped, by model:
- XT-10 and XT-20: ¾" worm-drive clamp and D29 bolt clamp
- XT-30 and XT-50: 1¼" worm-drive clamp and D43 bolt clamp

See the replacement parts section of this manual for part numbers.

** Hose cuffs and hose clamps can be ordered from DRISTEEM. One cuff and two clamps connect tubing or pipe to the stainless steel adapter shown above, and one cuff and two clamps connect tubing or pipe to the dispersion assembly (not shown). Use 1.5" × 6" cuffs (Part No. 305390-006) with 1.5" clamps (Part No. 700560-150).

Connecting humidifier to dispersion assembly with tubing or pipe (continued)

- Insulating hard pipe reduces the loss in output caused by condensation.
- When using hard pipe, take care to remove ALL traces of residual materials used to assemble the pipe. This will minimize the possibility of foaming in the steam cylinder. Denatured alcohol or mineral spirits work best for removing residual materials.
- If the humidifier must be located above the dispersion assembly, use the recommend installation as shown on Page 25.
- See the maximum steam carrying capacity table below.

Table 24-1:
Maximum steam carrying capacity and length of interconnecting vapor hose, tubing, and pipe*

Vapor hose††						Copper or stainless steel tubing and Schedule 40 steel pipe					
Hose I.D.		Maximum capacity		Maximum length**		Tube or pipe size***		Maximum capacity		Maximum developed length†	
inches	DN	lbs/hr	kg/h	ft	m	inches	DN	lbs/hr	kg/h	ft	m
1½	40	150	68	10	3	1½	40	150	68	20	6
						2†††	50†††	220	100	30	9

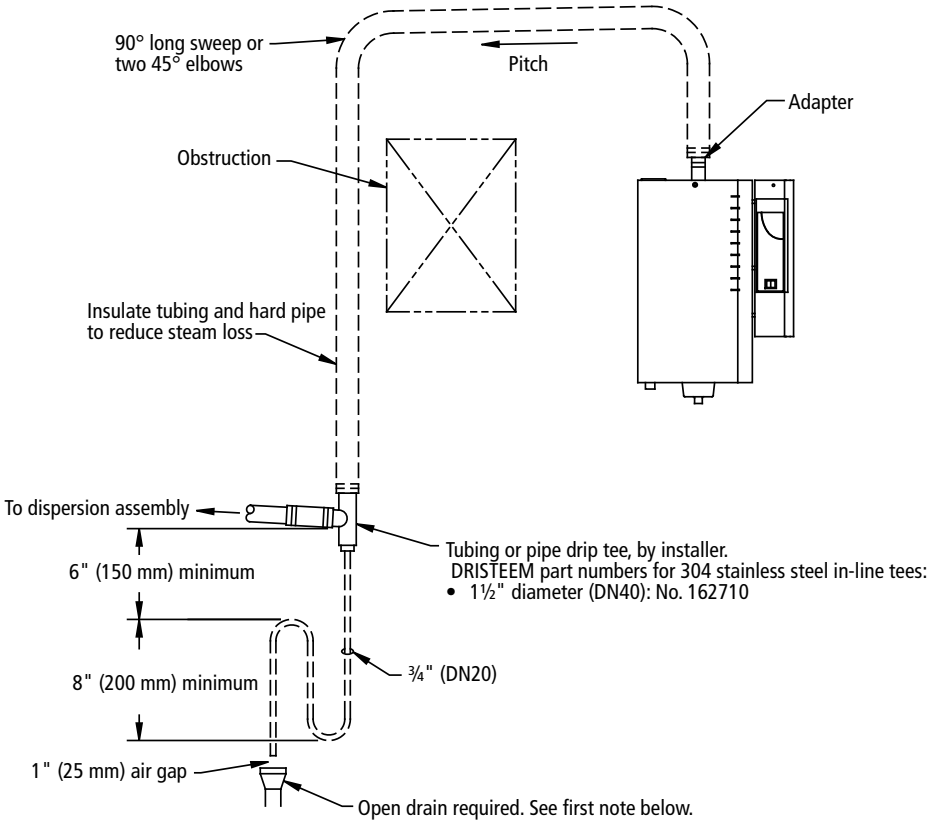
* Based on total maximum pressure drop in hose, tubing, or piping of 5" wc (1244 Pa)
** Maximum recommended length for vapor hose is 10' (3 m). Longer distances can cause kinking or low spots.
*** To minimize loss of capacity and efficiency, insulate tubing and piping.
† Developed length equals measured length plus 50% of measured length to account for pipe fittings. If maximum developed length is more than 20' (6 m), a fill cup extension kit is required.
†† When using vapor hose, use DRISTEEM vapor hose for best results. Field-supplied hose may have shorter life and may cause foaming in the steam cylinder resulting in condensate discharge at the dispersion assembly. Do not use vapor hose for outdoor applications.
††† Use 2" (DN50) tubing or pipe only for piping multiple humidifiers from manifold to dispersion assembly.

Dispersion: Drip tee installation

Install a drip tee as shown below when the humidifier is mounted higher than the dispersion assembly, when interconnecting hose or piping needs to go over an obstruction, or when interconnecting piping runs are long.

IMPORTANT: Vapor hose must be supported to prevent sagging or low spots.

Figure 25-1:
Drip tee installation (piping over an obstruction)



Notes:
- Locate air gap only in spaces with adequate temperature and air movement to absorb flash steam; otherwise, condensation may form on nearby surfaces. Refer to governing codes for drain pipe size and maximum discharge water temperature.
- Support vapor hose so there are no sags or low spots
- Dashed lines indicate provided by installer

Dispersion: Single Tube and Multiple Tube

IMPORTANT:

Failure to follow the recommendations in this section can result in excessive back pressures on the humidifier. This will result in unacceptable humidification system performance such as water siphoning from the steam cylinder, blown water seals, erratic water level control, and spitting condensate from the dispersion tube(s).

Table 26-1: Hose kit sizing by capacity

Maximum tube capacity		Hose kit (vapor hose, dispersion tube, and hardware)
lbs/hr	kg/h	
28.4	12.9	1½" (DN40) without drain
56.8	25.8	1½" (DN40) with drain
> 56.8	>25.8	These capacities require multiple tube assemblies and cannot use a single hose kit.

Installation

- See the following pages for detailed drawings and notes for installing Single Tube and Multiple Tube dispersion assemblies.
- See the hose kit sizing table on this page for Single Tube applications.

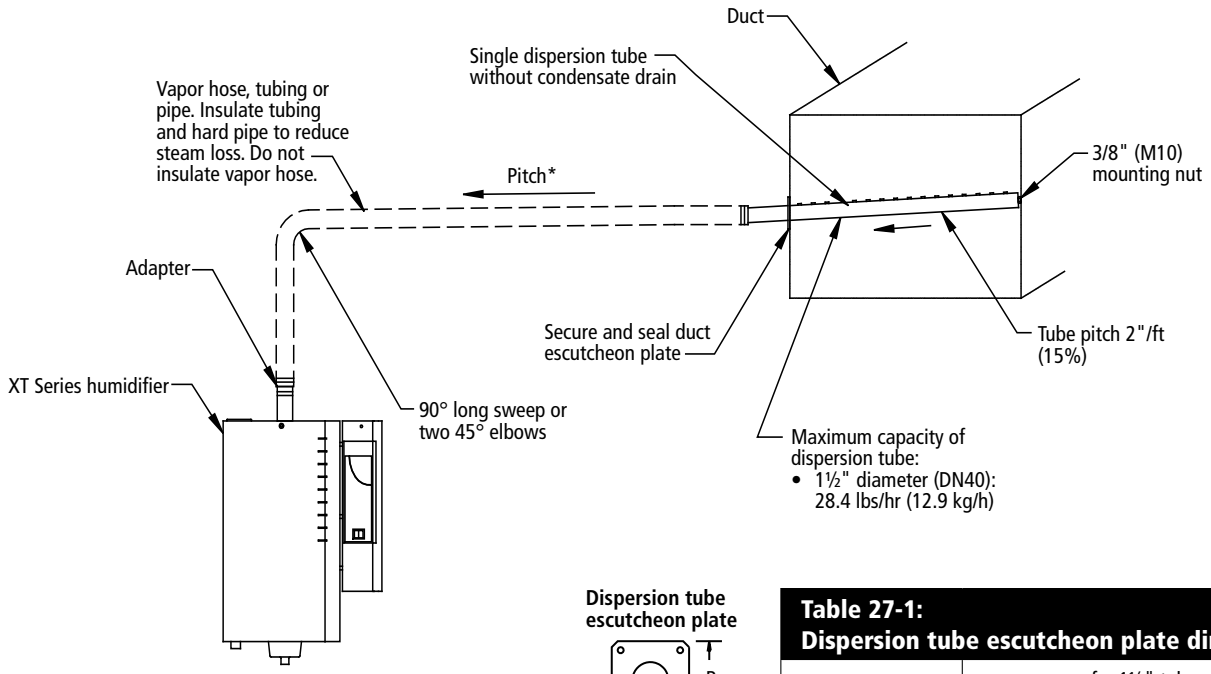
Dispersion tube mounting

- Orient dispersion tube(s) so that tubelets (steam orifices) point up.
- See the table on the next page for dispersion tube pitch requirements.
- When mounting the humidifier above the level of the dispersion tube(s), see the drip tee installation drawing on Page 25.

Condensate drain piping

- Minimum diameter (ID) for draining from one or two dispersion tubes: ¾" (DN20)
- Minimum diameter (ID) for draining from three or more dispersion tubes: 1¼" (DN32)
- Condensate drain piping must be rated for 212 °F (100 °C) continuous operating temperature.
- Condensate drain line must be piped as shown in the figures on the following pages. Provide a 6" (152 mm) drop prior to a 5" (127 mm) water seal to:
  – Ensure drainage of condensate from the header
  – Keep steam from blowing out of the drain line
- After the water seal, run the drain line to an open drain with a 1" (25 mm) vertical air gap. Cut the drain line at a 45° angle on the end above the drain to permit a direct stream of water into the drain pipe while maintaining a 1" (25 mm) air gap. Locate air gap only in spaces with adequate temperature and air movement to absorb flash steam, or condensing on nearby surfaces may occur.
- All drain lines must be installed and sized according to governing codes.

