

HTD

High Temperature Non-Cycling Refrigerated Compressed Air Dryers

Operation & Maintenance Manual

MODELS HTD 21 thru HTD 100

- TABLE OF CONTENTS -

1.0	GENERAL	2
1.1	How to use this manual	
1.2	Symbols	
1.3	Warranty	
1.4	Standard Equipment	
1.5	Description of Operation	
1.6	Use	
1.7	General Safety Instructions	
2.0	MACHINE UNPACKING AND HANDLING	3
2.1	Unpacking and handling	
2.2	Package disposal	
2.3	Returned Equipment	
3.0	SET-UP	4
3.1	Positioning	
3.2	Installation	
3.3	Start-Up	
4.0	MAINTENANCE	4
4.1	Each week	
4.2	Each month	
4.3	Each 6 months	
5.0	CONTROL PANEL OPERATION	5
5.1	Warning LEDs	
5.2	Button Functions	
5.3	Set Point Modification	
5.4	Configuration Parameter Modification	
5.5	Error Codes	
5.6	Configuration Parameter Descriptions & Default Values	
6.0	TROUBLESHOOTING	7
7.0	COMPRESSED AIR FILTERS	8
7.1	Installation	
7.2	Replacement of Elements	
7.3	Maintenance	
8.0	EQUIPMENT DATA SHEET	9
9.0	REFRIGERATION CIRCUIT DIAGRAM	10
10.0	ELECTRICAL WIRING DIAGRAM	11
11.0	SYSTEM INSTALLATION & LAYOUT	12

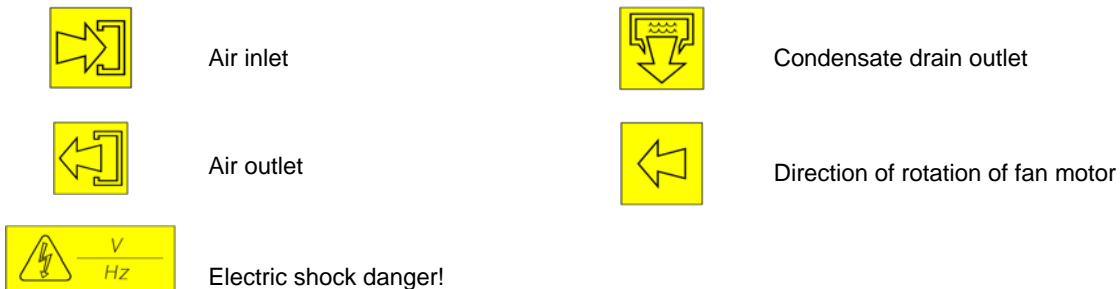
1.0 GENERAL

1.1 How to use this manual

All features of this machine, including information on safety, installation, operation, and maintenance are described in this manual. This manual is an integral part of the machine and must be read and understood by any person involved with its operation or maintenance. In the event of re-sale of this unit, this manual should be forwarded to the new owner. Replacement manuals may be obtained from your authorized dealer.

1.2 Symbols

The symbols below are used throughout this manual, and on the unit itself, to indicate specific unit components or potential safety hazards that will be encountered during machine operation and maintenance.



1.3 Warranty

This product has been factory tested before shipment. It is guaranteed to be free from defects in material and/or workmanship for a period of 12 months from the date of shipment. This warranty applies provided the machine has been installed and used in accordance with the instructions detailed in this manual. The manufacturer agrees, at its discretion, to repair or replace all defective parts free of charge. Further, the manufacturer agrees to cover charges associated with field labor required to make authorized warranty repairs, provided the Motivair warranty policy is followed and an S.I.R. authorization is issued by Motivair. Labor coverage shall be limited to maximum rates as published in the latest price list. All field repairs may only be performed by a factory authorized service technician. This warranty is limited to defects associated with operation and manufacture only. All parts subject to wear due to their normal operation are not covered by this warranty. All transportation costs associated with factory repair of equipment are the sole responsibility of the owner.

1.4 Standard Equipment

- Inlet air pre-cooler & particulate filter.
- Refrigerated air drying circuit with economizing heat exchanger & condensate separator.
- Automatic condensate drain system.
- Microprocessor-based control panel with LED display and pushbutton user interface.
- Instruction and maintenance manual with wiring diagram.

1.5 Description of Operation

These dryers have been specially designed to provide clean, dry compressed air without the added expense and floor space required for a separate aftercooler, separator, and particulate filter. The dryers utilize mechanical refrigeration to condense moisture by lowering the compressed air temperature to about 38°F. An aircooled pre-cooler and an air-to-air economizer are employed to minimize the size of the refrigeration plant and to save electrical energy. Condensed moisture is accumulated in the built-in moisture separator and is discharged through an electronic timer drain.

A start /stop device (ON/OFF) is included to allow the dryer to be de-energized locally. Individual over-current and thermal protection (automatic reset on the compressor) is included to prevent damage to the electric and refrigeration circuits.

ATTENTION: although this unit is equipped with a main power disconnect switch (S1) & internal individual component protection, complete unit over-current & short circuit protection MUST be provided by the installer between S1 and the user's power supply source.

