

Please read and save these instructions. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

Speedaire® by Dayton® Refrigerated Compressed Air Dryers

Description

Speedaire by Dayton refrigerated compressed air dryers are used to cool compressed air to 38° to 50°F (3° to 10°C), thereby condensing water vapor in the compressed air to liquid form, for removal from your air system. Removal of this water vapor allows you to keep air tools, air valves and cylinders, spray guns, and any air operated device clean and dry. This reduces downtime and maintenance from malfunctioning equipment due to dirt and water. Speedaire by Dayton dryers work best when sized close to the cubic feet per minute load as rated. Following the installation and maintenance information will result in maximum performance and life from the dryers.

Receiving

This shipment has been thoroughly checked, packed and inspected before leaving our plant. It was received in good condition by the carrier and was so acknowledged.

Check for visible loss or damage. If this shipment shows evidence of loss or damage at time of delivery to you, insist that a notation of this loss or damage be made on the delivery receipt by the carrier's agent.

Unpacking

Check for concealed loss or damage. When a shipment has been delivered to you in apparent good order, but concealed damage is

found upon unpacking, notify the carrier immediately and insist on his agent inspecting the shipment.

Concealed damage claims are not our responsibility as our terms are F.O.B. point of shipment.

Moving

In moving or transporting dryer, do not tip dryer onto its side.

Storage

IMPORTANT - Do not store dryer in temperatures above 130°F, 54.4°C.

General Safety Information

1. This equipment is a pressure containing device. Do not exceed maximum operating pressure as shown on equipment serial number tag. Make sure equipment is depressurized before working on or disassembling it for service. 
2. This equipment requires electricity to operate. Install equipment in compliance with all applicable electrical codes. Standard equipment is supplied with electrical enclosures not intended for installation in hazardous environments. Disconnect power supply to equipment when performing any electrical service work. 
3. Air treated by this equipment may not be suitable for breathing without further purification. Refer to applicable standards and specifications for the requirements for breathing quality air. 

Specifications

Model	AIR CONNECTION Inlet/Outlet	MAXIMUM		DIMENSIONS			
		Working Pressure	Inlet Temperature	Height	Width	Depth	Weight (lbs)
3YA51	3/4" NPT	250 psiG	122°F (50°C)	22.2"	14.5"	15.5"	88
3YA52	3/4" NPT	250 psiG	122°F (50°C)	22.2"	14.5"	15.5"	92
3YA53	3/4" NPT	250 psiG	122°F (50°C)	22.2"	19.7"	19.7"	101
3YA54	3/4" NPT	250 psiG	122°F (50°C)	29.6"	18.4"	27.0"	132

Speedaire® by Dayton® Refrigerated Compressed Air Dryers

Installation

LOCATION

1. For typical placement in a compressed air system, see Figure 1.
2. Air compressor intake - Locate air compressor so that contaminants potentially harmful to the dryer (e.g. ammonia) are not drawn into the air system.
3. Clearances

Free air flow - Allow at least 6 inches (153 mm) clearance (24 inches on 75 scfm model) from the front and from the condenser sides of the cabinet.

Service - To facilitate maintenance, allow 24" (610 mm) of clearance for maintenance.
4. Standard units are designed to operate in ambients from 40 to 113°F (4 to 45°C).

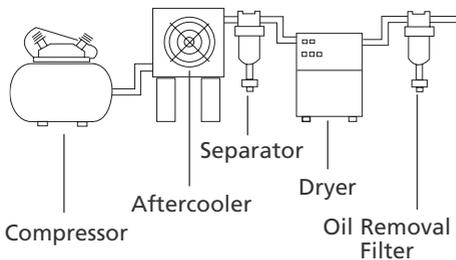


Figure 1 - Typical Placement

MOUNTING

Dryer may be installed on a suitable shelf or floor stand.

PIPING

1. Air Inlet - Connect compressed air line from air source to air inlet.

⚠ WARNING Refer to serial number tag for maximum working pressure. Do not exceed dryer's maximum working pressure.

