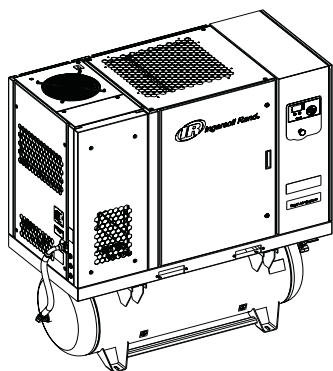




Contact-Cooled Rotary Screw Air Compressor

RS15ie, RS15ne, RS18ie, RS18ne, RS22ie, RS22ne,
RS11i, RS15i, RS15n, RS18i, RS18n, RS22i, RS22n



Product Maintenance Information

- EN Product Maintenance Information
- ES Información de mantenimiento del producto
- FR Informations relatives à l'entretien du produit
- PT Informação sobre manutenção do produto



Save These Instructions



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ABOUT THIS MANUAL

The purpose of this manual is to provide maintenance and troubleshooting guidelines for the compressor.

For supporting documentation refer to Table 1.

Table 1: Product Manuals

Publication	Product	Part/Document Number by Region		
		Americas	EMEIA*	Asia Pacific
Product Safety Information Manual	All	80446313	80446156	80446321
Product Maintenance Manual	RS15-22ie, ne RS11-22i, RS15-22n	47629519	47629518	47629520
Product Information Manual - FS	RS15-22ie, RS11-22i	47629513	47629512	47629514
Product Information Manual - VSD	RS15-22ne, RS15-22n	47629516	47629515	47629517
Product Parts Information Manual	RS15-22ie, ne	47629511		
	RS11-22i, RS15-22n	47636056		

* Europe, Middle East, India and Africa

Product specification sheets and reference drawings are also available.

PERSONNEL

Proper use, inspections and maintenance increases the life and usefulness of the compressor. It is extremely important that anyone involved with maintaining the compressor be familiar with the servicing procedures of these compressors and be physically capable of conducting the procedures. These personnel shall have skills that include:

1. Proper and safe use and application of mechanics common hand tools as well as special **Ingersoll Rand** or recommended tools.
2. Safety procedures, precautions and work habits established by accepted industry standards.

Some maintenance procedures are technical in nature and require specialized tools, equipment, training and experience to accomplish correctly. In such situations, only allow **Ingersoll Rand** trained technicians to perform maintenance on this compressor. Service or inspections beyond the procedures given in this manual shall not be attempted by operating personnel.

For additional information contact the **Ingersoll Rand** factory or the nearest service provider.

SAFETY

Before undertaking any work on the compressor, ensure that the electrical supply has been isolated and remote start/stop function is not enabled, locked off, tagged and the compressor has been relieved of all pressure. Ensure the compressor is electrically isolated for at least 15 minutes before commencing any maintenance work. See the Product Safety Information manual for additional information.

Ingersoll Rand cannot know of or provide all the procedures by which repairs may be conducted and the hazards and/or results of each method. If maintenance procedures not specifically recommended by the manufacturer are

conducted, ensure that safety is not endangered by the actions taken.

If you are unsure of a maintenance procedure or step, place the compressor in a safe condition before consulting technical assistance.

The use of other than genuine **Ingersoll Rand** replacement parts may result in safety hazards, decreased performance and increased maintenance and may invalidate all warranties.

For additional information contact the **Ingersoll Rand** factory or the nearest service provider.

AIR COMPRESSOR MAINTENANCE

■ Maintenance Prompts

The service warning and flashing LED will appear at intervals dependent on the service level selected. Refer to the Product Information manual for information about service level settings.

■ Maintenance Chart

Maintenance should be performed per the recommendations below in the following priority: (1) Perform maintenance when indicated by the controller; (2) Perform maintenance through either hourly intervals or scheduled maintenance intervals, or (3) Annually.

Table 2: Maintenance Chart (RS15-22ie/ne, RS11-22i, RS15-22n)

Period	Action	Maintenance Item
When indicated by controller	Replace	Air filter element
	Replace	Coolant filter element
	Replace	Separator element
Daily	Check	Connections and hoses for leaks
	Check	Coolant level
	Check	Condensate drain operation
	Check	Controller for service indicators
	Check	Package pre-filter for blockage
	Check	Air filter indicator condition to ensure air filter operation
Weekly	Check	Control panel display for temperature
Monthly	Inspect/Clean	Air-cooled cooling system for blockage
	Inspect/Clean	Starter box power drive module filter element
	Clean	Condenser (TAS only)
	Check/Replace	Inline Filter elements (TAS only)
	Check	Dryer operation (TAS only)
Every 2000 hours	Inspect	Starter box power drive filter element
	Replace	Food-grade Filter Module
	Analysis	Shock pulse bearing
	Analysis	Premium Coolant (Ultra/Ultra EL/FG)
Every 4000 hours	Grease	All motors (as required)
	Replace	Air filter element
	Replace	Coolant filter
	Replace	Separator element
	Inspect	Scavenge screen for blockage
	Replace	Starter box power drive filter element
	Replace	Package pre-filter element
	Clean	Air-cooled cooling system
	Replace	Inline Filter Elements (TAS only)
	Calibrate	Pressure transducers
Every 8000 hours	Check/Replace	Condensate drain flexible tube (TAS only)
	Check	All connecting pipes
	Replace	No-loss condensate drain service module
	Replace	Premium Coolant (Ultra/FG) [8000 hours]
	Service	Minimum pressure check valve (MPCV) service kit
	Clean	Drains with all their components (Timed Drains only)
	Service	Inlet valve service kit
Every 16000 hours	Replace	Coolant hoses
	Replace	Belt
	Replace	Gas spring
	Replace	Extended-life Premium Coolant (Ultra EL)

NOTICE

Inspect and replace coolant filter elements and separator elements more frequently in dirty operating environments.

■ Routine Maintenance

This section refers to the various components which require periodic maintenance and replacement.

Refer to safety information and maintenance procedures prior to carrying out any of the maintenance in the following sections.

NOTICE

Prior to opening or removing panels or covers to work inside a machine, ensure that anyone entering the machine is aware of the reduced level of protection and the additional hazards, including hot surfaces and intermittently moving parts.

■ Checking Coolant Level

A coolant level sight glass is located on the side of the separator tank. While the compressor is running under load, coolant should always be visible in the sight glass. The normal position is top half of the sight glass. The compressor should be running for at least 40 seconds for this check.

Stop the compressor, ensure the sump pressure is 0 psig and ensure the coolant is still visible in the sight glass.