Figure 27-1:
Single Tube dispersion without condensate drain



Notes:
* Pitch vapor hose, tubing or pipe toward humidifier:
– 2"/ft (15%) when using vapor hose
– 1/8"/ft (1%) when using tubing or pipe
• Dashed lines indicate provided by installer

Dispersion tube escutcheon plate

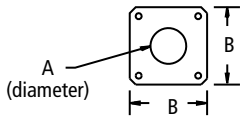


Table 27-1:
Dispersion tube escutcheon plate dimensions

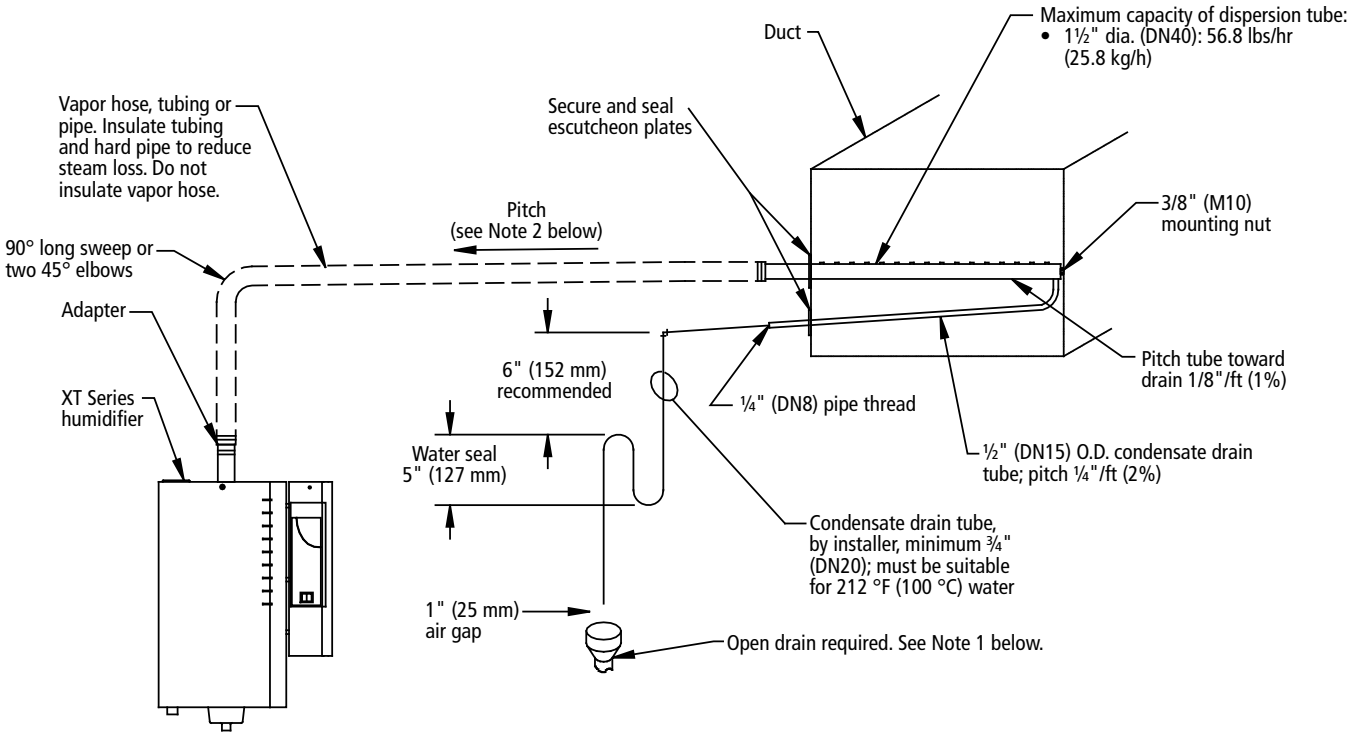
	for 1½" tube	
	inches	mm
A	1.51	38
B	3.25	83

Table 27-2:
Pitch of dispersion tube(s) and interconnecting piping for Single Tube or Multiple Tube evaporative dispersion units*

Condensate drain	Type of interconnecting piping	Diameter of dispersion tube and interconnecting piping	Pitch of interconnecting piping	Pitch of dispersion tube(s)	Pitch of condensate drain
Without drain	Vapor hose	1½" (DN40)	2"/ft (15%) toward humidifier	2"/ft (15%) toward humidifier	No drain
	Tubing or pipe	1½" (DN40)	1/8"/ft (1%) toward humidifier		
With drain	Vapor hose	1½" (DN40)	2"/ft (15%) toward humidifier	1/8"/ft (1%) toward condensate drain	¼"/ft (2%) toward floor drain
	Tubing or pipe	1½" (DN40)	½"/ft (5%) toward humidifier		

Note:
* When piping over an obstruction, see the drip tee installation illustration on Page 25.

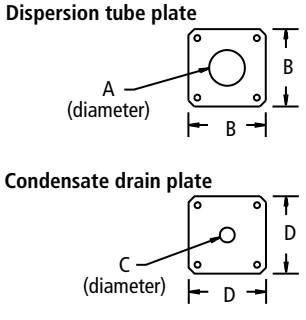
Figure 28-1:
Single Tube dispersion with condensate wasted to floor drain



Notes:
1 Locate air gap only in spaces with adequate temperature and air movement to absorb flash steam; otherwise, condensation may form on nearby surfaces. Refer to governing codes for drain pipe size and maximum discharge water temperature.
2 Pitch vapor hose, tubing or pipe toward humidifier:
– 2"/ft (15%) when using vapor hose
– ½"/ft (5%) when using 1½" tubing or pipe
3 Dashed lines indicate provided by installer

OM-7366

Figure 28-2:
Dispersion tube and condensate drain escutcheon plates

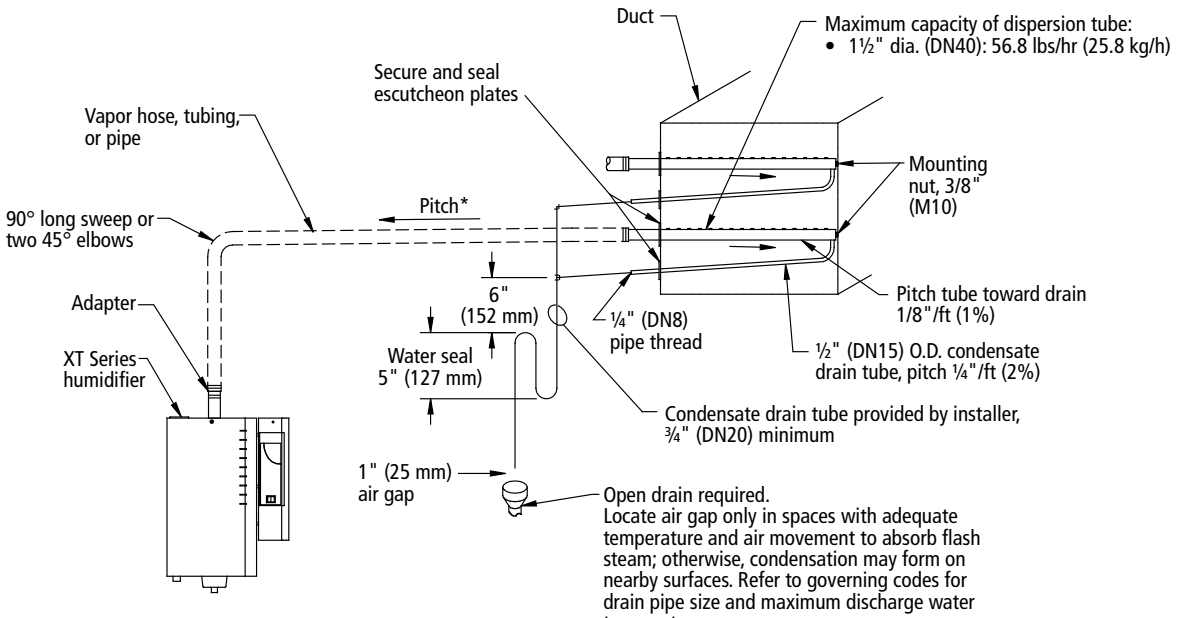


OM-351c

Table 28-1:
Dispersion tube and condensate drain escutcheon plate dimensions

	for 1½" tube	
	inches	mm
A	1.51	38
B	3.25	83
C	0.75	19
D	3.25	83

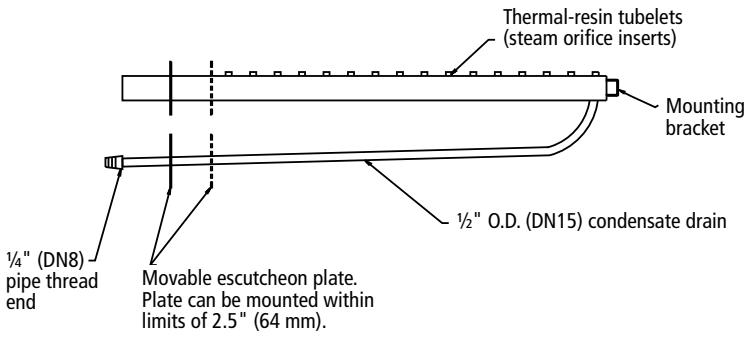
Figure 29-1:
Multiple Tube with condensate wasted to floor drain



Notes:
* Pitch vapor hose, tubing or pipe toward humidifier:
– 2"/ft (15%) when using vapor hose
– ½"/ft (5%) when using 1½" tubing or pipe
• Dashed lines indicate provided by installer

OM-7368

Figure 29-2:
Single Tube dispersion with condensate drain



OM-351b

IMPORTANT:

Failure to follow the recommendations in this section can result in excessive back pressures on the humidifier. This will result in unacceptable humidification system performance such as water siphoning from the steam cylinder, blown water seals, erratic water level control, and spitting condensate from the dispersion tube(s).

Table 30-1:
Rapid-sorb dispersion tube capacities

Tube capacity		Tube diameter	
lbs/hr	kg/h	inches	DN
≤ 35	≤ 16	1½	40

Table 30-2:
Rapid-sorb header capacities

Header capacity		Header diameter	
lbs/hr	kg/h	inches	DN
≤ 250	≤ 113	2	50

General Rapid-sorb installation instructions

- Before you begin installation, read all dispersion instructions in this manual.
- Before you begin installation, unpack shipment and verify receipt of all Rapid-sorb components with packing list. Report any shortages to DRISTEEM factory immediately. The components typically include the following:
  - Multiple dispersion tubes
  - Header
  - ¾" × 2" (19 mm × 51 mm) L-bracket
  - A single duct escutcheon plate the size of the header
  - Slip couplings or hose cuffs and clamps.
  - Accessories such as duct plates, slip couplings, or hose cuffs are in a plastic bag.
  - The bolts and washers for mounting the dispersion tubes to the bracket will be in the end of the tubes or packaged in a bag with the other accessories.
  - The tubes, header, and L-bracket are tagged with the customer requested identification number written on each component.
- When choosing a location for installation, select a location that provides necessary access in and around the ductwork or air handler.
- The Rapid-sorb typically is installed centered side to side in a duct, or is installed across the face of a coil in an air handler.
- The center line of the outer dispersion tubes should never be closer than 4.5" (114 mm) from the side of the ductwork or air handler wall.
- Rapid-sorbs are provided with an L-bracket for installation:
  - L-brackets that are 50" (1270 mm) or less in length have a hole 4" (102 mm) in from each end to mount the L-bracket to the duct or air handler wall.
  - L-brackets that are greater than 50" (1270 mm) in length have an additional hole in the center of the L-bracket.
  - **Important:** Before marking and drilling holes in the duct or air handler, refer to ALL pitch requirements for the Rapid-sorb assembly you received (see the table on Page 31). The size, quantity, and location of penetrations are determined by the specific dimensions and configuration of the Rapid-sorb assembly you received.
  - **Note:** The hardware for mounting the L-bracket to the duct or air handler wall and the hardware for the header support bracket is not provided.
- The Rapid-sorb instructions that follow are for the most typical Rapid-sorb installations — installed in a duct horizontal airflow with Rapid-sorb header either inside or outside the duct. See the Dri-calc Installation Guides library or contact your representative/ distributor or DRISTEEM for installation instructions for air handler or vertical airflow applications.