1.6 Use

The use of a dryer is recommended for nearly all compressed air applications, but especially when high purity and low moisture content is required, such as in the pharmaceutical & food industry, medical applications and for coating & painting applications.

1.7 General Safety Instructions

Read this manual carefully before performing any operation. This machine has been designed and manufactured to be used only as described below. The supplier is not responsible for difficulties associated with operation other than the intended use or operation that is not in compliance with the instructions mentioned in this manual. All maintenance or cleaning operations involving interior parts must be performed by trained technicians only.

ALWAYS:

- **Always** be familiar with all controls.
- **Always** be sure that the dryer is isolated from the compressed air network (intake and outlet valves closed) and that internal pressure has been released before performing any maintenance.
- **Always** disconnect electrical power and allow 15 minutes for the inner parts to cool down before removing the protection panels.
- **Always** be sure to disconnect electrical power before removing the cooling fan protection grill.
- **Always** be sure that all protection panels are properly attached during operation and after any maintenance operation.
- **Always** be sure not to operate the unit in the presence of flammable fumes or vapors that might cause explosion or fire risk.

NEVER:

- **Never** place flammable objects near the dryer.
- **Never** use the dryer if the power cable is faulty or the connection is not safe.
- **Never** allow anyone to operate the dryer without giving him/her proper instructions.
- **Never** make any alterations to safety parts.
- **Never** strike or use excessive force on internal parts.
- **Never** touch any part of the cooling circuit when the machine is running. They are very hot!
- **Never** drain the condensate directly into the sewage system.

***All installation, use and maintenance operations must be performed according to the instructions detailed in this manual.
All dryer maintenance should only be performed by qualified personnel taking the proper safety precautions.***

2.0 MACHINE UNPACKING AND HANDLING

2.1 Unpacking and Handling

The dryer is shipped on a wooden skid and packaged in a protective cardboard carton with banding straps. The package must always be lifted from the bottom and must be kept in an upright position at all times. Unpack the dryer by cutting straps (always wear safety gloves and eye protection and cut either with scissors or cutting nippers), removing the carton from the top and moving the dryer from the wooden pallet to the chosen position.

2.2 Package Disposal

It is recommended that the packaging materials be retained at least throughout the warranty period. Should the dryer need to be transported for service, the original packaging will allow for easier and safer shipping.

2.3 Returned Equipment

- Repack the dryer in its original carton or with one of the same dimensions.
- The dryer must be kept vertical and packed as supplied from the manufacturer.
- Do not transport the dryer without proper packing, shipment damage remains the responsibility of the sender.

Materials returned without proper packing and authorization documents will not be accepted.

3.0 SET-UP

3.1 Positioning

The dryer should be located in an area with a flat floor and that is protected against weather conditions and direct sun light. The area must also be properly ventilated (& heated, if necessary) so that the temperature is kept between **41 °F** and **104 °F** when the dryer is running (remember that the dryer will add heat to the room). It must also be large enough to allow at least a three foot free area in all directions to allow for proper unit cooling.

3.2 Installation

- Air by-pass piping is recommended to allow uninterrupted air service during instances of maintenance of repair.
- Prior to installation check insure that the compressed air piping is free of debris or other contaminants.
- Connect the dryer to the compressed air line in accordance with one of the diagrams shown in section 11 and per unit labeling.
- Make sure that line power agrees with the unit data plate and the service complies with local electrical codes.
- Always include a safety switch in the line power supply (refer to data plate amperage for proper selection).
- A particulate filter is factory installed at the air inlet to avoid any deposit of solid particles into the dryer.
- Position the dryer so that all controls can be easily read and so that all maintenance operations are easily performed.
- Connect the condensate drain tube in compliance with local regulations. The condensate is a pollutant and cannot be drained directly into the sewage system. A water-oil separator of suitable capacity is recommended.

3.3 Start-Up

- Close inlet and outlet valves, switch on the devices (S1) and (ON/OFF), and check for the pilot light on the control panel.
- Allow the dryer to run until the displayed temperature value is about **38°F**.
- Open the outlet air valve completely and then gradually pressurize the dryer by slowly opening the inlet air valve.
- Compressed air flow rates in excess of rating will reduce performance but will not compromise safety.

4.0 MAINTENANCE

4.1 Weekly

- Visually inspect for proper condensate drain operation.