■ Adding Coolant

Run the compressor for a minimum of 40 seconds. The coolant level should be visible in the sight glass. If not:

1. Stop the compressor.
2. Isolate the compressor from the external air system.
3. Press the emergency stop to vent the separator tank and airend. Fixed speed compressors can take more than two minutes to fully de-pressurize once stopped.
4. Slowly unscrew the coolant fill plug to verify all pressure has been released.
5. Add coolant.
6. Replace the coolant fill plug and restart the compressor.
7. Recheck the coolant level.
8. Repeat the above steps until the coolant level is visible in the sight glass with the compressor both running and stopped.

NOTICE

Do not add coolant through the intake of the compressor, as this can result in overfilling, saturation of the separator filter element, and coolant carry-over downstream.

■ Draining Coolant

It is better to drain the coolant immediately after the compressor has been operating as the coolant will drain faster and any contaminant will still be in suspension.

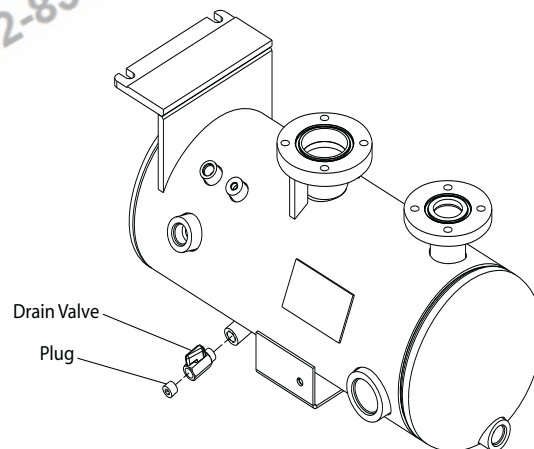
See Figure 1.

1. Stop the machine, electrically isolate and vent all trapped pressure.
2. Place a suitable container close to the drain valve.
3. Slowly remove coolant fill/vent cap.
4. Remove plug from the drain valve.
5. Open the drain valve and drain coolant into container.
6. Close the drain valve.
7. Install plug in drain valve.
8. Refill the compressor with coolant to the proper level, following the process outlined in the "Adding Coolant" procedure. After initial fill, to purge any airlocks, the machine should be run for a few minutes cycling between load and no load, before checking that the level is correct.
9. Replace and tighten coolant fill cap.

NOTICE

On air cooled compressors, you may also drain coolant from the coolant cooler by removing the plug.

Figure 1: Coolant Drain



NOTICE

Shorter coolant change intervals may be necessary if the compressor is operated in adverse conditions.

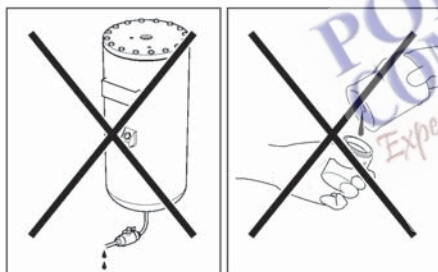
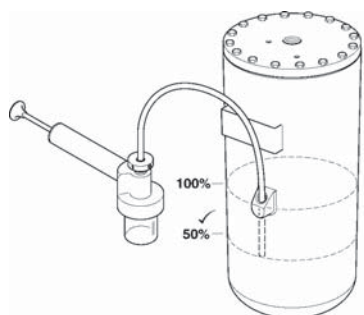
■ Sampling Coolant for Analysis

1. Bring the compressor up to operating temperature.
2. Stop the compressor.
3. Isolate the compressor from the external air system.
4. Press the emergency stop to vent the separator tank and airend. Fixed speed compressors can take more than two minutes to fully de-pressurize once stopped.
5. Draw a sample from the separator tank port using a pump kit. DO NOT draw a sample from the drain port or oil filter.

Use a new hose on the pump for each sample. Failure to do this can give false readings.

See Figure 2.

Figure 2: Coolant Sampling



NOTE: The original separator tank is horizontal. These figures are for reference only.

■ Changing Coolant Filter

1. Stop the machine, electrically isolate and vent all trapped pressure.
2. Loosen the filter with the correct tool.
3. Remove the filter from the housing.
4. Place the old filter in a sealed bag and dispose of in a safe way.
5. Remove the new **Ingersoll Rand** replacement filter from its protective package.
6. Apply a small amount of lubricant to the filter seal.
7. Screw the new filter down until the seal makes contact with the housing, then hand tighten a further 1/4 turn.
8. Start the compressor, check for leaks and check the coolant level.

■ Checking Separator Element

XE-70M Controller:

With the compressor running on load, check the separator differential pressure using the controller. It will be necessary to change the element if the differential pressure equals to zero or exceeds 1 bar (15psig).

XE-50M Controller:

It will be necessary to change the element if the controller issue warning of "Service required".

■ Changing Separator Element

1. Stop the machine, electrically isolate and vent all trapped pressure.
2. Loosen the separator element with the correct tool.
3. Remove the element from the housing.
4. Place the old element in a sealed bag and dispose of in a safe way.
5. Clean the mating faces of the housing.
6. Remove the new **Ingersoll Rand** replacement element from protective package.
7. Apply a small amount of lubricant to the element seal.
8. Screw the new element down until the seal makes contact with the housing, then hand tighten a further quarter turn.
9. Start the compressor and check for leaks.

■ Inspecting Separator Tank/ Pressure System

Inspect the external surfaces of the separator tank, including all fittings, for visible signs of impact damage, excessive corrosion and abrasions. When changing the separator element, inspect the internal components and surfaces. Any suspect parts shall be replaced before the compressor is put back into service.

The separator tank should also be tested and inspected in accordance with any national or local codes that may exist.

■ **Cleaning/ Checking Scavenge Screen**

The screen/orifice assemblies will be located between airend and 6 mm (0.25 in) O.D. scavenge line tubing.

The main body is made from 17 mm hexagon shaped metal and the diameter of the orifice and a direction-of-flow arrow is stamped in flat areas of the hexagon.

A removable screen and orifice will require clearing as outlined in the maintenance chart.

To remove the screen/orifice:

1. Disconnect the scavenge line tubing from each end.
2. Hold the center section firmly and use a pair of pliers to gently grasp the exit end of the assembly that seals against the scavenge line tubing. The exit end is the end toward which the arrow is pointing.
3. Pull the end out of the center section while using care to prevent damage to the screen or sealing surfaces.
4. Clean and inspect all parts prior to reinstallation.
5. When the assembly is installed, confirm the direction of flow to be correct. Observe the small arrow stamped in the center section and ensure the direction flow to be from the separator tank to the airend.