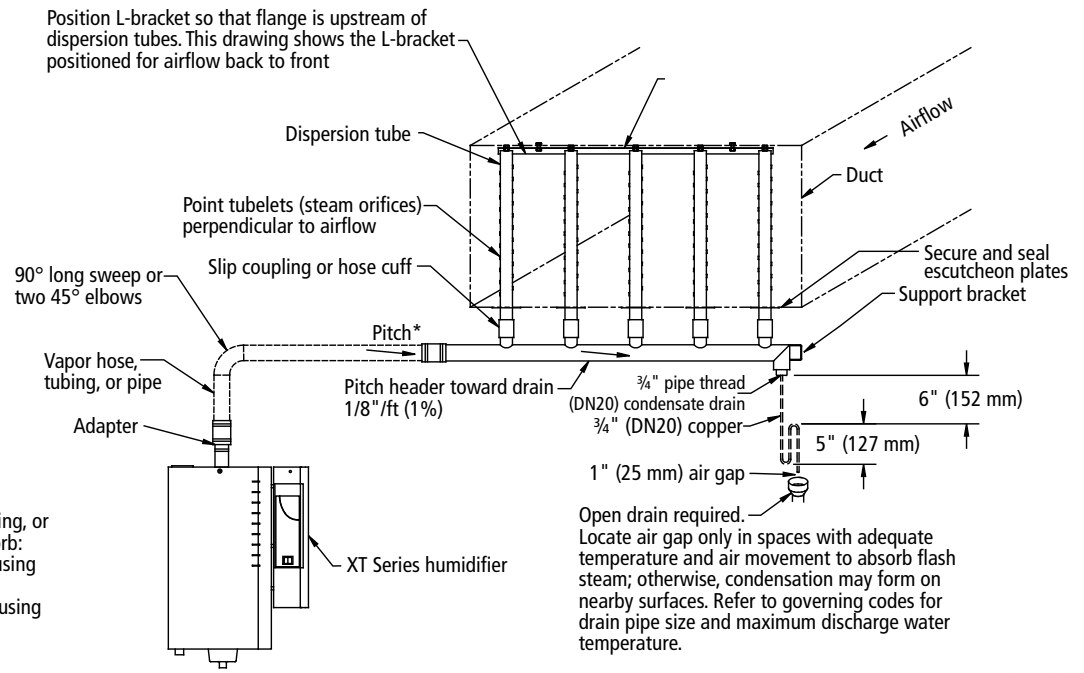
Rapid-sorb pitch requirements

- When installing Rapid-sorb with the header outside a horizontal airflow duct, consider the following pitch issues:
  - For 1½" (DN40) dispersion tubes, use a fastener of sufficient length to accommodate the 1/8"/ft (1%) pitch requirements toward the ¾" pipe thread (DN20) header drain fitting.
  - For 2" (DN50) dispersion tubes, the bracket can be mounted flush to the ductwork. The 1/8"/ft (1%) pitch typically can be accomplished in the length of the hose cuffs used to connect the tubes to the header.
- See the table below and the drawings on the following pages for pitch requirements.

Table 31-1:
Pitch of interconnecting piping, dispersion tubes, and headers for Rapid-sorb evaporative dispersion units

Airflow	Type of interconnecting piping	Diameter of interconnecting piping	Pitch of interconnecting piping	Pitch of dispersion tubes	Pitch of header
Horizontal	Vapor hose	1½" (DN40)	2"/ft (15%) toward Rapid-sorb	Vertically plumb	1/8"/ft (1%) toward condensate drain
	Tubing or pipe	1½" (DN40)	1/8"/ft (1%) toward Rapid-sorb		
Vertical	Vapor hose	1½" (DN40)	2"/ft (15%) toward Rapid-sorb	2"/ft toward header	1/8"/ft (1%) toward condensate drain
	Tubing or pipe	1½" (DN40)	1/8"/ft (1%) toward Rapid-sorb		

Figure 32-1:
Rapid-sorb installed in a horizontal airflow with header outside the duct



Note:
* Pitch vapor hose, tubing, or pipe toward Rapid-sorb:
– 2"/ft (15%) when using vapor hose
– 1/8"/ft (1%) when using tubing or pipe

Assembly and installation instructions for a Rapid-sorb installed with header outside the duct (horizontal airflow)

1. Locate and cut the holes in the ductwork for the dispersion tubes. Use the L-bracket as a template to locate the holes on the duct floor.

2. Temporarily, loosely suspend or support the header below the final location — the vertical balance point of the dispersion tube length dictates where the header should be suspended or supported temporarily.

3. Mount the dispersion tubes to the header with the provided connector, either a slip coupling or a hose cuff.
   - When installing slip couplings for 1½" (DN40) dispersion tubes, take care not to shear the O-rings.
   - Set the slip coupling on the header stub or dispersion tube so the O-ring is resting on the face of the tubing.
   - Rotate the slip coupling as you push it on to the tubing.
   - The O-rings are lubricated at the factory. If additional lubrication is necessary, DO NOT use a petroleum-based lubricant.

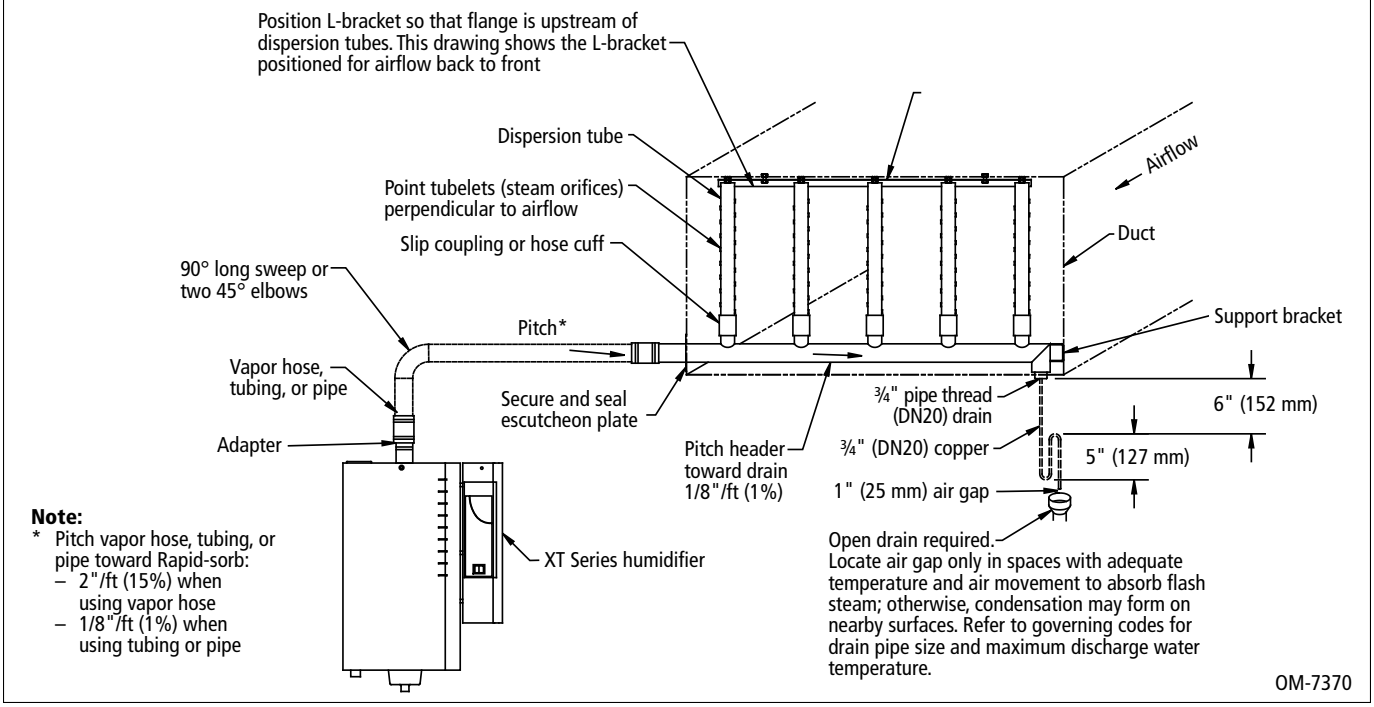
4. Position the flange of the L-bracket so it is upstream of the tubes when the assembly is raised and fastened into position. Fasten the

Assembly and installation instructions for a Rapid-sorb installed with header outside the duct (continued)

L-bracket to the end of the dispersion tubes with the provided bolt, lock washer, and flat washer.

5. Before tightening the L-bracket bolts to the dispersion tubes follow these instructions:
   - For 1½" (DN40) dispersion tubes:
     - The dispersion tube will rotate in the slip coupling. Verify that the dispersion tube orifices are directed perpendicular to the airflow.
     - The dispersion tube and slip coupling must be fully engaged on to the header stub for the O-rings to provide a seal.
   - For 2" (DN50) dispersion tubes:
     - Before securing the hose cuff in place with the hose clamps on the dispersion tube and the header stub, verify that the dispersion tube orifices are directed perpendicular to the airflow.
6. Slide the assembly up until the L-bracket aligns with the mounting holes in the duct.
   - For 1½" (DN40) dispersion tubes:
     - The header pitch is duplicated in the L-bracket.
     - The dispersion tube and slip coupling must be fully engaged on to the header stub for the O-rings to provide a seal.
     - The high end of the L-bracket can be fastened tight to the duct or air handler.
     - On the low end of the L-bracket, the fastener must be long enough to compensate for the pitch, and a nut should be provided and secured on both sides of the L-bracket and the duct or air handler for stability.
   - For 2" (DN50) dispersion tubes:
     - Fasten the bracket to the top of the duct and use the hose cuffs to compensate for the pitch of the header.
     - Before securing the hose cuff in place with the hose clamps on the dispersion tube and the header stub, verify that the header pitch, 1/8"/ft (1%) toward drain, is maintained.
7. Permanently secure both ends of the header and verify that the header pitch, 1/8"/ft (1%) toward drain, is maintained.
8. Verify that all fasteners are secure:
   - L-bracket to duct
   - Dispersion tubes to L-bracket
   - Hose clamps on 2" (DN50) tubes
9. Secure and seal the dispersion tube escutcheon plate and condensate drain tube escutcheon plate around the respective tubes, if applicable.