4.2 Monthly

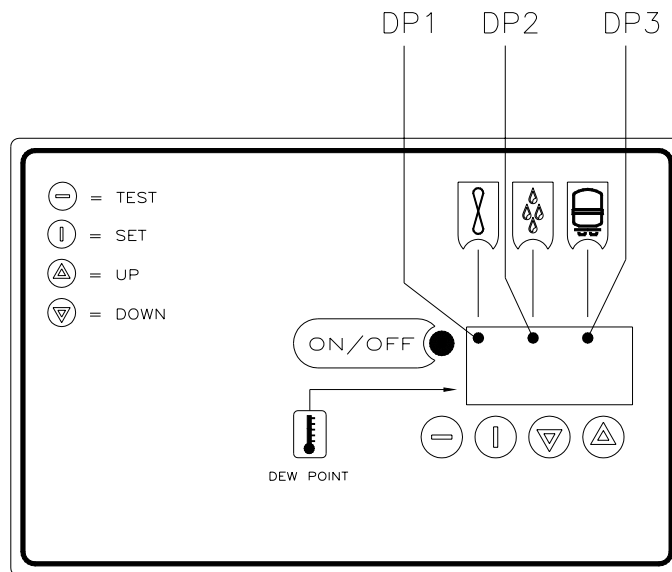
- Isolate the dryer from the compressed air system by closing inlet & outlet valves and release pressure.
- Clean or replace prefilter element to remove any accumulated debris.

4.3 After 6 Months

- Check compressor electrical current draw against amperage listed on the data plate.
- Remove power from the dryer and clean pre-cooler & condenser finned surfaces with compressed air jet.

5.0 CONTROL PANEL OPERATION

These dryers are equipped with an electronic controller for the adjustment of the operating parameters. Adjustments can be made using the digital interface located on the front panel. The control panel (see figure 1) consists of 5 buttons (ON/OFF, TEST, SET, DOWN and UP) and a three-figure display with three warning LED's labeled DP1, DP2, DP3.



5.1 Warning LEDs

DP1	<ul style="list-style-type: none"> • Flashing 	<ul style="list-style-type: none"> • Programming phase
DP2	<ul style="list-style-type: none"> • On 	<ul style="list-style-type: none"> • Condensate drain energized
DP3	<ul style="list-style-type: none"> • On 	<ul style="list-style-type: none"> • Compressor energized

5.2 Button Functions

TEST	<ul style="list-style-type: none"> • Performs a test of the condensate discharge valve when pressed for more than 3 seconds during the normal operation.
SET	<ul style="list-style-type: none"> • Displays the set point value when pressed during normal operation. • Provides entry to the parameter programming menu when pressed for 10 seconds. • Stores all changes when pressed after having programming.
DOWN	<ul style="list-style-type: none"> • Decreases the displayed value when pressed during set point or parameter programming. • Initiates the controller's auto-test cycle when pressed for 10 seconds during normal operation.
UP	Increases the displayed value when pressed during set point or parameter programming.
UP + DOWN	Lock ("POF" - push-button OFF) or unlock ("PON" - push button ON) access to the parameter programming menu when pressed simultaneously for 10 seconds. The keypad lock avoids tampering with the configuration parameters by non-authorized personnel.
ON/OFF	Activates or deactivates unit operation when pressed for 3 seconds. When deactivated, the OFF message is displayed.

5.3 Set Point Modification

- Press the SET button (the current set point value is displayed).
- Modify the displayed set point value by using the UP or DOWN button (if modification is not performed in 15 seconds the controller automatically returns to the normal operating display indicating the DEW POINT value).
- Confirm the new set value by pushing the SET button within 10 seconds of the modification, the flashing of the set point value confirms acceptance of the new data. *If the modified data is not confirmed within 10 seconds, the new data will not be stored and the controller will revert to the previous set point.*

5.4 Configuration Parameter Modification

- Press SET for 10 seconds to enter the parameter programming menu. The display shows the SET (Set Point) as the first programmable parameter. Each successive push of the SET key displays the next programmable parameter.
- Use the UP and/or DOWN keys to modify the value of each displayed parameter. Press the SET key to store each change.
- After 15 seconds from the last operation the controller automatically returns to normal operation.

Changes to time-related values take effect after previously programmed settings have expired. Changes in other variables have an immediate effect.

Please note that changes to the unit's configuration parameters could effect proper operation and therefore should only be done by authorized technical service personnel.

5.5 Error Codes

The controller recognizes specific types of operational errors. When an error occurs the display shows a flashing alarm message alternating with the current dewpoint value, as described below:

Message (flashing)	Cause
HtA	Dewpoint > (E1 + E2) for preset delayed time E7
LtA	Dewpoint < (E1 - E38) for preset delayed time E7
PF1	Sensor failure

All the alarms except for PF1 are automatically reset when the cause is removed. PF1 must be cleared by switching the unit off and then re-started. PF1 has a priority over all the other displayed messages.

5.6 Configuration Parameter Descriptions & Default Values:

Parameter	Description	Default Value HTD 21 - 100
E1	Set point (°F)	33
E2	Differential (°F)	8
E3	Set point: lower limit (°F)	33
E4	Set point: higher limit (°F)	34
E5	Minimum compressor OFF time (sec)	120
E6	High temperature alarm diff. (E1+E6 = alarm) (°F)	20
E7	Alarm delay (min)	10
E8	Interval between condensate discharges (min)	1
E9	Duration of condensate discharge (sec)	3
E22	Unit of measure	1
E38	Low temperature alarm diff. (E1-E38 = alarm) (°F)	1