■ **Replacing Coolant Hoses**

The flexible hoses that carry coolant through the cooling system may become brittle with age and will require replacement. Replace them as needed or every four years.

1. Depending on the location of the hose, it may contain compressor coolant. It is recommended to drain the coolant into a clean container. Cover the container to prevent contamination. If the coolant is contaminated, replace with new coolant.
2. Remove the hose.
3. Install the new hose and refill the compressor with coolant.
4. Start the compressor, check for leaks and check coolant level. Refill as necessary.

■ **Checking Minimum Pressure Check Valve (MPCV)**

The minimum pressure check valve (MPCV) shall be frequently tested and regularly maintained. Remove it from the compressor for testing. If operating conditions are particularly severe, the frequency of testing and maintenance shall be increased accordingly. The user shall establish the frequency of such tests as it is influenced by such factors as the severity of the operating environment. The MPCV is installed as part of combination block.

The minimum pressure check valve (MPCV) should be tested and re-calibrated in accordance with any national or local codes that may exist. If no code exists, **Ingersoll Rand** recommends that the valve is recalibrated at intervals of one year by a licensed contractor or qualified service personnel.

■ **Changing Air Filter**

1. Check the retaining cap for dirt and debris and wipe clean.
2. Unclip the retaining cap and withdraw the old element.
3. Fit the new element and refit the retaining cap.

■ **Regreasing Motor**

The fan motor contains pre-greased, sealed bearings. They cannot be re-greased and do not require re-greasing.

Motor Bearings - Clean the area around the inlet and outlet plugs before removing the plugs. Add the specified quantity of recommended grease using a hand lever gun. Replace the inlet plug, run the machine for 10 minutes and then replace the outlet plug.

NOTICE

Read the motor data plate(s). For motors that require greasing, grease them more frequently in harsh environments or higher ambient conditions.

■ **Cleaning Air-Cooled Cooling System**

Air compressor operating temperatures will be higher than normal if the external passages between the fins of the cooler cores become restricted with foreign material. Regular cleaning of the cooler surfaces will support the reliable operation of the air compressor system, improve the life of the compressor coolant and improve overall compressor efficiency. When performed frequently as determined by site conditions and airborne contamination, more significant cleaning or replacement may not be necessary.

1. Stop the compressor.
2. Isolate the compressor from the system.
3. Press the emergency stop to vent the separator tank and airend. Fixed speed compressors can take more than two minutes to fully de-pressurize once stopped.
4. Ensure that the main power disconnect switch is locked off and tagged.

NOTICE

For any required lifting of air compressor parts or required tools, always use the proper certified lifting equipment, and employ sound working principles.

5. Visually check the outside of the cooler cores to determine the appropriate cleaning method detailed as follows:
 - a. For loose dirt, dust and other light foreign material, open the access panel on the cooler plenum. Gently blow compressed air across the cooler surface. Repeat the process until the coolers are sufficiently clean. Replace the access panels before returning the compressor to service.
 - b. For thick, packed dirt, coolant or grease, or other heavy material, the coolers will need to be removed from the compressor for pressure washing. **Ingersoll Rand** does NOT support pressure washing coolers when they are installed in the compressor due to the dangers of spraying water in or around potential electrical power sources. Follow the steps below for cooler removal.

■ **Removing/Installing Air-Cooled Cooler**

To remove:

1. Stop the compressor.
2. Isolate the compressor from the system.
3. Press the emergency stop to vent the separator tank and airend. Fixed speed compressors can take more than two minutes to fully de-pressurize once stopped.
4. Ensure that the main power disconnect switch is locked off and tagged.

NOTICE

For any required lifting of air compressor parts or required tools, always use the proper certified lifting equipment, and employ sound working principles.

5. Drain the coolant from the coolant cooler by removing the hex plug located at the lower side of the coolant cooler. Place the straight end of the drain hose in a suitable container. Install the other end of the drain hose in the drain valve located at the lower side of the coolant cooler. The coolant flows through the drain hose automatically. After drainage, remove the hose and close the valve.
6. Remove all hoses, pipes, and sensors from the coolers.
7. Remove the top panel (for RS15-22ie, ne) or Remove front, rear door and top panel (for RS11-22i, RS15-22n).
8. Properly secure the cooler and remove four screws at the upper side of the cooler.
9. Re-install the coolant drain plug to 16 Nm (12 ft-lb).

To install:

1. Carefully place the cooler in its proper location and install four screws (gun tight).
2. Re-attach all hoses and pipes, and properly torque according to the Parts Information manual.
3. Install the top panel.
4. Refill the compressor with coolant to the proper level, following the process outlined in the "Adding Coolant" procedure.

■ **Checking High Airend Temperature Sensor**

It is recommended that the discharge temperature sensor (2ATT) is checked regularly as follows:

- a. For air cooled compressors, stop the cooling blower by opening the blower / fan motor circuit breaker.

The compressor should trip at 109 °C (228 °F). A trip warning will appear on the controller display.

■ **Cleaning Motor Cowl**

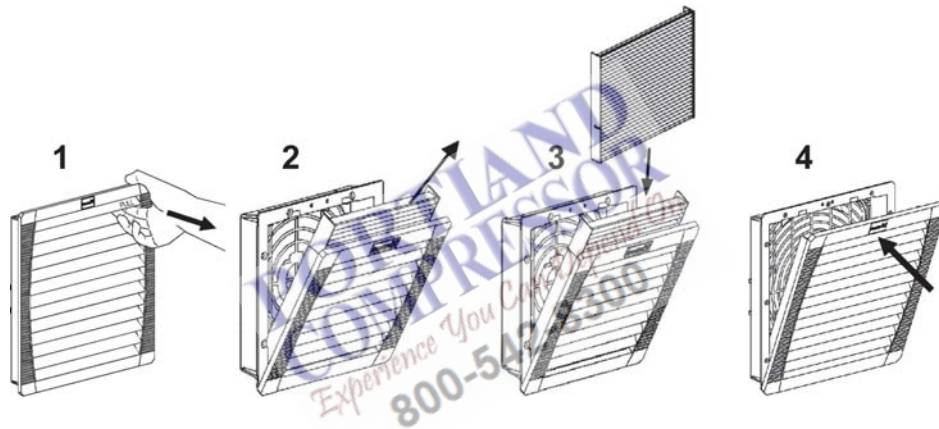
1. Ensure the compressor is electrically isolated for at least 15 minutes before commencing any maintenance work.
2. Remove the rear door from the compressor.
3. Using a clean dry cloth, remove dust from the surface of the motor cowl and ensure all ventilation slots are free of obstructions.
4. Replace the rear door.