Figure 34-1:
Rapid-sorb installed in a horizontal airflow with header inside the duct



Note:
* Pitch vapor hose, tubing, or pipe toward Rapid-sorb:
- 2"/ft (15%) when using vapor hose
- 1/8"/ft (1%) when using tubing or pipe

Assembly and installation instructions for a Rapid-sorb installed with header inside the duct (horizontal airflow)

1. Locate and cut the holes in ductwork or air handler for steam header penetration, condensate drain piping, and header support bracket fastener. Allow 1/8"/ft (1%) header pitch toward the support bracket when you drill the hole for the header support bracket fastener.
2. Loosely fasten the header in place.
3. Rotate the header 90° so the header stubs point horizontally in the duct.
   - When installing in an air handler, the rotation of the header is often less than 90°. Typically, due to the condensate drain piping requirements, the header can be set on the floor of the air handler, assembled in the vertical position, and then raised and mounted in place.
4. Mount the dispersion tubes on the header with the slip couplings or hose cuffs.
   - When installing slip couplings for 1½" (DN40) dispersion tubes, take care not to shear the O-rings.
   - Set the slip coupling on the header stub or dispersion tube so the O-ring is resting on the face of the tubing.

More on next page ►

Assembly and installation instructions for a Rapid-sorb installed with header inside the duct (continued)

- Rotate the slip coupling as you push it on to the tubing.
- The O-rings are lubricated at the factory. If additional lubrication is necessary, DO NOT use a petroleum-based lubricant.

5. Allow the dispersion tubes to rest against the bottom of the duct.
6. Position the flange of the L-bracket so it is upstream of the tubes when the assembly is rotated into position. Fasten the L-bracket to the end of the dispersion tubes with the provided bolt, lock washer, and flat washer.
7. Rotate the assembly up until the L-bracket aligns with the mounting holes in the duct or air handler.
   - 1½" (DN40) dispersion tubes
     - The header pitch is duplicated in the L-bracket.
     - The dispersion tube and slip coupling must be fully engaged on to the header stub for the O-rings to provide a seal.
     - The high end of the L-bracket can be fastened tight to the duct or air handler.
     - On the low end of the L-bracket, the fastener must be long enough to compensate for the pitch, and a nut should be provided and secured on both sides of the L-bracket and the duct or air handler for stability.
   - 2" (DN50) dispersion tubes
     - Fasten the bracket to the top of the duct or air handler and use the hose cuffs to compensate for the pitch of the header.
     - Before securing the hose cuff in place, with the hose clamps on the dispersion tube and the header stub, verify that the dispersion tube orifices are directed perpendicular to the airflow.
8. Verify that all fasteners are secure:
   - L-bracket to duct
   - Dispersion tubes to L-bracket
   - Hose clamps on 2" (DN50) tubes
   - Header support bracket fastener
9. Secure and seal the header escutcheon plate around the header.

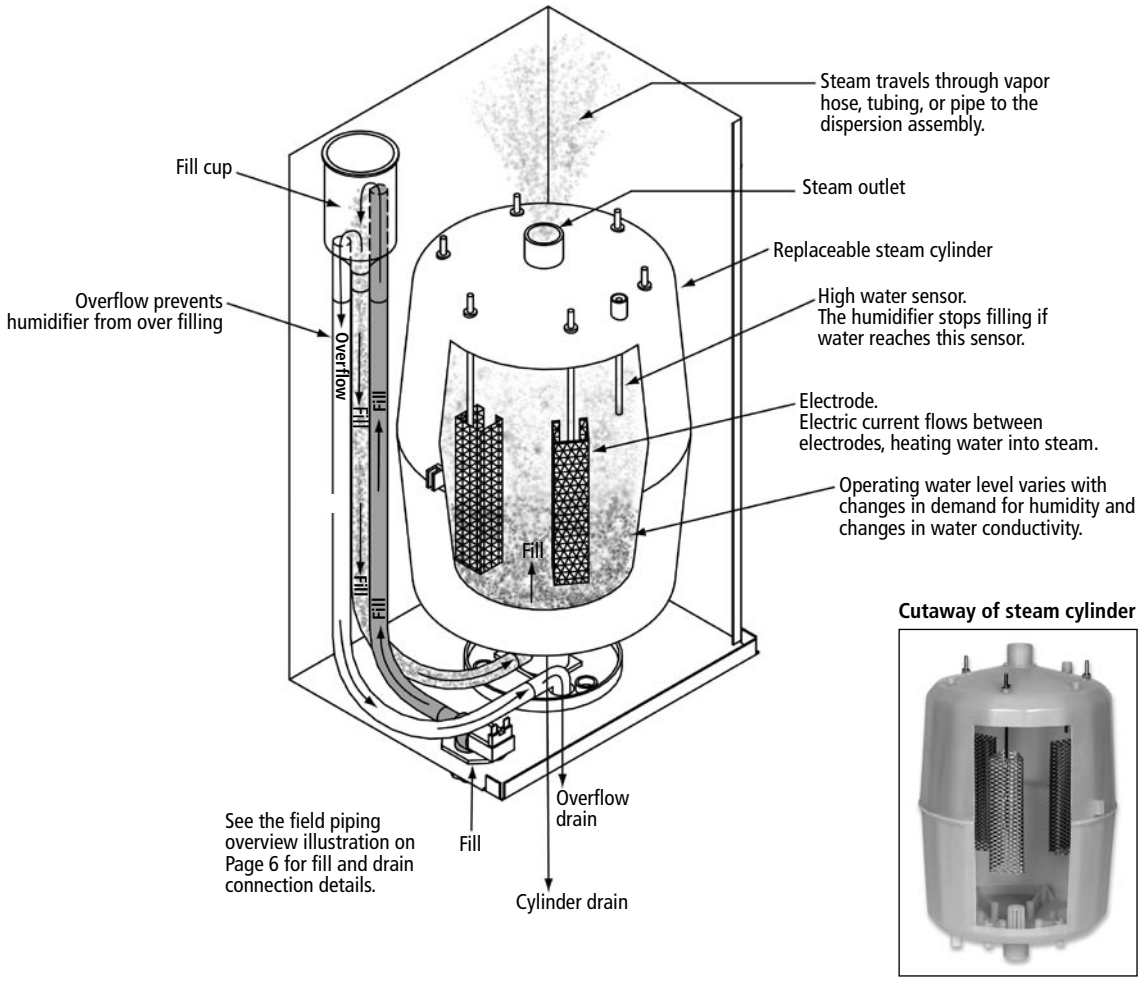
Steam supply connections to the Rapid-sorb header

1. Connect the steam supply interconnecting piping from the humidifier to the Rapid-sorb. The steam supply piping requires a minimum of 1/8"/ft (1%) pitch toward the header.
2. If multiple humidifiers are supplying one Rapid-sorb, a multiple steam supply connector is provided.
   - Typically, the multiple steam supply connector attaches to the Rapid-sorb header supply end with hose cuff and clamps.
   - Route the necessary number of steam supplies from the humidifier steam cylinders to the steam supply connector.
   - Position the steam supply connector to accept the steam supplies while maintaining the necessary pitch.
   - Make sure the hose clamps on the steam supply connector and header are tight.

Condensate drain connections to the Rapid-sorb header

1. Piping must be minimum ¾" I.D. (DN20) and rated for 212 °F (100 °C) minimum continuous operating temperature.
2. Condensate drain line must be piped as shown in the figures on the previous pages. Provide a 6" (152 mm) drop prior to a 5" (127 mm) water seal to:
   - Ensure drainage of condensate from the header
   - Keep steam from blowing out of the drain line
3. After the water seal, run the drain line to an open drain with a 1" (25 mm) vertical air gap. Cut the drain line at a 45° angle on the end above the drain to permit a direct stream of water into the drain pipe while maintaining a 1" (25 mm) air gap. Locate air gap only in spaces with adequate temperature and air movement to absorb flash steam, or condensing on nearby surfaces may occur.
4. All drain lines must be installed and sized according to governing codes.

Figure 37-1:
XT Series principle of operation



Principle of operation

When the relative humidity level in the space being humidified drops below set point, the microprocessor controller in the XT Series humidifier receives a call for humidity and calculates a corresponding amperage value. The controller closes the contactor, which energizes the electrodes. If there is no water or not enough water in the steam cylinder, the fill valve opens and water enters the steam cylinder.

As soon as water rises to touch the electrodes, current flows through the conductive water from one electrode to another. The conductive water provides resistance to current flow, producing heat, and causing water in the steam cylinder to boil and produce

steam. As the amount of water covering the electrodes increases, or as water conductivity increases, current flow increases. The fill valve remains open until the current flow increases to the amperage corresponding to the demand signal. When this amperage is met, the fill valve closes and water continues to boil off into steam. As the water level decreases, current flow decreases. When current flow becomes less than the amperage corresponding to the demand signal, the fill valve opens to increase the water level in the cylinder to increase current flow, increasing steam production. Steam created in the cylinder flows through the steam outlet via vapor hose or piping to the dispersion assembly, where it is discharged into the airstream.

End-of-season drain

If there is no call for humidity for 72 hours, the humidifier is placed in End-of-Season (EOS) mode. When the unit enters EOS mode, the drain valve remains open for five minutes to allow the steam cylinder to drain, and then closes. When the humidifier receives a call for humidity after the end-of-season drain, the steam cylinder refills and the humidifier resumes normal operation. Draining the steam cylinder after 72 hours reduces the possibility of electrode corrosion and microbial growth in the cylinder.

Extended shutdown

To prepare the unit for an extended shutdown:

1. Drain the steam cylinder to reduce possibility of electrode corrosion.
2. Turn the unit off by toggling the on-off switch.
3. Open the main external fused disconnect to stop power to the humidifier.
4. Close the water supply shut-off valve to the humidifier.
5. After shutdown, limit unit access to qualified service personnel only.

Safety functions

XT Series humidifiers are protected against running dry — current does not flow when the electrodes in the steam cylinder are no longer submerged in water. After 30 minutes of no current, an **E3** message is displayed (see Page 49).

Should the current rating exceed 125% of nominal current, the drain valve opens automatically. As the water level drops, the current rating drops back to the nominal value.

Should the current rating exceed 140% of the nominal current

after several drainage operations, the humidifier will shut down automatically and display an **E2** message (see Page 49).

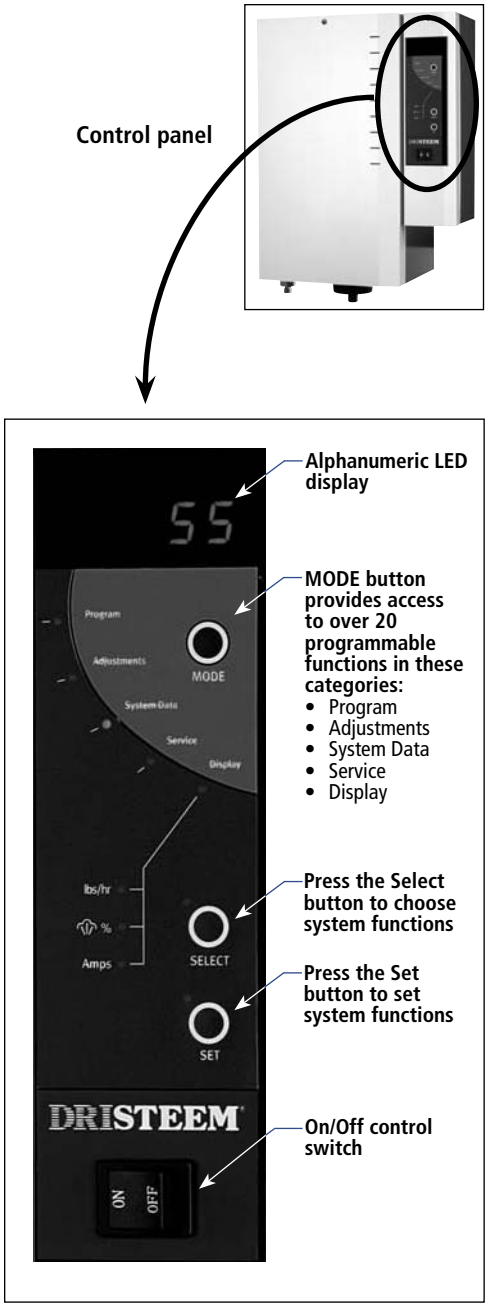
To prevent duct saturation, installing a high limit humidistat and airflow proving switch is recommended.