6.0 TROUBLESHOOTING

SYMPTOM	POSSIBLE ORIGIN	SOLUTION
Temperature shown in display is higher than preset value	High compressed air inlet temperature	Reduce air temperature to within design limits
	High compressed air flow	Reduce air flow to within design limits
	High ambient air temperature	Increase ventilation rate of installation area
	Fouled refrigerant condenser	Clean condenser
	Low refrigerant charge	Locate & repair leak & re-charge
	Faulty refrigerant compressor	Repair or replace
	Faulty refrigerant solenoid valve	Repair or replace
	Faulty fan thermostat	Repair or replace
	Faulty control relay	Repair or replace
Excessive air pressure drop across dryer	Refrigerant high pressure switch open	Eliminate cause & reset switch
	Inlet/outlet piping reversed	Connect properly
	Thermostat sensor out of well	Re-install
	Faulty thermostat	Repair or replace
	Ambient temperature below freezing	Install dryer in heated space
Water present in air downstream of dryer	Obstruction in air circuit	Locate & remove blockage
	Air by-pass valve open	Close valve
	Condensate drain strainer fouled	Clean strainer
	Faulty condensate drain	Repair or replace
Fan doesn't start and/or stop.	High dew point temperature	See Symptom #1 above
	Faulty fan thermostat	Repair or replace
	Low refrigerant charge	Locate & repair leak & re-charge
Fan doesn't start and/or stop.	Low load with low ambient temperature	Install dryer in heated space

7.0 COMPRESSED AIR FILTERS

7.1 Installation

- This product has been developed and manufactured for the treatment of compressed air only.
- A permanent specification label is affixed to the filter casing for immediate identification. Do not use the filter at pressures or temperatures higher than those reported on this label.
- Each filter is carefully tested prior to shipment. The airflow direction is indicated by means of an adhesive label (arrow). Mount the filter in an upright position, away from open flames, isolate from vibration and protect from potential impact. Allow adequate access space around the filter to facilitate maintenance.
- Please note that the manufacturer is not responsible for damage or failure due to improper usage and that the user is solely responsible for the proper treatment and the disposal of both the condensate and the used filter elements.

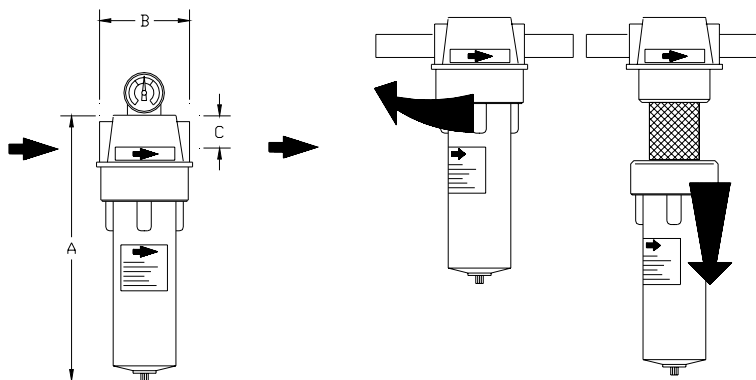
7.2 Replacement of Elements

1. Isolate the dryer from line pressure & release pressure by opening energizing the automatic drain.
2. Carefully turn the threaded bowl counterclockwise and remove it.
3. The element is press-fit to the tapered filter head, pull the old element away to disengage.
4. Install the new element by pushing it onto the tapered fitting. The element's O-ring provides the seal.
5. Re-install the bowl by turning it clockwise into the filter head until tight. The bowl design prevents movement of the element.
6. Slowly open the dryer isolation valves to allow airflow through the dryer.

7.3 Maintenance

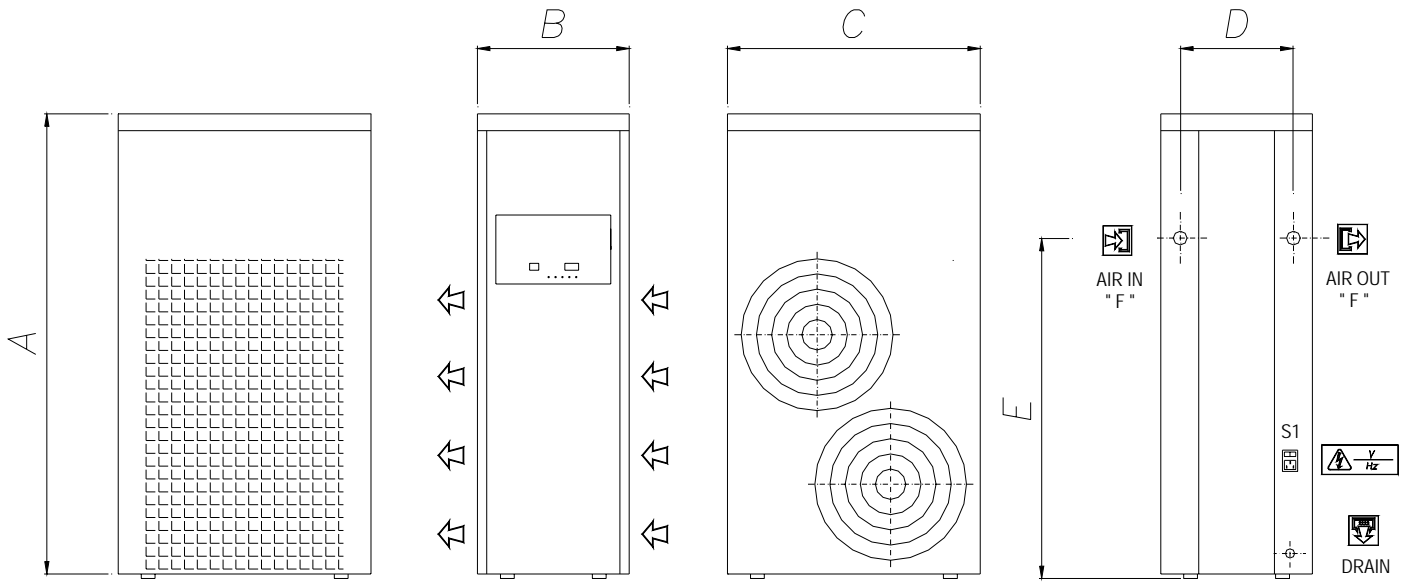
Daily: Check for proper drainage.