■ **Removing/ Replacing Starter Box Power Drive Module (PDM) Filter Element (for VSD only)**

See Figure 3.

1. Ensure compressor is electrically isolated for at least 15 minutes before commencing any maintenance work.
2. Unclip the front grill of the starter box filter housing.
3. Remove the filter element from the housing and replace with a new filter element.
4. Replace the front grill.

Figure 3: Starter Box Power Drive Module (PDM) Filter Element Replacement



■ **Cleaning/ Checking Condensate Drain**

1. Ensure the compressor is electrically isolated for at least 15 minutes, before commencing any maintenance work.
2. Isolate the compressor from the system and fully discharge the compressed air within the compressor.
3. Remove the tube from the fitting located on the bottom of the moisture separator.
4. Remove the bowl of the moisture trap, clean and replace.

■ **Cleaning/ Installing Package Pre-Filter**

1. **Fix Speed (FS) Unit:**
Unlatch the starter box panel and open the intake panel.
- Variable Speed (VSD) Unit:**
Unlatch the rear door and open the intake panel.
2. Remove the four wing nuts and flat washers.
3. Remove the filter grill.
4. Pull out the filter element.
5. Center the new element over the package intake opening. Also note that the filter is washable with mild detergent.
6. Push the filter over the grill studs so that the studs poke through the filter media.
7. Install the filter grill.
8. Install the four wing nuts and flat washers.
9. Close the intake panel and latch.

■ **Checking/ Cleaning No Loss Drain Trap (where fitted)**

It is recommended to check the no loss drain trap daily to ensure that condensate is draining from the moisture separator system. To check for correct function:

1. Press the test button on the drain and listen for condensate / air passing through the drain.
2. If the drain is clogged, replace the no loss drain valve service module. The service module consists of the lower portion of the drain trap and is not serviceable.

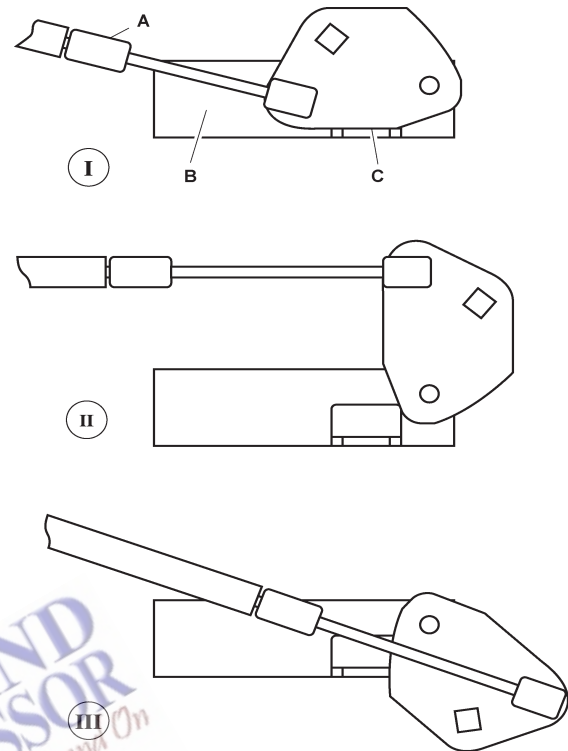
Additionally, it is recommended to replace the service module every 8000 hours or once per year, whichever comes first.

■ **Monitoring Fluid and Performing Shock Pulse Bearing Analysis**

Ingersoll Rand recommends incorporating predictive maintenance, specifically the use of coolant and shock pulse bearing analysis, into all preventative maintenance programs. Contact **Ingersoll Rand** for details.

■ **Belt Change / Gas Strut Change Procedure**

Figure 4: Belt / Gas Strut Change



A. Gas Strut

B. Support bracket (part of pivoted assembly)

C. Tension cam

1. Stop the machine, electrically isolate and vent all trapped pressure.
2. Fit a 1/2" square drive wrench in the tension cam located above the airend (access from front door) Turn clockwise 1/4 turn to Position II to release gas strut tension on the belts.
3. Using a small screwdriver under the spring clip, ease the ball ends off the spherical studs at the ends of the gas strut.
4. Replace the gas strut and the studs at the same time by removing and replacing the studs then pushing the new gas strut firmly onto the studs until it clicks into place.
5. Turn the tension cam clockwise 1/4 turn to Position III to raise and support the airend.
6. Replace the belts from the left side of the machine.
7. Turn the tension cam counter-clockwise 1/2 turn to Position I to tension the gas strut.
8. Spin the drive to check alignment of the belt ribs on the pulleys (sheaves).

TROUBLESHOOTING

This section provides basic troubleshooting information. Determination of specific causes to problems are best identified by thorough inspections performed by personnel instructed in safety, operation and maintenance of this equipment. The chart below provides a brief guide to common symptoms, probable causes and remedies.

Table 3: General Faults

SYMPTOM	CAUSE	REMEDY
Compressor will not start.	No power supply to compressor.	Check supply is switched on. If so, contact a qualified electrician.
	Controller failure.	Check supply to controller. Replace controller.
	Starter failure.	Isolate supply, lock off and tag. Replace failed component or contact your local Ingersoll Rand representative.
Compressor stops and will not restart.	Drive controller has tripped.	See Tables 4 and 6.
	Controller has tripped the compressor.	See Tables 4 and 6.
	Maximum number of starts per hour exceeded.	See Tables 4 and 6.
Compressor is stopped and will not restart.	Controller has tripped the compressor and has not been reset.	See Tables 4 and 6.
	Emergency stop has been pressed and not released.	Identify reason why, repair fault, disengage button and reset controller.
	Emergency stop has been pressed and released but controller has not been reset.	Repair fault and reset controller.
Compressor will not meet pressure required by system.	Compressor not sized to meet system requirements or requirements have been changed.	Contact your local Ingersoll Rand representative.
	Air loss due to pipe, hose, joint or seal failure.	Repair or replace.
	Air loss due to blowdown valve stuck open.	Repair or replace.
	Air loss through pressure relief valve not seating or set incorrectly.	Repair or replace.
	Air loss due to moisture separator drain trap stuck open.	Repair or replace.
	Motor speed too low caused by drive incorrectly set.	Contact your local Ingersoll Rand representative.
	Motor speed too low caused by fault in drive settings.	See Table 6.
	Controller fault.	Repair or replace.
	Drive motor fault.	See Table 6.
	Pressure transducer faulty, incorrectly calibrated or EMF interference.	Recalibrate or replace.
	Incorrect controller settings.	Check and modify settings.
Compressor will not meet pressure required by system.	Inlet grill or ducting is blocked.	Check and clean.
	Air filter dirty or collapsed.	Replace.
	Inlet valve not opening fully.	Repair or replace.
	Separator element dirty or collapsed.	Replace.
	Pipe / Hoses blocked or collapsed.	Clean or replace.
	Cooler core blocked.	Clean or replace.
	Minimum pressure check valve not functioning correctly.	Repair or replace.
	Belt slippage.	Replace belt and gas spring.
Gas spring failed.	Replace gas spring.	
Equipment between compressor and customer measuring point causing pressure drop / pressure loss.	Review system requirements.	