Display panel operation

Press the **MODE** button on the display panel to access five operating modes: Display, Service, System Data, Adjustments, and Program. Press **MODE** until the LED of the chosen mode illuminates. Press **SELECT** to enter the mode submenu.

Press the **SELECT** button to view information and parameters of the chosen menu. In some cases, parameter labels and parameter values alternate on the display. For example, when the unit type for model number XT-30 is displayed, **typ** alternates with **30**.

If a parameter is selected, press the **SET** button to enter or change the parameter value. Press **MODE** to leave the accessed mode and select the next mode.



Display operating mode

Press the **MODE** button until the LED next to **Display** illuminates. Press the **SELECT** button to view the following:

- Steam production rate in lbs/hr
- Output limit setting as a percentage of maximum unit capacity
- Heating current in amps

Table 40-1: Display operating mode

Mode	Program variable	Definition	Default display	Alternate display	Range	Increment	Variable type
Display	<Default>	Default display: Four dashed lines for external control; %RH for internal control	- - - -	<%RH>	0-100	1	Indicator
	lbs/hr	Steam production rate in **lbs/hr**			0.0 - max. capacity	0.1	Indicator
	~%	Output limit setting as a **percent**age of maximum unit capacity	100		20-100	1	Indicator
	Amps	Heating current in **Amps**			0.0-max.	0.1	Indicator

Service operating mode

In the Service operating mode, components can be tested by manually switching them on or off using the **SET** button. To do this, press the **MODE** button until the LED next to **Service** illuminates. The LED next to the **SELECT** button is now flashing. This indicates that it is selectable. Press the **SELECT** button to view the Service submenu. Press the **SELECT** button repeatedly to scroll through the submenu. To modify parameter status, press the **SET** button if the LED is flashing. The table below shows the Service submenu parameters that may be switched on or off.

Note: Unit will stop steam production when the **FL** program variable is reached.

Table 41-1:
Service operating mode

Mode	Program variable	Definition	Default display	Alternate display	Range	Increment	Variable type
Service	<Default>	Default display: Four dashed lines for external control; %RH for internal control	- - - -	<%RH>	0-100	1	Indicator
	SE	High water **Se**nsor status: off (**oF**) or **on**	SE.oF or SE.on				Indicator
	HU	**Hu**midistat status: off (**oF**) or **on**	HU.oF or HU.on				Indicator
	P	**P**ower. Use **SET** button to switch unit on/off manually.	P .oF or P .on				Cycles component
	FL	**Fil** valve. Use **SET** button to switch fill valve on/off manually.	FL.oF	FL.on			Cycles component
	dr	**Dr**ain valve. Use **SET** button to switch drain valve on/off manually.	dr.oF	dr.on			Cycles component
	Co	**Co**ntactor. Use **SET** button to switch contactor on/off manually.	Co.oF	Co.on			Cycles component
	r1	Remote indication **r**elay **1.** Use **SET** button to switch remote indication relay 1 (terminals 9, 10, 11) on/off manually.	r1.oF	r1.on			Cycles component
	r2	Remote indication **r**elay **2.** Use **SET** button to switch remote indication relay 2 (terminals 26, 27, 28) on/off manually.	r2.oF	r2.on			Cycles component

System Data operating mode

The **System Data** operating mode provides a quick way to review (but not change) current system parameters. To review **System Data,** press the **MODE** button until the LED next to **System Data** illuminates. The LED next to the **SELECT** button is now flashing, which indicates that it is selectable. Press the **SELECT** button to view the **System Data** submenu. Press the **SELECT** button repeatedly to scroll through the submenu. The table below and on the next page shows the parameters available for review.

Note: For most displayed information, the parameter label alternates with the parameter value. For example, when the unit type for model number XT-30 is displayed, **typ** alternates with **30**.

Table 42-1:
System Data operating mode

Mode	Program variable	Definition	Default display	Alternate display	Range	Increment	Variable type
System Data	<Default>	Default display: Four dashed lines for external control; %RH for internal control	- - - -	<%RH>	0-100	1	Indicator
	vErS	Firmware **vers**ion					Indicator
	tYP	Model **typ**e 10, 20, 30, or 50 (corresponds to maximum unit capacity)					Indicator
	voLt	Unit **volt**age					Indicator
	PHSE	Unit **ph**a**se** Single phase Three phase	1 3				Indicator
	OL	**O**utput **l**imit setting as a percentage of maximum unit capacity	100		20-100	1	Indicator
	HU.SP	**Hu**midity **s**et **p**oint (%RH) for internal controller	35		10-100	1	Indicator
	HU.Pr	Internal controller **hu**midity **p**roportional **r**ange	10		05-15	1	Indicator
	HU	**E**xternal or **i**nternal **hu**midity controller	HU. E	HU. I			Indicator
	CS	**C**ontrol **s**ignal: **on oF** on-off humidistat **0-20** 0-20 volt **0-16** 0-16 volt **0-10** 0-10 volt **2-10** 2-10 volt **1-5** 1-5 volt **1.020** 0-20 mA **1.420** 4-20 mA **Pot** potentiometer	on oF	0-20 0-16 0-10 2-10 1-5 1.020 1.420 Pot			Indicator
	SPLt	**Spli**t combination for sequencing units: See Page 47 for an explanation of settings.	00.99	00.49 50.99 00.24 25.49 50.74 75.99			Indicator
	20.SP	**S**ignal for turn-on **p**oint: **20.SP** signal for turn-on at 20% **10.SP** signal for turn-on at 10%	20.SP	10.SP			Indicator

More on the next page ►

Table 43-1:
System data operating mode (continued)

Mode	Program variable	Definition	Default display	Alternate display	Range	Increment	Variable type
System Data (continued)	d.PLU	**D**rain **plu**s. Adds drain time (in seconds) to the calculated drainage duration.	00		00-99	1	Indicator
	d.Int	**D**rain **int**erval. Time (in minutes) between automatic drains.	20		10-20	1	Indicator
	d.Add	**D**rain **add**itional. If the function is active, a drain will occur at regular intervals independent of the automatic drain: **oF** function not active **on** regular drainage active	oF	on			Indicator
	d.HU	**D**rain **hu**midistat. If the function is active, the automatic drain will only occur after the humidistat switches off: **oF** function not active **on** function active	oF	on			Indicator
	d.H.Ad	**D**rain **h**umidistat **ad**ditional. This function activates the drain valve (in seconds) after the humidistat switches off.	Varies by model		00-30	1	Indicator
	FL.dL	**F**il**l** valve **d**el**a**y. Function is active (fill valve opening delayed, in seconds) if current is sensed in the monitored electrode wire.	55		01-70	1	Indicator
	FL.PU	**F**il**l** valve **pu**lsed. If function is active, fill valve will open for 3 seconds and close for 7 seconds repeatedly, until water level in steam cylinder is adequate: **oF** function not active **on** function active	oF	on			Indicator
	r1 r2	**R**elay **1** or **R**elay **2**: **SE** Collective message without E1 **b** Relay switches during steam operation **S** Collective message (displayed if any E1-E5) **E1** Cylinder service message (displays at end of cylinder life) **E2** Over current (displays if unit exceeds 140% of nominal current and shuts unit down) **E3** No water (displays after 30 minutes if no water in cylinder and shuts unit down **E4** Uncoded replacement processor board **E5** Cylinder maintenance interval reached	r1.SE r2.E1	r1. b r1. S r1.E1 r1.E2 r1.E3 r1.E4 r1.E5			Indicator
	noE1	**No E1** message: **oF** E1 message will be displayed **on** E1 message is suppressed	oF	on			Indicator
	SErv	**Serv**ice. Counter (in hours) for maintenance interval	00				Indicator
	LIFE	**Life** of steam cylinder, Counter of steam cylinder operating hours					Indicator
	totL	**Tot**a**l** operating hours on the unit. Hours are counted to 9999 then every 10 hours.					Indicator
	FOAM	Setting of the anti-**foam** program: **oF** function not active **on** function active	oF	on			Indicator
	H.L. A	**H**igh **l**imit **a**ctual. Displays relative humidity measured by the high limit VAV transmitter	0%	<%RH>			Indicator
	AdrS	**Ad**d**res**s of unit to be controlled by a PC	01		00-29	01	Indicator

Adjustments operating mode

The **Adjustments** operating mode provides access to values that require frequent adjustment. To make adjustments, press the **MODE** button until the LED next to **Adjustments** illuminates. Press the **SELECT** button to index to the first variable. The LEDs near the **SELECT** and **SET** buttons flash indicating that they are selectable. Press the **SELECT** button repeatedly to scroll through the **Adjustments** submenu. Press the **SET** button to change the parameter. The table below shows the parameters available for adjustment.