Weekly: Check differential pressure gauge. Replace element when indicated. Always use of spare parts and accessories supplied by the manufacturer. **Remember; always depressurize the unit before any filter maintenance!**



Filter Model No.	Air Flow Rate (SCFM)	Connections (NPT)	A	B	C	Weight (Lbs)	Element Model No.
F0008	30	1/2"	7.40"	3.70"	0.70"	2.2	040 F051 QF
F0016	60	3/4"	9.80"	3.70"	0.70"	2.5	040 F052 QF
F0025	88	1"	13.78"	4.72"	1.18"	4.9	040 F053 QF
F0036	127	1"	13.78"	4.72"	1.18"	5.2	040 F054 QF

8.0 EQUIPMENT DATA SHEET

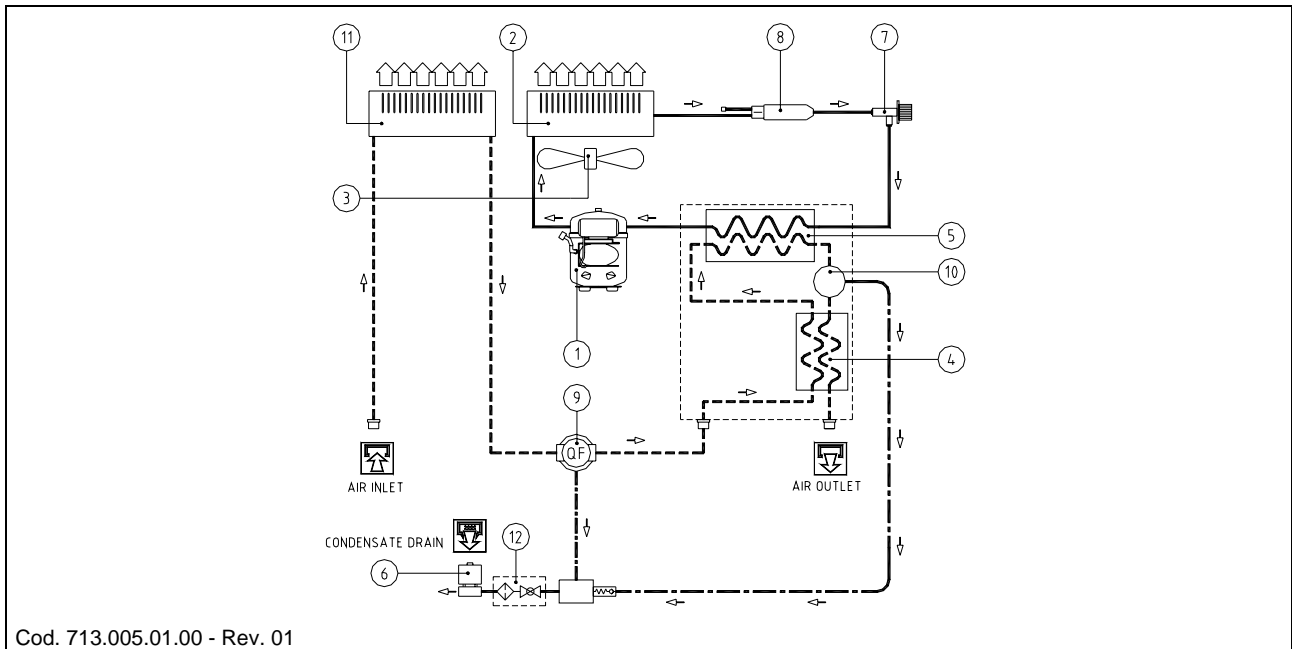


Model	HTD 21	HTD 30	HTD 41	HTD 60	HTD 82	HTD 100
Capacity (scfm)*	21	30	41	60	82	100
Max. Working Pressure (psig)	230	230	230	230	230	230
Compressor Power (HP)	1/4	1/3	1/3	1/2	3/4	1