SYMPTOM	CAUSE	REMEDY
Pressure produced by compressor is too high due to speed not reducing as demand reduces (VSD only).	Controller set incorrectly.	Check and modify settings.
	Pressure transducer may be faulty, incorrectly calibrated or not receiving pressure signal.	Recalibrate or replace.
	Drive settings fault.	Contact your local Ingersoll Rand representative.
Compressor discharge air too hot.	High ambient temperature.	Review installation and system parameters.
	Insufficient cooling air.	Check ducting and cooling air path, check direction of blower rotation.
	Dirty, blocked aftercooler (cooling air side).	Clean or replace.
Compressor package produces excessive noise.	Panels or doors are not closed properly.	Rectify fault.
	Air leaks from internal pipework / components.	Repair or replace.
	Fan motor bearings worn.	Repair or replace.
	Loose debris impacting on fan during rotation.	Remove and rectify any damage.
	Blowdown valve stuck open.	Repair or replace.
	Pressure relief valve not seating correctly.	Repair or replace.
	Belt slippage.	Replace belt and gas spring.
	Vibration due to motor, airend or fan imbalance.	Repair or replace.
Discharge air is contaminated with coolant.	Airend requires repair.	Contact your local Ingersoll Rand representative.
	Scavenge pipe is blocked, broken or o-ring is not sealing.	Clean or replace.
	Separator element is punctured, or incorrect, or requires changing, or not sealing correctly.	Replace.
	Incorrect coolant has been added.	Drain system, check for damage. Clean, refill with correct coolant.
Discharge air is contaminated with condensate.	System has been overfilled with coolant.	Check for damage, drain excess.
	Aftercooler not functioning correctly.	Clean or replace.
	Moisture separator drain trap faulty.	Repair or replace.
	Continuous low speed / low ambient operation causing condensate build up.	Review system requirements and contact your local Ingersoll Rand representative.
Compressor package draws too much current.	Compressor operating above rated pressure.	Check and modify settings. Review system requirements and contact your local Ingersoll Rand representative.
	Separator filter element dirty or blocked.	Replace.
	Voltage supply is low or unbalanced.	Contact your local Ingersoll Rand representative or a qualified electrician.
	Airend is damaged.	Contact your local Ingersoll Rand representative.
Excessive coolant consumption.	Coolant system leak.	Repair or replace.
	See also 'discharge air is contaminated with coolant'.	See above.
High dewpoint.	Refrigeration compressor not supplied power.	Check incoming power supply.
		Check the dryer protection fuse.
		Check auxiliary contact on main motor contactor.
	Condensate system malfunction.	Check operation of drain valve.
		Check operation of condensate check valves.
Condenser dirty.	Clean condenser and replace panel filter element.	

SYMPTOM	CAUSE	REMEDY
Ice formation in dryer.	Low evaporator pressure.	Check hot gas valve setting.
Solenoid condensate valve will not close.	Debris in solenoid valve prevents diaphragm from seating.	Remove solenoid valve, disassemble, clean and reassemble.
	Short in electrical component.	Check and replace power cord or timer as needed.
Black residue on belt guard or airend.	Drive belt slippage.	Replace belt and gas spring.
	Pulley misaligned.	Re-align pulley.
	Worm pulleys.	Replace pulley and belt.
	Gas spring failed.	Replace gas spring.
Inlet valve will not actuate and load package.	Blowdown valve not functioning.	Examine and clean/replace if necessary.
	Contamination/liquid in controls tubing.	Examine and clean/replace if necessary.
	Either orifice is contaminated.	Examine and clean/replace if necessary.

Table 4: XE-70 Controller Faults (indicated on the controller)

FAULT	CAUSE	REMEDY
Emergency stop.	Emergency stop button has been pressed.	Identify reason why, repair fault, disengage button and reset controller.
Fan motor overload.	Fan is blocked, damaged or fan motor is faulty.	Remove blockage, repair or replace damaged components.
High airend discharge temperature.	Compressor operating above rated pressure.	Check and modify settings. Review system requirements and contact your local Ingersoll Rand representative.
	Low coolant level.	Check for leaks. See also 'discharge air is contaminated with coolant'. Top up coolant.
	High ambient temperature.	Review installation and system parameters.
	Insufficient cooling air.	Check ducting and cooling air path.
	Dirty, blocked coolant cooler (cooling air side).	Clean or replace.
	Fan motor direction of rotation incorrect.	Wire correctly.
Check setpoints.	Controller software has been changed.	Recalibrate all sensors and check setpoints.
Remote start failure.	Remote start button is pressed after compressor is running or remote start button remains closed.	Check operation of buttons or operating procedures.
Remote stop failure.	Remote stop button remains open and either start button is pressed.	Check operation of buttons or operating procedures.
Sensor failure.	Sensor is missing or faulty.	Install, repair or replace faulty sensor.
Controller has tripped the compressor.	A fault has occurred.	Repair fault/reset controller.
Invalid calibration.	Calibration done with pressure in compressor.	Depressurize and re calibrate with pressure pipe to sensor disconnected. If fault still exists, replace pressure transducer.

FAULT	CAUSE	REMEDY
Low sump pressure.	System leak.	Located and repair.
	Minimum pressure check valve faulty.	Repair with service kit.
	Blowdown valve faulty.	Repair with service kit.
	Loss of control power.	Check 110V circuit breaker. Check wiring. Check contactor KM1.
Check motor rotation.	Drive system fault.	Contact your local Ingersoll Rand representative.
VSD communication failure.	Communication wiring faulty.	Check and replace if required.
	Drive faulty.	Contact your local Ingersoll Rand representative.
	Controller faulty.	Contact your local Ingersoll Rand representative.
VSD initialization fault.	Communication wiring faulty.	Check and replace if required.
	Drive faulty.	Contact your local Ingersoll Rand representative.
	Controller faulty.	Contact your local Ingersoll Rand representative.
Change separator element and/or high sump pressure.	Faulty pressure transducer measurement.	Calibrate and validate the wet sump and package discharge transducers (for RS15-22n, RS15-22ie/ne).
	Moisture separator condensate drain trap faulty.	Ensure condensate drain system is functioning properly, and condensate is being drained.
	Separator element dirty or blocked.	Change separator element.
Machine stops but no alarm message.	Loss of outputs of control power.	Check controller outputs (110V AC) power supply (fuses/mini circuit breaker).
Motor current fault.	Loss of control power. Sump pressure too high. Faulty motor or Airend.	Check control power circuit and breaker. Check separator element pressure drop. Contact your local Ingersoll Rand representative.
CT failure	Fault CT, wiring or loss of control power.	Check wiring and control power circuit.