Table 44-1: Adjustments operating mode

Mode	Program variable	Definition	Default display	Alternate display	Range	Increment	Variable type
Adjustments	<Default>	Default display: Four dashed lines for external control; %RH for internal control	- - - -	<%RH>	0-100	1	Indicator
	HU.SP	**Hu**midity **s**et **p**oint for internal controller	35		10-100	1	Variable
	HU. L	**Hu**midity **l**imitation for high limit VAV transmitter	80		10-100	1	Variable
	SErv	**Se**rvice. Use the **SET** button to set counter for maintenance interval.	00		00-9900	100	Variable
	LIFE	**Life** of cylinder (reset code: 37). Counter of steam cylinder operating hours.					Reset with cylinder change

Program operating mode

The **Program** operating mode provides access to values that require infrequent adjustment. To make adjustments, press the **MODE** button until the LED next to **Program** illuminates. The LEDs near the **SELECT** and **SET** buttons flash indicating that they are selectable. Press the **SELECT** button until the first two digits read **27** (**27 00** is displayed). Press the **SET** button until the second two digits are **05** (**27 05** is displayed). This code is used to access the program variables. Wait four seconds. Press the **SELECT** button repeatedly to scroll through the submenu. Press the **SET** button to change the parameter. The table on the next page shows the parameters available for adjustment

Table 45-1:
Program operating mode

Mode	Program variable	Definition	Default display	Alternate display	Range	Increment	Variable type
Program	<Default>	Default display: Four dashed lines for external control; %RH for internal control	- - - -	<%RH>	0-100	1	Indicator
	OL	**O**utput **l**imit setting as a percentage of maximum unit capacity	100		20-100	1	Variable
	CS	**C**ontrol **s**ignal: **on oF** on-off humidistat **0-20** 0-20 volt **0-16** 0-16 volt **0-10** 0-10 volt **2-10** 2-10 volt **1-5** 1-5 volt **1.020** 0-20 mA **1.420** 4-20 mA **Pot** potentiometer	on oF	0-20 0-16 0-10 2-10 1-5 1.020 1.420 Pot			Variable
	HU.Pr	Internal controller **hu**midity **p**roportional **r**ange	10		05-15	1	Variable
	HL.Pr	**H**igh **l**imit VAV transmitter **p**roportional **r**ange	10		05-15	1	Variable
	HU	**E**xternal or **i**nternal **hu**midity controller	HU. E	HU. I			Variable
	SPLt	**Spl**i**t** combination for sequencing units: See Page 47 for an explanation of settings.	00.99	00.49 50.99 00.24 25.49 50.74 75.99			Variable
	20.SP	**S**ignal for turn-on **p**oint: **20.SP** signal for turn-on at 20% **10.SP** signal for turn-on at 10%	20.SP	10.SP			Variable
	d.PLU	**D**rain **plu**s. Adds drain time (in seconds) to the calculated drainage duration.	00		00-99	1	Variable
	d.Int	**D**rain **int**erval. Time (in minutes) between automatic drains.	20		10-20	1	Variable
	d.Add	**D**rain **add**itional. If the function is active, a drain will occur at regular intervals independent of the automatic drain: **oF** function not active **on** regular drainage active	oF	on			Variable
	d.HU	**D**rain **hu**midistat. If the function is active, the automatic drain will only occur after the humidistat switches off: **oF** function not active **on** function active	oF	on			Variable
	d.H.Ad	**D**rain **h**umidistat **ad**ditional. This function activates the drain valve (in seconds) after the humidistat switches off.			00-30	1	Variable
	FL.dL	**F**ill valve **d**el**l**ay. Function is active (fill valve opening delayed, in seconds) if current is sensed in the monitored electrode wire.	55		01-70	1	Variable
	FL.PU	**F**ill valve **pu**lsed. If function is active, fill valve will open for 3 seconds and close for 7 seconds repeatedly, until water level in steam cylinder is adequate: **oF** function not active **on** function active	oF	on			Variable

More on the next page ►

Table 46-1:
Program operating mode

Mode	Program variable	Definition	Default display	Alternate display	Range	Increment	Variable type
Program (continued)	r1 r2	**R**elay **1** or **R**elay **2**: **SE** Collective message without E1 **b** Relay switches during steam operation **S** Collective message (displayed if any E1-E5) **E1** Cylinder service message (displays at end of cylinder life) **E2** Over current (displays if unit exceeds 140% of nominal current and shuts unit down) **E3** No water (displays after 30 minutes if no water in cylinder and shuts unit down **E4** Uncoded replacement processor board **E5** Cylinder maintenance interval reached	r1.SE r2.E1	r1. b r1. S r1.E1 r1.E2 r1.E3 r1.E4 r1.E5			Variable
	noE1	**No E1** message: **oF** E1 message will be displayed **on** E1 message is suppressed	oF	on			Variable
	FOAM	Setting of the anti-**foam** program: **oF** function not active **on** function active	oF	on			Variable
	AdrS	**Add**re**s**s of unit to be controlled by a PC	01		00-29	01	Variable
	o.SEt	**O**riginal **set**tings (reset code: 91). All programmed parameters are reset to factory default settings.					Program reset

Sequenced application; humidifier start-up

Sequenced application

Up to four XT Series humidifiers can be connected to operate in sequence. In a sequenced application, one control input signal is divided in a pre-determined range of settings, depending on how many humidifiers are connected in sequence. These settings, shown in Table 47-1, are entered while in **Program** mode by changing the variable **SPLt** (see Table 45-1). See also the wiring diagrams on pages 19-21 for wiring sequenced humidifiers.

Table 47-1:
Settings for sequencing multiple humidifiers

Number of humidifiers connected in sequence	Setting for humidifier No. 1	Setting for humidifier No. 2	Setting for humidifier No. 3	Setting for humidifier No. 4
1	00. 99	—	—	—
2	00. 49	50. 99	—	—
3	00. 24	25. 49	50. 99	
4	00. 24	25. 49	50. 74	75. 99

Sequence application example

Two units are operated with one 0-10 VDC controller signal.

The first unit is set to 00. 49. The second unit is set to 50. 99.

With these settings, the first unit operates between 0 and 100% of maximum capacity with a controller output of 0-5 V, and the second unit operates between 0 and 100% of maximum capacity with a controller output of 5-10 V.

Humidifier start-up

After connecting the steam hose, water supply, drain piping, and power per the instructions in this manual, open the water supply and turn on the humidifier's on-off control switch.

When there is a call for humidification the contactor closes, the inlet valve opens, and water flows into the steam cylinder. When the water reaches the electrodes, electric current flows, heats up the water, and steam is produced after a short time. The nominal steam capacity will be reached after a start-up time dependent on the supply water conductivity.

It is possible that the maximum fill level or **SE.on** (see Table 41-1) is reached during start up or after the installation of a replacement cylinder. When **SE.on** is reached, the inlet valve closes momentarily. This is quite normal during this water conductivity verification phase of operation. The duration of this phase varies and lasts until

the cylinder has achieved the nominal output. In the first stage of **Service** mode it can be checked whether the maximum fill level (**SE.on)** has been reached (see Page 41).

Start-up checklist

Your humidification system may not have all of the options listed below. If an item does not apply to your system, skip to the next item and continue the process.

- ❑ Before you start, read this manual and other information sent with your humidifier.
- ❑ Verify that the field wiring is done per the instructions in this manual and per the unit wiring diagram.
- ❑ Your humidifier uses cold potable or softened water. Do not use water treated by reverse osmosis (RO) or deionization (DI).
- ❑ Confirm that all wiring is correct per the wiring diagram.
- ❑ Confirm that proper grounding and an approved earth ground are provided.
- ❑ Turn water supply on and confirm that the drain valve is closed.
- ❑ Turn power on and confirm that the display is illuminated.
- ❑ Confirm that the airflow switch is closed.
- ❑ Confirm that the high limit humidistat input is closed or that the variable air volume (VAV) control system high limit transmitter is connected.
- ❑ With sufficient water in the steam cylinder, the airflow switch closed, the high limit humidistat closed, the door interlock safety switch closed, and a call for humidity, verify that the heat outputs are activated.
- ❑ If you experience difficulties, have the above information available with the model and serial number of the humidifier and firmware version and call DRISTEEM for assistance.

E messages

The humidifier is factory programmed to display five system messages: E1, E2, E3, E4, and E5. These messages may also be programmed to provide remote indication using two relays, r1 and r2. The E messages indicate the following:

E1: Check the steam cylinder

An E1 message indicates the steam cylinder can no longer meet demand. Inspect the cylinder to determine if it needs to be cleaned or replaced. An E1 message is a service message only; the humidifier will continue to operate with a reduced output. Press the **SET** button to acknowledge the message.

E2: Over current

An E2 message indicates the humidifier has been switched off due to an over current condition (140% of the nominal current). Resolve the over current condition by clearing the drain if clogged, or by cleaning or replacing the cylinder if there is excessive mineral buildup, and then press the **SET** button to restart the humidifier.

E3: No water

An E3 message indicates there is no water in the steam cylinder. The humidifier shuts down automatically after 30 minutes if no current is sensed. First, try to clear the drain valve by pressing the **SET** button and going to the **Service** mode to cycle the drain valve on and off. If this doesn't help, resolve the condition by manually clearing the drain valve if it is stuck open, and checking the water supply (inlet valve, supply valve, in-line water filter), and then press the **SET** button to restart the humidifier.

E4: Processor board

An E4 message indicates a replacement processor board has been installed uncoded. Code the processor board switches per the instruction sheet included with the replacement board to enable humidifier operation.

E5: Maintenance interval reached

An E5 message indicates the maintenance interval set in the **Adjustments** operating mode has been reached. An E5 message is a service message only; the humidifier will continue to operate. Press the **SET** button to acknowledge the message.

WARNING!

When performing maintenance on the XT Series humidifier:

- Close the field installed manual supply water shut-off valve.
- Turn the humidifier off.
- Place all power disconnects in OFF position and lock in OFF position.

Failure to follow these instruction can result in property damage, severe personal injury, or death as a result of electric shock, burns, and/or fire.

Note:

It is advisable to keep a spare steam cylinder in stock during humidification season. See the replacement parts section of this manual for part numbers.

Inspect unit every 500 hours of operation

At 500 hour intervals, inspect the steam cylinder, fill and drain valves, vapor hose, condensate piping, water supply piping, drain, drain piping, and all other parts for proper operation and/or cleaning requirements. Verify proper operation of high limit humidistat, relays, and airflow proving switch.

Clean and/or replace the steam cylinder

Steam cylinder service life depends on operating hours and water hardness. Replace the steam cylinder when the electrodes become insulated with mineral deposits to a degree that output demand can no longer be achieved (when the maximum water level sensor is repeatedly triggered).

To clean and/or replace the steam cylinder:

1. Close the field installed manual supply water shut-off valve.
2. Drain water from the steam cylinder.

   Open the drain valve by pressing the **MODE** button to illuminate the **Service** LED. Press the **SELECT** button repeatedly until **dr.of** appears on the display. Press the **SET** button to display **dr.on** and the drain valve opens.
3. When the steam cylinder is completely empty, turn the humidifier off. Place all power disconnects in the OFF position and lock in the OFF position.
4. Open the steam cylinder door.

   CAUTION! Cylinder and any undrained water may be hot. To avoid injury from hot water, make sure cylinder and humidifier components have cooled before proceeding with maintenance.
5. Disconnect the steam hose.

   After the cylinder and humidifier components have cooled, loosen the steam hose clamp and disconnect the steam hose from the cylinder.
6. Disconnect the electrode plugs and high water sensor wire.
7. Remove the cylinder.
8. Check the drain valve.

   If the drain valve port is dirty, clean per the instructions on Page 51.
9. Check O-ring.

   Ensure that the O-ring of the drain valve body is correctly placed. Change the O-ring if necessary. Dampen the O-ring seals **with water** before replacing cylinder. **Do not use lubricant or other substance.**

10. Clean the cylinder if mineral buildup is minimal.

    To clean the cylinder, **flush with fresh water only**. Remove the strainer and flush. Do not use chemicals, acids, or soap to clean the cylinder because they can cause foaming.

11. Ensure strainer is in place.

12. Insert the cleaned or new cylinder.

    Ensure that cylinder is secured properly by the mounting brackets within the unit.

13. Connect electrode plugs to cylinder electrode pins.

    The electrode plug wires are color-coded. See the unit wiring diagram for a color-coded connection diagram. This color-coding must be followed when connecting electrode plugs to cylinder electrode pins. On cylinders with six electrode pins, note that there are two electrode plug wires per color. Make sure that electrode plug wires of the same color are always directly opposite each other when connected to the cylinder electrode pins. Ensure that cylinder plugs fit snugly on the pins. If cylinder plugs become loose, obtain a new replacement plug from DRISTEEM. See the replacement parts section of this manual.