NOTE: Install dryer in air system at highest pressure possible (e.g. before pressure reducing valves)

NOTE: Install dryer at coolest compressed air temperature possible. Maximum inlet compressed air temperature: 122°F (50°C). If inlet air exceeds this temperature, precool the air with an aftercooler.

2. Air Outlet - Connect air outlet to downstream air lines.
3. If servicing the dryer without interrupting the air supply is desired, piping should include inlet and outlet valves and an air by-pass valve.

MOISTURE SEPARATOR

1. Separator has an internal drain which automatically discharges collected condensate. It may be desirable to pipe the condensate from the automatic drain outlet to a suitable drain.

NOTE: Discharge is at system pressure. Drain line should be anchored.

NOTE: Condensate may contain oil. Comply with applicable laws concerning proper disposal.

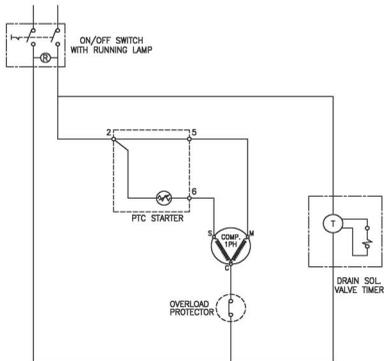
VOLTAGE REQUIREMENTS

1. Dryer is designed to operate on the voltage, phase, and frequency listed on serial number tag.
2. Dryer is supplied with a cord and plug. Install in receptacle of proper voltage.

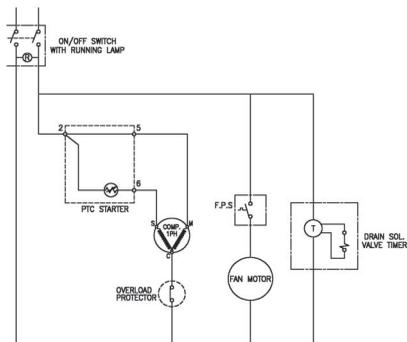
NOTE: Refrigeration condensing unit is designed to run continuously and should NOT be wired to cycle on/off with the air compressor.

Models 3YA51, 3YA52, 3YA53 and 3YA54

ELECTRICAL DRAWING



25-50 scfm models



75 scfm model

MINIMUM/MAXIMUM OPERATING CONDITIONS

- a) Maximum inlet air pressure: refer to unit serial number tag
- b) Minimum inlet air pressure: 30 psiG (2.1 kgf/cm²)

- c) Maximum inlet air temp 122°F (50°C)
- d) Maximum ambient temp: 113°F (45°C)
- e) Minimum ambient temp: 40°F (4°C)

INSTRUMENTATION

ON/OFF SWITCH

The dryer is equipped with an ON/OFF switch on the front panel. A light signals when the dryer is on.

An electronic drain valve is supplied to automatically discharge condensate from the dryer. The drain valve and its controls are accessible from the right side of the dryer. The electronic drain valve has two indicators and a test button to help verify operation. Pushing the test button causes the drain port to click open. If either indicator fails to turn on at the proper time, refer to the maintenance section of this manual. Drain valve operation is controlled by an electronic timer. The drain opening can be set from 0.5 sec to 10 sec. The drain cycle can be set from 0.5 min to 45 min.

Electronic Drain Valve Adjustment

To minimize air losses, the drain valve timer should be adjusted to open the drain port just long enough to discharge accumulated condensate. Set the timer so that only air discharges at the end of the open period.

Recommended Drain Settings

Model	Time	
	Open (sec)	Closed (Min)
25	2	10
35	2	10
50	2	10
75	2	20

NOTE: If a liquid discharges as the port is closing, set the timer for a shorter cycle or a longer opening. The amount of condensate will vary as ambient conditions and inlet flow rates change.

START-UP/OPERATION

Follow the procedure below to start your dryer. Failure to follow the prescribed start-up procedure will invalidate the warranty. If problems arise during start-up, call your distributor.

⚠ WARNING Refer to Serial Number Tag for dryer operating capacity. Do not exceed recommended capacity

Drain connections must be made before the dryer can be operated. The dryers are fully automatic and require no auxiliary controls.