Table 5: XE-50 Controller Faults (indicated on the controller)

	Xe-50 DISPLAY	MEANING	CAUSE	REMEDY
Warnings	A:2118	High Airend Discharge Pressure	Discharge pressure is greater than offline pressure by 1.45 psi for a period of 3 seconds or longer.	Discharge pressure must fall to the rated pressure value before the unit is available for reload.
	A:2128	High Airend Discharge Temperature (above 105°C)	Compressor operating above rated pressure.	Check and modify settings. Review system requirements and contact your local Ingersoll Rand representative.
			Low coolant level.	Check for leaks. See also if discharge air is contaminated with coolant. Top off coolant.
			High ambient temperature.	Review installation and system parameters.
			Insufficient cooling air.	Check ducting and cooling air path.
			Dirty, blocked coolant cooler (cooling air side).	Clean or replace.
			Fan motor direction of rotation incorrect.	Wire correctly.
	A:2816	Power Failure Detected	If power supply to controller is inconsistent.	Check power supply.
A:4804	Service Due	Service interval hours counter has reduced to zero	Service compressor.	
Trips	E:0010	Emergency Stop	24Vac input not being detected on terminal R1C (emergency stop button pressed)	Identify reason why, repair fault, disengage button (if pressed) and reset controller.
	E:0020	Main or Blower Motor Overload	Will occur if the fan or main motor overload relays open for three seconds. Fan is blocked, damaged seconds. Fan is blocked, damaged or blower fan is faulty.	Remove blockage, repair or replace damaged components.
	E:0115	Pressure Sensor Fault	4-20mA signal out-of-range (<3.8mA or >20.8mA)	Install, repair or replace faulty sensor.
	E:0119	High Airend Discharge Pressure	Discharge pressure is greater than offline pressure by 4.35 psi	Check and modify settings. Review system requirements and contact your local Ingersoll Rand representative.
	E:0125	Temperature Sensor Fault	Signal out of range (<-50°C or >250°C)	Install, repair or replace faulty sensor.
	E:0129	Excess Temperature	Shutdown limit exceeded	Can be reset only when airend discharge temperature is lower than 107°C.
	E:0866	Power Supply 24V DC Low	24V DC power supply to controller is low.	Check controller power supply and call your local Ingersoll Rand representative.
	E:0821	Power Supply Analog Inputs Low	Analog input power supply to controller is low.	Check controller power supply and call your local Ingersoll Rand representative.

	Xe-50M DISPLAY	MEANING	CAUSE	REMEDY
Start Inhibit	A:3129	High Airend Discharge Temperature (above 103°C)	Airend discharge temperature above 103°C.	Abnormal operating condition which is self-cleaning.
	A:3123	Run Inhibited	Temperature is below set low temperture run inhibit limit.	Will self-reset when temperature increases above the temperature limit; cannot be manually reset.
	A:3423	Load Inhibited	Temperature is below set low temperature load inhibit limit.	Will self-reset when temperature increases above the temperature limit; cannot be manually reset.
Warning	High A/E Disch T	High Airend Discharge Temperature	Compressor operating above rated pressure.	Check and modify settings. Review system requirements and contact your local Ingersoll Rand representative.
			Low coolant level.	Check for leaks. See also if discharge air is contaminated with coolant. Top off coolant.
			High ambient temperature.	Review installation and system parameters.
			Insufficient cooling air.	Check ducting and cooling air path.
			Dirty, blocked coolant cooler (cooling air side).	Clean or replace.
			Fan motor direction of rotation incorrect.	Wire correctly.
	SVC Required	Service Level 1: Service required	Service timer has alarmed.	Service machine and reset warning.
	"100 hours to SVC SVC Required Service Alarm"	"Service Level 2: 100 hours till service required Service required 100 hours after service requirement"	"Preliminary service timer has alarmed. Service timer has alarmed. Late service timer has alarmed."	"Plan machine service and reset warning. Service machine and reset warning. Service machine and set the service complete factory set point."
High Disch Pres	High Discharge Pressure	Will occur if the unit is using a remote sensor or is under the control of an external device, such as an X81, is loaded, and the discharge pressure (4APT) is greater than the maximum offline pressure. If occurs for longer than 3 seconds, the compressor will automatically unload.	Discharge pressure must fall to the rated pressure value before the unit is available for reload.	
Invalid Cal	Invalid Calibration	Calibration done with pressure in compressor.	Depressurize and recalibrate with pressure pipe to sensor disconnected. If fault still exists, replace pressure transducer.	

	Xe-50M DISPLAY	MEANING	CAUSE	REMEDY
Trips	High A/E Disch T	High Airend Discharge Temperature (above 109°C)	Compressor operating above rated pressure.	Check and modify settings. Review system requirements and contact your local Ingersoll Rand representative.
			Low coolant level.	Check for leaks. See also if discharge air is contaminated with coolant. Top off coolant.
			High ambient temperature.	Review installation and system parameters.
			Insufficient cooling air.	Check ducting and cooling air path.
			Dirty, blocked coolant cooler (cooling air side).	Clean or replace.
			Fan motor direction of rotation incorrect.	Wire correctly.
	Ck Motor Rot	Check Motor Rotation	Drive system fault.	Contact your local Ingersoll Rand representative.
	Overload	Fan Motor Overload	Fan is blocked, damaged or fan motor is faulty.	Remove blockage, repair or replace damaged components.
	Main Motor OL	Main Motor Overload	Will occur if the main motor overload relays open for a time period of 3 seconds.	Remove blockage, repair or replace damaged components.
	Rem Start Fail	Remote Start Failure	Remote start button is pressed after compressor is running or remote start button remains closed.	Check operation of buttons or operating procedures.
Rem Stop Fail	Remote Stop Failure	Remote stop button remains open and either start button is pressed.	Check operation of buttons or operating procedures.	
4APT Failure 2 ATT Failure	Sensor Failure	Sensor is missing or faulty	Install, repair or replace faulty sensor.	
Emergency Stop	Emergency Stop	Emergency stop button has been pressed.	Identify reason why, repair fault, disengage button and reset controller.	
Unit Too Cold	Unit Too Cold to Start	Airend discharge temperature (2ATT) is less than 35°F, and the operator attempts to start compressor.	Reset and start compressor if desired. Will be logged that compressor is being used in low ambient conditions.	
Start Inhibit	High A/E Disch T	High Airend Discharge Temperature	Will occur if 2ATT is greater than 103°C	Abnormal operating condition which is self-clearing.