14. Connect the high water sensor wire.

    Connect the yellow wire to the single pin surrounded by a plastic shoulder.

15. Connect the steam hose.

16. Start up the humidifier per the instructions on Page 47.

17. Reset the steam cylinder operating hours counter (**LIFE**) to **00**.

    To reset the **LIFE** counter, go to the **Adjustments** menu using the **MODE** button and choose **LIFE** with the **SELECT** button. Enter the code number **37** with the **SET** button and wait until the counter is reset to **00**. Reset the steam cylinder operating hours counter every time a new cylinder is installed. If the counter is not reset to **00**, the steam cylinder operating hours will continue to accumulate.

Cleaning the drain valve

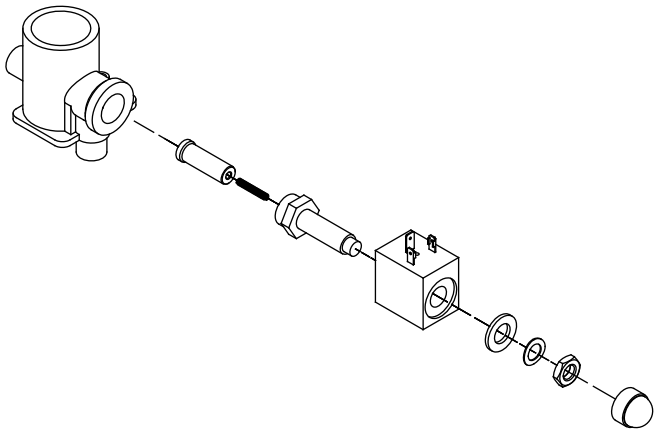
Always check the drain valve for need to clean before installing a new steam cylinder. Typically, the drain valve port is as dirty as the used steam cylinder.

1. Remove the steam cylinder as instructed on Page 50.

2. Remove the three screws and washers securing the drain cup plate to the drain cup.

3. Disconnect the two slip-on terminals from the two tabs on the 24 VAC drain valve coil.
4. Remove the hose clamp and hose from the drain valve body. Take the drain valve assembly to a sink for disassembly and cleaning.
5. Remove the snap-fit black cap, nut, and washers from the coil assembly. Slide coil off the actuator.
6. Loosen the actuator with a wrench and unscrew from the plastic valve body.
7. Clean the exposed plunger, spring, sleeve, and plastic drain valve port with clean water.
8. Reassemble. Tighten actuator 1/8 turn past being hand-tight.
9. Clean out the end of the hose. Reconnect it to the drain valve body with the hose clamp.
10. Fit mounting screws with washers through the drain cup plate.
11. Push the two female terminals back onto the two tabs on the coil. The terminals, although not identical, are reversible.

Figure 52-1:
Drain valve assembly



OM-7386

1. Review possible causes and recommended actions.

If you have a problem with your XT Series Humidifier, review the troubleshooting guide on the following pages for possible causes and recommended actions for typical problems. If you have a problem with an Ultra-sorb humidifier, refer to the Ultra-sorb manual.

2. If you're still having problems, call us.

If the troubleshooting guide does not help you solve your problem, call us with the following information available:

- Product name, firmware version, and serial number
  You'll find this information on the wiring diagram, on the outside of the control cabinet door, and/or in the System Data operating mode.
- Problem definition
  Example: water leaking, low humidity, high humidity, etc.
- Time problem began
  Example: Always, after remodel, after a change in weather, etc.
- System changes
  Example: Pressure, new service, new controller, relocation, change in maintenance, etc.

Calling DRISTEEM technical support: 800-328-4447

Have the following information ready before calling technical support.

Humidifier model number _____

Humidifier serial number _____

Firmware version _____

Problem definition _____

Time problem began _____

Table 54-1:
Problem/possible cause/action

Problem	Possible cause	Action
No readable information on display	No power or incorrect voltage to processor board	• Check main power supply. • Reset control transformer circuit breaker if tripped.
	Modular communication cable is disconnected.	• Connect modular cable.
Humidifier does not energize; steam cylinder does not heat up	Non-existent supply voltage to humidifier	• Check main line fuse. • Check main line safety switch. • Verify terminal block electrical connections. • Verify contactor electrical connections.
	Non-existent control voltage	• Check for proper supply voltage per wiring diagram. • Verify proper wiring of multi-tap transformer. • Verify terminal block electrical connections. • Check for control circuit voltage, 24 VAC. If voltage is not present, check transformer circuit breaker. • Reset if needed by pressing On/Off switch on display panel. • Check door interlock switch continuity.
	H-H terminals are open.	• Check if auxiliary limit controls are not allowing system to operate, e.g., high limit humidistat, airflow proving switch, etc.). Reset, replace, or calibrate as needed. Jumper H-H if auxiliary limit controls are not used.
	Transmitter or humidistat faults: • Open, shorted, or incorrect wiring of transmitter or humidistat • Signal is incorrect, out of range, or miswired. • Ground loop • Control signal exceeded the range limits. Correct signals are 4 to 20 mA, 0 to 135 ohms, or 0 to 10 VDC.	• Check DC supply voltage terminals of RH transmitter, VAV humidity transmitter, or humidistat: – Terminal 13: 21 VDC; Terminal 23: GND • If there is no output 4 to 20 mA, replace transmitter. Transmitter by others may not be compatible. Consult DRISTEEM. • Isolation control board by others may not be compatible. Consult DRISTEEM. • Recalibrate if there is a calibration error: Normal range 4 to 20 mA = 0 to 100% RH; 12 mA = 50% RH • Measure for normal 0 to 10 VDC or 4 to 20 mA control signal.
Reduced or no output (even though water level is correct)	Malfunctioning control system	• Check if auxiliary limit controls are not allowing system to operate, e.g., high limit humidistat, airflow proving switch, etc.) Reset, replace, or calibrate as needed. Jumper H-H if auxiliary limit controls are not used. • Check fuse in power circuit. If open, replace fuse with equal fuse.
	Steam cylinder malfunctioning	• Verify that proper voltage is being applied to the steam cylinder. • Check current through electrode wires. • If power components are not functioning, replace.
Steam cylinder failure	Improper wiring	• Verify proper voltage applied to steam cylinder. • Verify proper electrical connections.
	Mineral buildup on steam cylinder electrodes	• Inspect steam cylinder for severe mineral buildup on or around electrodes. If present, increase cleaning frequency or replace steam cylinder.
	Steam cylinder electrode corrosion	• Inspect electrodes for surface corrosion or pitting. This is usually caused by a high chloride level in the supply water. Test water and consult DRISTEEM for advice.

More on the next page ►

Table 55-1:
Problem/possible cause/action

Problem	Possible cause	Action
Unit does not fill with water.	No water supply to fill valve	• Verify that manual water supply valve is open and that pressure exists. • Check if water supply line strainer is plugged. Clean strainer or replace. • Verify fill valve electrical connections. • Clean or replace fill valve strainer if plugged.
	Unit control is not on	• Press On/Off switch on display panel. • Verify transformer electrical connections.
	Malfunctioning fill valve	• Cycle fill valve while in Service mode. If fill valve does not open: – Verify fill valve electrical connections. – Verify proper 24 VAC (terminals 2 and 5) to fill valve. If voltage is present and valve does not open, replace valve.
	Humidifier is in end-of-season drain mode.	• Check for humidification demand signal at control board. See control wiring diagrams for terminal check points.
Fill valve does not close.	Malfunctioning level control system	• Check that high water sensor electrical plug is fully engaged. • Check water conductivity. Water conductivity must be at least 125 µS/cm . Add salt to increase. Consult DRISTEEM for further advice.
	Fill valve is stuck.	• Check for control voltage across fill valve coil (terminals 2 and 5 on control terminal strip). • Check if there is an obstruction that does not allow valve to seat properly. Clean or replace valve as needed.
	Drain valve is open.	• Clean or replace drain valve if an obstruction in the valve does not allow complete closure. • Replace broken or weak return spring on drain valve.
Fill valve cycles on and off frequently (several times per minute)	Malfunctioning level control system	• Check water conductivity. Water conductivity must be at least 100 µS/cm . Add salt to increase. Consult DRISTEEM for further advice.
	Drain valve not fully closed	• If an obstruction does not allow drain valve to fully close, clean valve. • Replace broken or weak return spring on drain valve.
Unit does not perform autodrain sequence	No power to automatic drain valve	• Verify drain valve electrical connections. • Check if 24 VAC is present at the internal controller board terminals 3 and 6 for drain valve.
	Drain fault, plugged drain valve, or plugged drain pipe	• Check drain valve piping.
	Defective automatic drain valve	• If voltage is present at valve and it still does not open, replace valve.
Unit does not perform end-of-season drain	Input signal always has a demand	• Reduce demand signal.
	Drain valve	• Verify drain valve electrical connections. • Verify drain valve is wired correctly to control board. • Check 24 VAC across valve coil during test cycle (terminals 3 and 6 on control terminal strip).

More on the next page ►

Table 56-1:
Problem/possible cause/action

Problem	Possible cause	Action
Humidity below desired level	No humidity demand signal from humidistat	• Low or no signal strength from humidistat. Check for proper wiring. • No demand signal by others.
	Unit is operating but fails to meet required humidity output	• If water is siphoning from the steam cylinder to the overflow drain, check if there is excessive internal steam pressure, determine the cause of the high pressure (e.g., high duct static pressure, undersized orifices in dispersion tube, or crushed vapor hose) and repair as required. • If drain valve does not close fully, determine the cause and clean, repair, or replace as needed. • If fill valve is stuck open, repair or replace. • Recalibrate if controls are out of calibration. • Replace leaking vapor hose. • Unit is undersized; replace with a larger unit or add additional humidifier.
	Steam cylinder not heating	• Verify that humidistat is calling for humidity. • Check for control voltage if limit controls (airflow proving switch, etc.) are not allowing unit to operate. • Check power fuse. If open, replace fuse with equal fuse. • Verify contactor and transformer electrical connections. • Check water conductivity. Water conductivity must be at least 125 µS/cm . Add salt to increase. Consult DRISTEEM for further advice.
	Humidity control input type not the same as the operating mode.	• Check the internal control board connections and the CS program variable in Program mode. See Pages 45-46 for more information.
	Excessive outside air volume	• Verify proper operation of fans and dampers.
Humidity above set point	Improperly located humidistat	• Relocate, using guidelines described on Page 10.
	Reduced airflow	• Check fans and dampers.
	Malfunctioning controls	• Check for incorrect supply voltage. • Check for incorrect control signal. • Check for improper wiring hookup. • If humidity controller is out of calibration or malfunctioning, repair or recalibrate. • Check if contactor shorted. Repair or replace as needed.
	Unit oversized	• Consult DRISTEEM.
	High entering relative humidity	• Dehumidify.
Hunting (humidity swings above and below desired set point)	Malfunctioning control system	• If there is a faulty or inaccurate humidity controller repair or replace. • Relocate poorly located control components. See humidity control placement information on Page 10.
Noisy operation	Contactor noise	• Verify that contactor and transformer electrical connections. • Verify 24 VAC on internal control board terminal strip. • Contactor normally makes a "clunk" sound as it pulls in. A continuous chattering noise is not normal and is symptomatic of a failing contactor or malfunctioning controls. Replace contactor or troubleshoot the control system.
	Fill valve noise	• A clicking sound as the fill valve opens or closes, and a hissing sound during fill are normal. A slamming sound as fill valve closes is "water hammer" and can be minimized by installing a shock arrestor. • A loud buzzing sound indicates poor alignment or valve stem. Replace valve.
No remote fault indication	Field wiring not installed	• Provide field wiring to a remote fault indicator from supply board (see Pages 16-18).
	Field-supplied remote fault indicator lamp is burned out	• Check if lamp by others is burned out; replace if needed.
	Remote fault relay is not switching	• Check relay continuity for contact closure (see Pages 16-18).