Electrical

Model	Horsepower	FLOW CAPACITY (scfm)*		Input Power (kW)	Fuse Protection (amps)	Electric Rating	Overload Protection
		38°F (3°C)	50°F (10°C)				
3YA51	1/4	25	33	.47	15	115V, 60 Hz Single Phase	Thermal & Current (auto reset)
3YA52	1/4	35	46	.47	15		
3YA53	1/3	50	72	.63	28.0		
3YA54	1/3	75	91	.65	35.0		

(* Dryers are designed to produce a 38°F (3°C) or a 50°F (10°C) pressure dewpoint at 100°F (38°C) air inlet temperature, 100 psiG inlet pressure, and up to 100°F (38°C) ambient air temperature.

ENGLISH

Speedaire® by Dayton® Refrigerated Compressed Air Dryers

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1. Connect inlet and outlet lines to the dryer. Reference dryer indentations and instruction tag for appropriate inlet and outlet connections.
2. Route drain connections to a condensate separator or approved collection point.
3. Turn the on/off switch to on. Double check connections.
4. After the dryer has been running for 30 minutes:
 - a. Check that on/off lighted switch is glowing. If light is not glowing, unplug unit and refer to Field Service Guide for additional information or call your local distributor.
 - b. Confirm that condensate is discharging from the drain. This can only be done when there is air flow through the dryer.

⚠ WARNING Reference Serial Number Tag for appropriate power requirement/connection rating. Make other dryer connections prior to connecting power source.

The dryer is designed to run continuously. Let the dryer run even when the demand for compressed air is interrupted; the dryer will not freeze up,

Operating Check Points

1. Power light is on, light is illuminated
2. Condensate is discharging properly

TABLE 1
Rated capacity and pressure drop @ 100 psiG inlet pressure, 100°F inlet temperature, and 100°F ambient temperature.

MODEL	Rated capacity of @60 Hz
3YA51	25
3YA52	35
3YA53	50
3YA54	75

SHUTDOWN

When the dryer must be shutdown for maintenance or other reasons, use the following procedure.

1. Turn the power on/off switch to off.
2. Disconnect the main power supply.

If mechanical repairs are to be made or service is performed, vent the internal pressure of the dryer to atmospheric pressure. Restart the dryer according to the start-up instructions.

⚠ WARNING Disconnect power supply and depressurize dryer before servicing. Dismantling or working on any component of the compressed air system under pressure may cause equipment failure and serious personal injury.

TABLE 2
Air capacity correction factors (multipliers)

		INLET COMPRESSED AIR CONDITIONS			
INLET PRESSURES psiG	INLET PRESSURES kgf/cm ²	INLET TEMPERATURES			
		90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
50	3.5	1.05	0.84	0.69	0.56
80	5.6	1.17	0.95	0.79	0.66
100	7.0	1.23	1.00	0.82	0.70
125	8.8	1.31	1.07	0.91	0.74
150	10.5	1.37	1.13	0.95	0.80
175	12.3	1.42	1.18	0.99	0.84
200	14.0	1.47	1.22	1.03	0.89
250	17.6	1.49	1.24	1.05	0.91

COOLING MEDIUM		
AMBIENT TEMPERATURE °F	MULTIPLIER	
	°C	
80	27	1.12
90	32	1.06
100	38	1.00
110	43	0.94

OUTLET DEWPOINT		
DEW POINT TEMPERATURE °F	MULTIPLIER	
	°C	
38	3	1.0
40	4	1.1
45	7	1.2
50	10	1.3

SIZING

Determining dryer capacity at actual operating conditions.

To determine the maximum inlet flow capacity of a dryer at various operating conditions, multiply the rated capacity from Table 1 by the multipliers shown in Table 2.

EXAMPLE:

How many SCFM can an air-cooled 50 SCFM dryer handle when compressed air to be dried is at 80 psiG and 90°F; ambient air temperature is 80°F; and a 38°F dew point temperature is desired?