Table 6: Drive Faults (indicated on the controller)

The drive controller is directly linked to the controller. Faults in the drive controller will be displayed on the controller.

The following VSD faults may be investigated and remedied at source. For all other VSD faults, contact your local **Ingersoll Rand** customer support representative.

FAULT	NO.	CAUSE	ACTION
High VSD Ambient Temperature	-	VSD ambient temperature gets within 5% of the shutdown value (55°C)	Check machine ambient temperature. Check PDM filters, replace if necessary. Check drive cooling fan(s).
Chk Motor Rot	-	Main motor reverse rotation	Check main motor rotation.
			Contact your local Ingersoll Rand representative.
VSD Comm Fail	-	Communication wiring faulty.	Check and replace if required.
	-	Drive faulty.	Contact your local Ingersoll Rand representative.
	-	Controller faulty.	Contact your local Ingersoll Rand representative.
Wrong VSD Type	-	Wrong VSD type	Contact your local Ingersoll Rand representative.
Stop Failure	-	Run relay or wiring fault.	Check run relay.
			Contact your local Ingersoll Rand representative.
Drive Init Error	-	Communication wiring faulty.	Check and replace if required.
	-	Drive faulty.	Contact your local Ingersoll Rand representative.
	-	Controller faulty.	Contact your local Ingersoll Rand representative.
VSD FAULT #			
Internal Fault	38	Drive faulty	Contact your local Ingersoll Rand representative.
24V Supply Low	47		
1.8V Supply Low	48		
Speed Limit	49		
Dangerous Fail	72		
DC link voltage high	5		
DC link voltage low	6		
DC over-voltage	7		
Phase U Missing	30	Motor connection lost.	Check drive/motor connection.
Phase V Missing	31		
Phase W Missing	32		
Mains phase loss	4	Problem with incoming power network.	Check incoming power leads, voltage.
Mains failure	36		
Phase imbalance	37		
DC under voltage	8		
Short Circuit	16	There is short-circuiting in the motor or motor wiring.	Check the motor, repair or change.
Internal Fan Fault	23	Drive fans not working properly.	Check for proper fan operation.
External Fan Fault	24		
Motor Thermal Overload	10, 11	Motor overheated.	Check ambient conditions, get the motor cooled down.
Over Current	13	Compressor operating above rated pressure.	Check and modify settings. Review system requirements and contact your local Ingersoll Rand representative.
		Separator filter element dirty or blocked.	Replace.
		Voltage supply is low or unbalanced.	Contact your local Ingersoll Rand representative or a qualified electrician.
		Airend is damaged.	Contact your local Ingersoll Rand representative.

FAULT	NO.	CAUSE	ACTION
Ground Fault	14	Earth (ground) fault on start-up.	Check for proper earthing (grounding) and loose connections.
Inrush Fault	33	Too many power ups.	Let the unit cool down.
Heatsink Temp	29	VSD heatsink temp too high.	Check ambient temp.
			PDM filters dirty or heatsink dirty Check VSD heatsink fan operation.
Torque Limit Current Limit	12	Compressor operating above rated pressure.	Check and modify settings. Review system requirements and contact your local Ingersoll Rand representative.
		Airend is damaged.	Contact your local Ingersoll Rand representative.
Heatsink Temp Low	66	The frequency converter is too cold to operate.	Check the ambient temp.

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INTEGRATED DRYER MAINTENANCE (For RS11-22i, RS15-22n)

■ Troubleshooting

NOTICE

The following behaviors are normal characteristics of operation and not troubles:

- Variable speed of the fan.
- Display of message ESA and ES2 in case of operation without load or low load.
- A 2 minute delay for dryer to start after pressing the on/off switch.







	Check condition of flexible tube used for condensate drainage and replace if necessary.
	Check if all connecting pipes are properly tightened and fixed.
	Check if dryer is working properly after above procedures.

Table 7: General Faults (Dryer)

TROUBLE	DISPLAY	POSSIBLE CAUSE	REMEDY
WATER IN THE SYSTEM	Control panel display is blank	No power in the line.	Restore the power in the line.
		Problems with cabling.	Check cabling; if the trouble persists, replace it.
		Problems with the electronic control board.	Check the electronic control board; if the trouble persists, replace it.
		Dryer in stand-by.	Wait 2 minutes after the dryer is switched on.
		The condenser is dirty.	Restore the nominal conditions.
		Condensate drain is not functioning. See Figure 5.	Clean the condenser.
			Replace the coil of the drainage solenoid valve if burned.
			Clean or replace the drainage solenoid valve if clogged/jammed.
	The temperature control probe is positioned improperly or faulty.	Check the probe; if the trouble persists, replace it.	
		Problems with cabling or with the electronic control board.	Check the cabling and the electronic control board, if the trouble persists, replace them.
		Activation of compressor's internal thermal protection.	Wait one hour and check again. If the fault persists: stop dryer and call your local Ingersoll Rand distributor.
	 	Problems with the electrical components of the compressor.	Check the electrical components of the compressor.
		Defective compressor.	Replace the compressor.
		The flow rate and/or temperature of the air entering the dryer are higher than the nominal values.	Restore the nominal conditions.
		The ambient temperature is higher than the nominal values.	Restore the nominal conditions.
		The condenser is dirty.	Clean the condenser.