Power Supply (V/Ph/Hz)	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60
Rated Current (A)	2.4	3.7	5.2	6.0	7.3	9.2
Full Load Current (A)	3.1	4.6	6.6	7.0	8.2	13.8
Locked Rotor Current (A)	23	35	28	49	37	44
Refrigerant Type	R-134a	R-134a	R-134a	R-134a	R-134a	R-134a
Refrigerant Charge (lbs)	0.66	0.77	0.99	1.66	1.88	1.88
Dimension A (in)	31.5	31.5	31.5	39.4	39.4	39.4
Dimension B (in)	13.0	13.0	13.0	13.0	13.0	13.0
Dimension C (in)	18.5	18.5	18.5	21.7	21.7	21.7
Dimension D (in)	8.8	8.8	8.8	9.3	9.3	9.3
Dimension E (in)	23.0	23.0	23.0	29.6	29.6	29.6
Connection Size F (NPT)	1/2"	3/4"	3/4"	3/4"	1"	1"
Weight (lbs.)	88	90	95	110	120	140

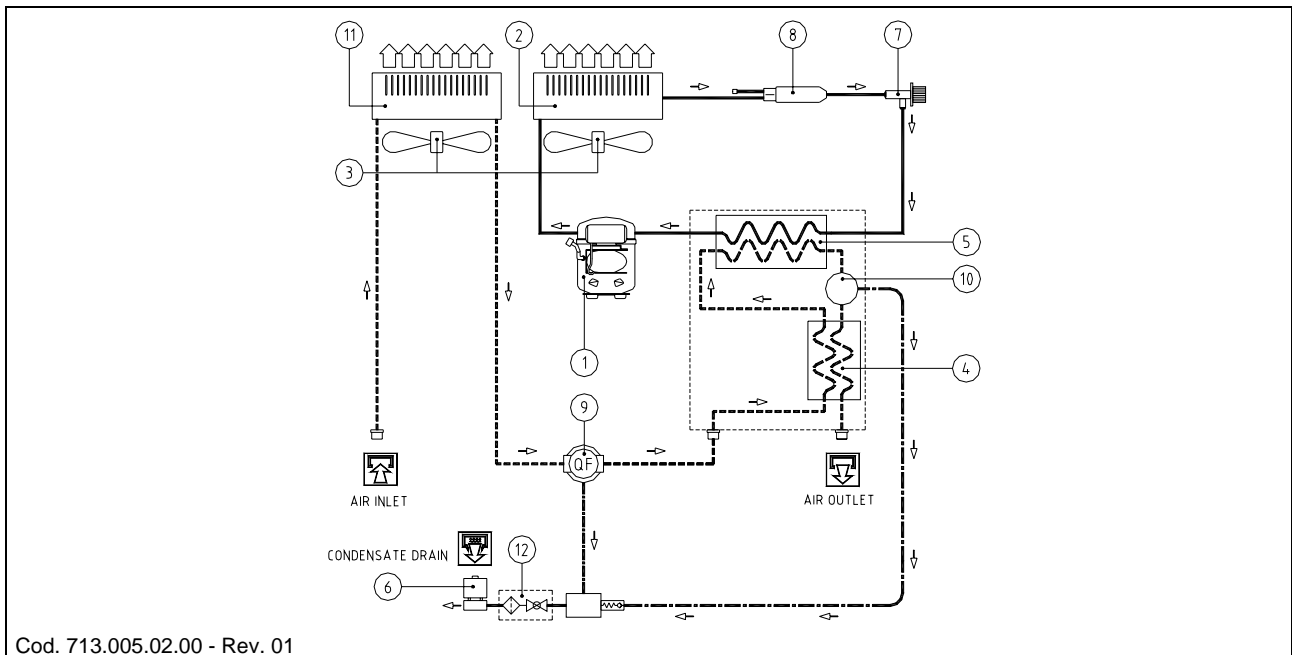
*Rated capacity @ air inlet of 180 F & 100 psig, 100 F ambient & 35 F leaving dewpoint