Answer: 50 x 1.17 x 1.12 x 1.0 = 65.5 scfm.

Models 3YA51, 3YA52, 3YA53 and 3YA54

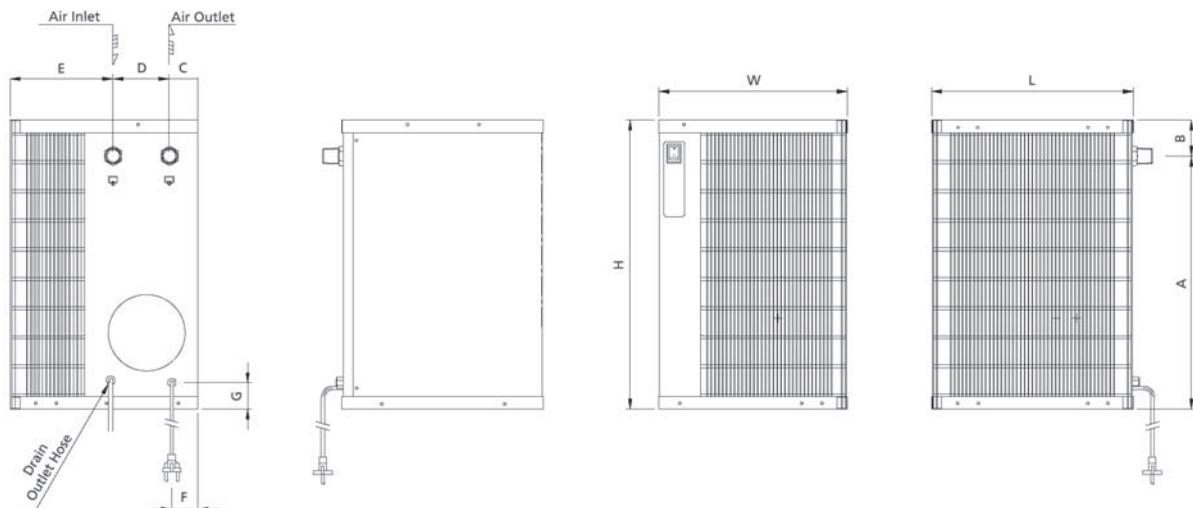
Refrigeration System Data

Models	3YA51	3YA52	3YA53	3YA54
Compressor Type	Hermetic - Resistance Start, Induction Run - Non-Cycling			
BTU/HR - Refrigeration Only @ 35°F (2°C) Evaporator & 100°F (38°C) Ambient	1010	1380	2160	2780
Refrigerant Type	R-134a	R-134a	R-134a	R-134a
Refrigerant Charge	Refer to serial number tag			