Figure 57-1:
XT Series replacement parts

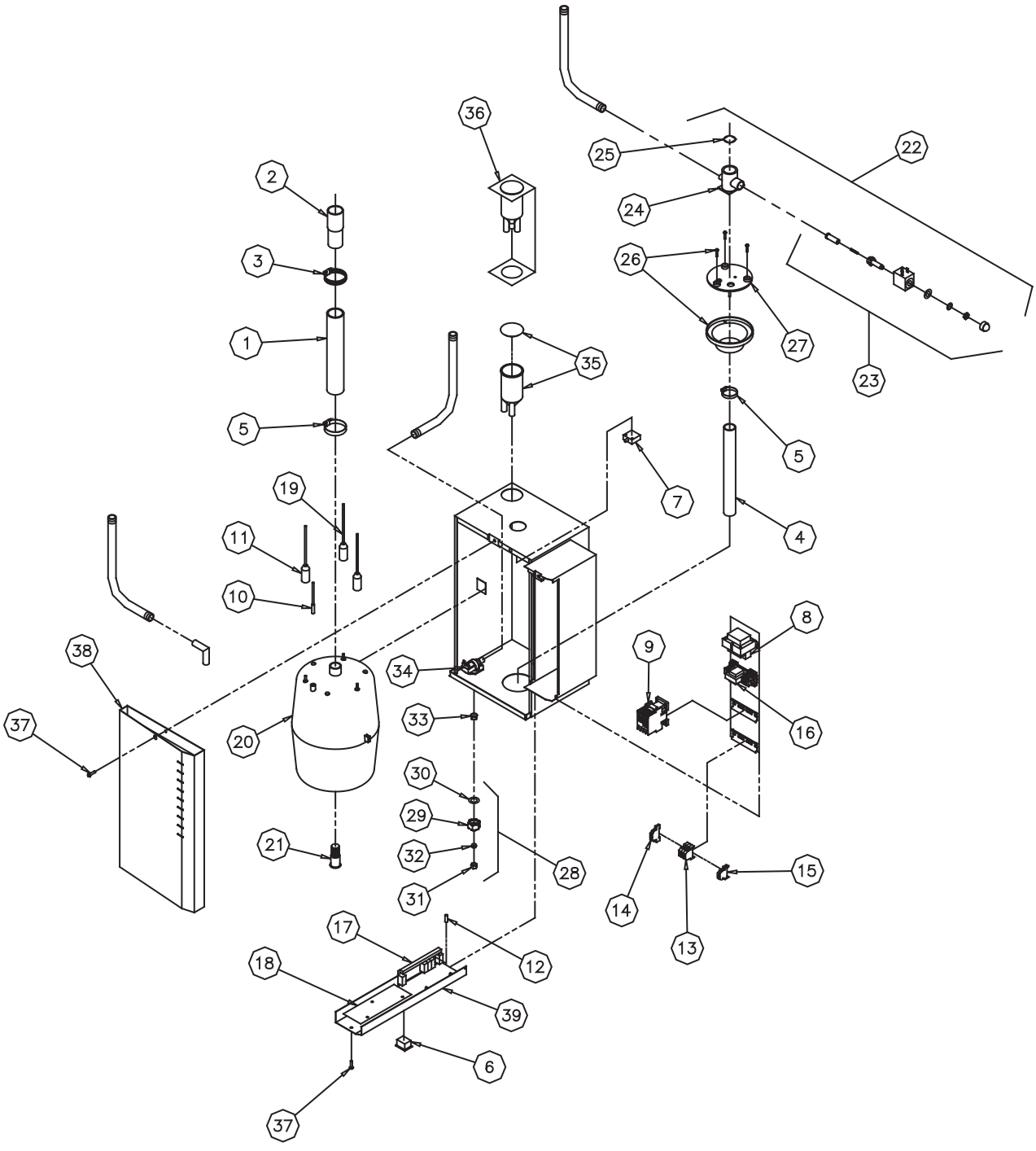


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Table 58-1:
XT Series replacement parts

No.	Description	Part no.
	Hoses, adaptors, and clamps	
1	Hose, steam 22/29 mm × 12.00 (XT-10/20)	530002-012
1	Hose, steam 35/43 mm × 12.00 (XT-30/50)	530003-012
2	Adaptor, 7/8" to 1-1/2" (XT-10/20)	162774-005
2	Adaptor, 1-3/8" to 1-1/2" (XT-30/50)	162774-010
3	Hose clamp, XT-10/20 steam hose to adaptor	700560-075
3	Hose clamp, XT-30/50 steam hose to adaptor	700560-125
4	Hose, drain 22/29 mm × 10.00	530005-010
5	Hose clamp D29, drain cup and XT-10/20 steam cylinder to steam hose	530001-051
5	Hose clamp D43, XT-30/50 steam cylinder to steam hose	530001-052
	Electrical	
6	Switch, main on-off	530010-001
7	Switch, door interlock	530010-002
8	Transformer, 208/240/480 to 24 VAC	408965-001
9	Contactor, type 3RT	530010-004
10	Plug, max. water level sensor (bag of 10)	530010-005
11	Plug, electrode	530010-006
12	Fuse, 6.3 A (bag of 10)	530010-007
13	Terminal 4 mm^2 (XT-10/20)	530010-010
13	Terminal 6 mm^2 (XT-30 480V/3ph)	530010-011
13	Terminal 10 mm^2 (XT-30 208V/3ph, XT-50)	530010-012
14	Ground terminal 4 mm^2 (XT-10/20)	530010-013
14	Ground terminal 6 mm^2 (XT-30 480V/3ph)	530010-014
14	Ground terminal 10 mm^2 (XT-30 208V/3ph, XT-50)	530010-015
15	Terminal, safety 4 mm^2	530010-017
16	Transformer, current sensing (208/240V units)	530010-021
16	Transformer, current sensing (480V units)	530010-022
17	Board, supply 24V	530010-030
18	Board, processor 24V	530010-031
19	Wiring kit, XT-10 208V/3ph, XT-20 208/480V/3ph	530010-041
19	Wiring kit, XT-10 208/240V/1ph	530010-042
19	Wiring kit, XT-30 480V/3ph	530010-043
19	Wiring kit, XT-30 208V/3ph, XT-50 480V/3ph	530010-044

More on next page ►

Table 59-1:
XT Series replacement parts

No.	Description	Part no.
	Steam cylinders	
20	Steam cylinder, XT-10 208/240V/1ph	530011-001
20	Steam cylinder, XT-10 208V/3ph	530011-002
20	Steam cylinder, XT-20 208V/3ph	530011-003
20	Steam cylinder, XT-20 480V/3ph	530011-004
20	Steam cylinder, XT-30 480V/3ph	530011-005
20	Steam cylinder, XT-30 208V/3ph	530011-006
20	Steam cylinder, XT-50 480V/3ph	530011-007
21	Strainer, steam cylinder	530001-047
	Drain	
22	Drain valve assembly, 24 V	530001-041
23	Drain valve, with operator 24 V	530001-042
24	Drain valve body	530001-043
25	O-ring, drain valve body (bag of 10)	530001-044
26	Drain cup with screws	530001-045
27	Drain cup plate	530001-046
	Inlet	
28	Fill adaptor assy, 3/8"	180994-038
29	Fill adaptor, 3/8" O.D. tubing	530001-002
30	Washer, 5/8" hose	530001-003
31	Compression nut, 3/8"	530001-006
32	Compression sleeve, 3/8"	530001-008
33	Strainer, inlet valve	530001-004
34	Valve, inlet yellow (XT-10)	530001-011
34	Valve, inlet green (XT-20)	530001-012
34	Valve, inlet red (XT-30/50)	530001-013
35	Fill cup with cap, XT-10/20	530001-021
35	Fill cup with cap, XT-30/50	530001-022
36	Fill kit, high pressure XT-10/20	530001-031
36	Fill kit, high pressure XT-30/50	530001-032
	Exterior	
37	Door fastener	530001-054
38	Door assy, cylinder XT-10/20	530012-001
38	Door assy, cylinder XT-30/50	530012-002
39	Door assy, electrical XT Series	530012-005

Notes

Notes

Expect quality from the industry leader

For 40 years, DRISTEEM has been leading the industry with creative and reliable humidification solutions. Our focus on quality is evident in the construction of this humidifier, which features a two year limited warranty.

For more information

www.dristeem.com
sales@dristeem.com

Technical support

800-328-4447

DRISTEEM Corporation
An ISO 9001: 2000 certified corporation and a subsidiary of Research Products Corporation

U.S. Headquarters:
14949 Technology Drive
Eden Prairie, MN 55344
800-328-4447
952-949-2415
952-229-3200 (fax)

European office:
Bell Place, Bell Lane
Syresham, Brackley
NN13 5HP, UK
+44 1280 850122 (voice)
+44 1280 850124 (fax)
E-mail: 106277.1443@compuserve.com

Continuous product improvement is a policy of DRISTEEM Corporation; therefore, product features and specifications are subject to change without notice.

Form No. XT-IOM-0905
Part No. 890000-140

Two-year limited warranty

DRISTEEM Corporation ("DRISTEEM") warrants to the original user that its products (with the exception of the electrode cylinder) will be free from defects in materials and workmanship for a period of two (2) years after installation or twenty-seven (27) months from the date DRISTEEM ships such product, whichever date is the earlier.

If any DRISTEEM product is found to be defective in material or workmanship during the applicable warranty period, DRISTEEM's entire liability, and the purchaser's sole and exclusive remedy, shall be the repair or replacement of the defective product, or the refund of the purchase price, at DRISTEEM's election. DRISTEEM shall not be liable for any costs or expenses, whether direct or indirect, associated with the installation, removal or reinstallation of any defective product.

DRISTEEM's limited warranty shall not be effective or actionable unless there is compliance with all installation and operating instructions furnished by DRISTEEM, or if the products have been modified or altered without the written consent of DRISTEEM, or if such products have been subject to accident, misuse, mishandling, tampering, negligence or improper maintenance. Any warranty claim must be submitted to DRISTEEM in writing within the stated warranty period.

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