9.0 REFRIGERATION CIRCUIT DIAGRAM

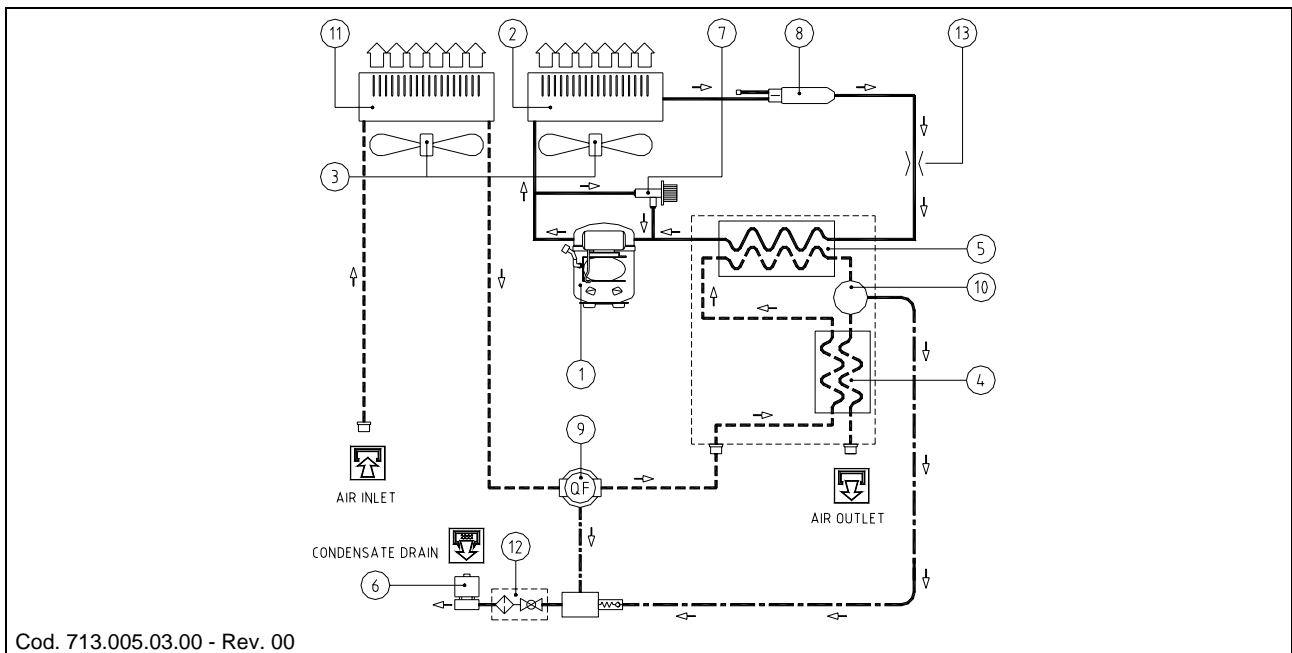
HTD 21 & 30 & 41



HTD 60 & 82



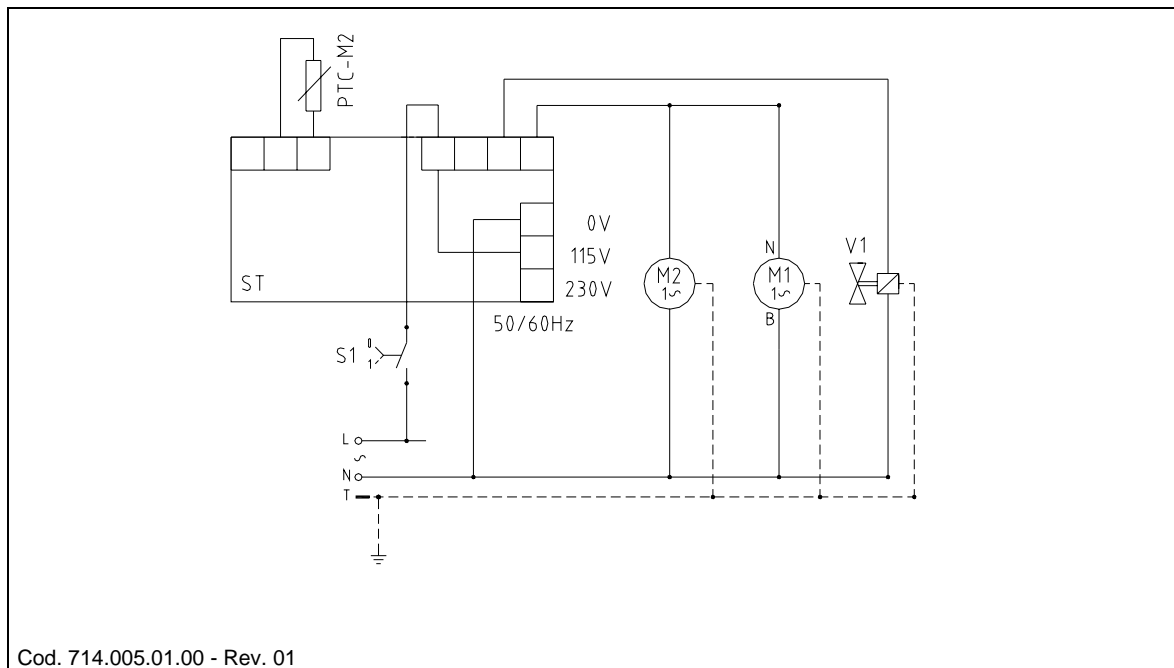
HTD 100



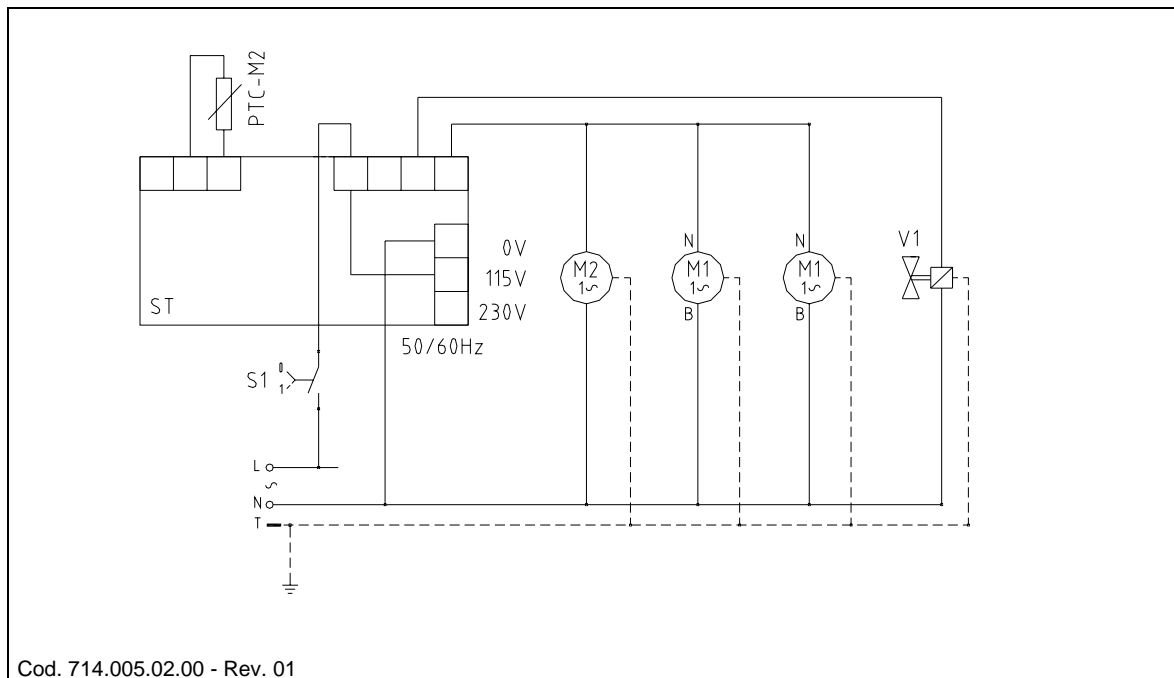
1	Compressor	8	Refrigerant Filter / Dryer
2	Condenser	9	Particulate Air Filter
3	Fan	10	Condensate Separator
4	Air-to-Air Economizer	11	Pre - cooler
5	Evaporator	12	Ball Valve
6	Solenoid Drain Valve	13	Capillary Tube
7	Expansion valve		

10.0 ELECTRICAL WIRING DIAGRAM

HTD 21 & 30 & 41

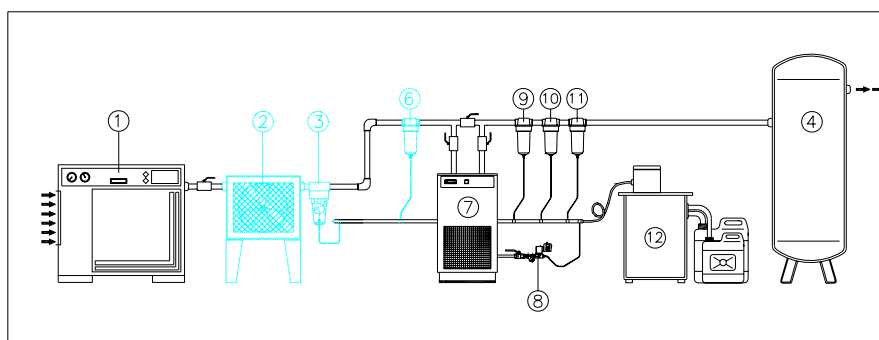