TROUBLE	DISPLAY	POSSIBLE CAUSE	REMEDY
WATER IN THE SYSTEM		The temperature control probe is positioned improperly or faulty.	Check the probe; if the trouble persists, replace it.
		Fan pressure / Temperature switch defective or burned out	Turn off the dryer and call your local Ingersoll Rand distributor.
		High pressure / Temperature switch defective or burned out.	Turn off the dryer and call your local Ingersoll Rand distributor.
		Gas leakage in the refrigerating circuit	Turn off the dryer and call your local Ingersoll Rand distributor.
		Defective fan.	Replace the fan.
		Protection fuse burned out (if present).	Replace the fuse.
	ESA ES2	The temperature control probe is positioned improperly or faulty.	Check the probe; if the trouble persists, replace it.
		Gas leakage in the refrigerating circuit without load.	Turn off the dryer and call your local Ingersoll Rand distributor.
	PF 1 ASt	The temperature control probe is positioned improperly or faulty.	Check the probe; if the trouble persists, replace it.
		Series of alarms very close to each other.	Call your local Ingersoll Rand distributor.
LOW PRESSURE IN THE LINE	ESA ES2 On	Ice formation in the evaporator.	Check the probe; if the trouble persists, replace it.
			Check the electronic control board; if the trouble persists, replace it.
			Contact our Service Centre to check the gas charge.
	On.	Clog.	Check if the connecting tubing is clogged; in case proceed accordingly.
			Check if any valves are closed.
			Check the condition of any filter.
	On.	Air flows continuously through the condensate drainage.	Drainage solenoid valve jammed, clean or replace it.
	Verify the condensate drainage times set on the electronic control board (C8 and C9).		
	Check the signal from the control board: if it is continuous, replace the control board.		

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Disassembly of the Integrated Dryer

NOTICE

The dryer shall be disassembled, charged or repaired by a refrigerant specialist.

Refrigerant liquid and lubricating oil inside the refrigeration circuit shall be recovered in compliance with current norm in the country where the dryer is installed.

NOTICE

Refrigerant leaks may be identified by tripping of the refrigeration overload protector.

If a leak is detected in the refrigerant circuit, seek technical assistance. If a refrigerant leak occurs, thoroughly air the room before commencing work.

NOTICE

In normal temperature and pressure conditions, the R134a refrigerant is a colorless, class A1/A1 gas with TVL value of 1000 ppm (ASHRAE classification).

NOTICE

The temperature control probe is extremely delicate. Do not remove the probe from its position. In case of any kind of problem, please contact your local Ingersoll Rand distributor.

Decommissioning the Integrated Dryer

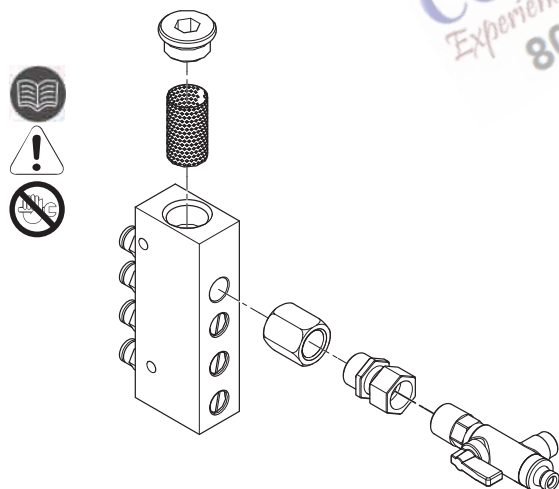
Decommission the dryer and the relevant packaging in compliance with the rules locally enforced.

Pay particular attention to the refrigerant as it contains part of the refrigerating compressor lubricating oil. Always contact a qualified waste management or recycling utility for proper disposal of all refrigerant.

Table 8: Recycling Disassembly

RECYCLING DISASSEMBLY	
Frame and panels	Steel / epoxy resin polyester
Heat exchanger (cooler)	Stainless steel / aluminum
Pipes	Copper
Insulation	Gum synthetic/polystyrene
Compressor	Steel / copper / aluminum / oil
Condenser	Copper/aluminum/steel
Refrigerant	R-134a
Valve	Brass

Figure 5: Cleaning of Drain Solenoid Valve



INTEGRATED DRYER MAINTENANCE (For RS15-22ie, RS15-22ne)

⚠ WARNING

Before accessing live electrical parts, disconnect the power supply to the dryer using the disconnect switch or disconnecting the cable connections.

■ **Cleaning Condensate Drains (Timed Drains Only)**

Periodically clean the screen inside the valve to keep the drain functioning at maximum capacity. To do this, perform the following steps:

1. Close the strainer ball valve completely to isolate it from the air receiver tank.
2. Press the TEST button on the timer to vent the pressure remaining in the valve. Repeat until all pressure is removed.

⚠ WARNING

High pressure air can cause injury from flying debris. Ensure the strainer ball valve is completely closed and pressure is released from the valve prior to cleaning.

3. Remove the plug from the strainer with a suitable wrench. If you hear air escaping from the cleaning port, STOP IMMEDIATELY and repeat steps 1 and 2.
4. Remove the stainless steel filter screen and clean it. Remove any debris that may be in the strainer body before replacing the filter screen.
5. Replace plug and tighten with wrench.
6. When putting the valve back into service, press the TEST button to confirm proper function.

■ **Testing Condensate Drains (No-Loss Drains only)**

Press the TEST button to confirm proper function.

■ **Troubleshooting Condensate Drains (Electronic Drains only)**

This section provides basic troubleshooting information. Determination of specific causes to problems are best identified by thorough inspections performed by personnel instructed in safety, operation and maintenance of this equipment. The chart below provides a brief guide to common symptoms, probable causes and remedies.

Table 9: Condensate Drain Troubleshooting Chart

TROUBLE	CAUSE	ACTION
Solenoid condensate valve will not close.	Debris in solenoid valve prevents diaphragm from seating.	Remove solenoid valve, disassemble, clean and reassemble.
	Short in electrical component.	Check and replace power cord or timer as needed.

■ **Disassembling the Integrated Dryer**

NOTICE

The dryer shall be disassembled, charged or repaired by a refrigerant specialist.

Refrigerant liquid and lubricating oil inside the refrigeration circuit shall be recovered in compliance with current norms in the country where the dryer is installed.

NOTICE

Refrigerant leaks may be identified by tripping of the refrigeration overload protector.

If a leak is detected in the refrigerant circuit, seek technical assistance.

If a refrigerant leak occurs, thoroughly air the room before commencing work.

NOTICE

In normal temperature and pressure conditions, the R-404A refrigerant is a colorless, class A1/A1 gas with TVL value of 1000 ppm (ASHRAE classification).

■ **Decommissioning the Integrated Dryer**

Decommission the dryer and the relevant packaging in compliance with the rules locally enforced.

Pay particular attention to the refrigerant as it contains part of the refrigerating compressor lubricating oil.

Always contact a qualified waste management or recycling utility for proper disposal of all refrigerant.

Table 10: Integrated Dryer Materials of Construction

RECYCLING DISASSEMBLY	
Frame and panels	Steel/ epoxy resin polyester
Heat exchanger (cooler)	Stainless steel/ aluminum
Pipes	Copper
Insulation	Gum synthetic
Compressor	Steel/ copper/ aluminum/ oil
Condenser	Aluminum
Refrigerant	R-134a
Valve	Steel

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