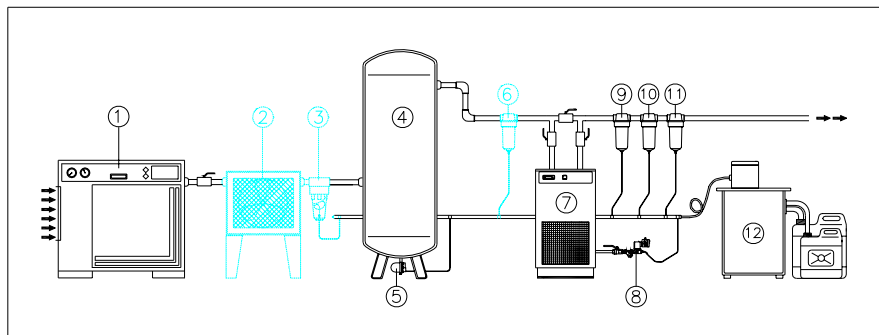


HTD 60 & 82 & 100



M1	Fan Motor	PTC-M1	Fan Control Senesor
M2	Compressor Motor	PTC-M2	Compressor Control Sensor
V1	Solenoid Drain Valve	ST	Electronic Controller

11.0 SYSTEM INSTALLATION & LAYOUT DIAGRAM



1	Air Compressor	7	Dryer
2	Aftercooler*	8	Drain Valve
3	Condensate Separator*	9	Filter AF Series (M)
4	Receiver Tank	10	Filter AF Series (S)
5	Automatic Drain	11	Activated Carbon Filter- AF Series
6	Particulate Prefilter AF Series (P)	12	Water/Oil Separator

**These components incorporated in HTD Dryers*