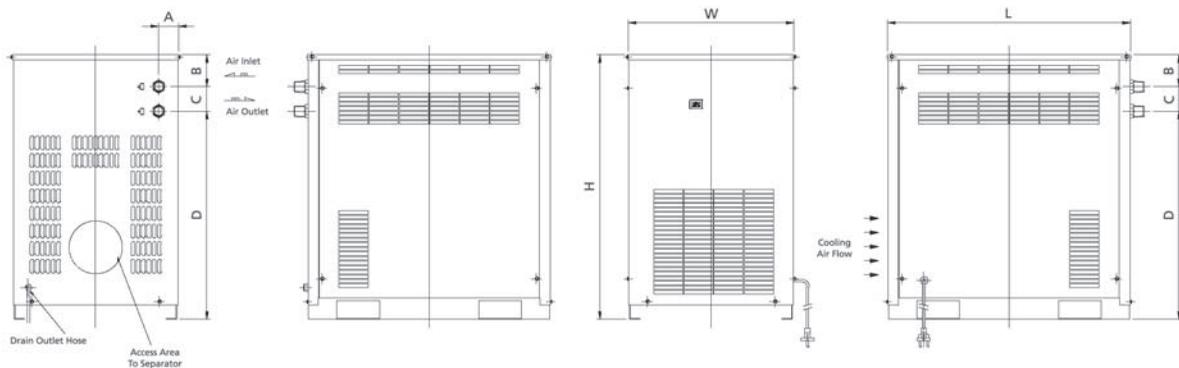
Dimensions

Model	Inches										In/Out (Male)
	A	B	C	D	E	F	G	H	L	W	
3YA51	19.56	2.80	2.24	4.33	7.91	2.05	2.05	22.36	15.51	14.48	3/4" NPT
3YA52	19.56	2.80	2.24	4.33	7.91	2.05	2.05	22.36	15.51	14.48	3/4" NPT
3YA53	19.96	2.40	2.76	11.02	5.90	5.31	2.05	22.36	19.68	19.68	3/4" NPT
3YA54	2.20	2.40	2.76	24.4	-	-	-	29.6	18.4	27.0	3/4" NPT

Models
3YA51
3YA52
3YA53



Model
3YA54



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Troubleshooting Chart

Symptom	Possible Cause(s)	Corrective Action
WATER DOWNSTREAM OF DRYER		
No discharge from separator drain trap	Failure of drain trap	Dismantle & clean strainer, repair or replace solenoid valve or float mechanism.
Dryer inlet air temperature too high	Aftercooler malfunction	Check aftercooler discharge temperature and reduce to dryer design condition (122°F max)
Refrigerant compressor stopped	<ol style="list-style-type: none"> 1. Leak in refrigerant system 2. Compressor overheated 3. Compressor burned out 4. Inlet air temperature too high 5. Excessive airflow 6. Condenser fouled or clogged 7. High ambient temperature 8. Improper adjustment of Expansion Valve 9. Fan motor inoperative 	<ol style="list-style-type: none"> 1. Consult local distributor 2. Turn dryer off, wait 30 minutes; turn dryer on. (Motor thermostat self-starting) 3. Consult local distributor 4. Reduce aftercooler discharge temperature to design conditions 5. Check airflow & system capacity. Reduce airflow or resize and replace system 6. Clean or replace condenser 7. Ventilate area 8. Consult Factory 9. Replace fan motor (75 scfm model)
HIGH PRESSURE DROP		
Low outlet pressure	<ol style="list-style-type: none"> 1. Dryer undersized (may cause water downstream of dryer) 2. Blocked separator 3. Dryer icing up 	<ol style="list-style-type: none"> 1. Check airflow and dryer capacity. Reduce airflow or resize and replace dryer 2. Dismantle & clean or replace separator (10 scfm model only) 3. Consult local distributor

For Repair Parts, call 1-800-323-0620
24 hours a day – 365 days a year

Please provide following information:

- Model number
- Serial number (if any)
- Part description and number as shown in parts list

Address parts correspondence to:

Grainger Parts
 P.O. Box 3074
 1657 Shermer Road
 Northbrook, IL 60065-3074 U.S.A.

Maintenance

The dryers require little maintenance for satisfactory operation. Good dryer performance can be expected if the following routine maintenance steps are taken.

⚠ WARNING Disconnect power supply and depressurize dryer before performing any maintenance.

General

For continued good performance of your refrigerated dryer, all refrigeration system maintenance should be performed by a competent refrigeration mechanic.

NOTE: Before corrective maintenance is done during the warranty period, call your local distributor and proceed according to instructions. Refer to the warranty for limits of your coverage.

Daily Maintenance

Check the separator for condensate discharge. If no discharge is evident, depressurize, dismantle and perform the following:

Electric Drain - Clean strainer and/or clean/replace solenoid valve.

Monthly Maintenance

Inspect the condenser coils. Remove accumulated dust and dirt with a soft brush or with air from an OSHA approved compressed air nozzle that limits the discharge pressure to 30 psiG.

Electronic Drain Valve

Disassembly and Servicing

⚠ CAUTION Do not disassemble drain valve timer or attempt to repair electrical parts. Replace timer if defective. The drain valve discharges condensate through a full-port drain opening. The valve body may need to be cleaned under conditions of gross particulate contamination.

To disassemble the drain valve body for cleaning and other maintenance:

1. Turn power switch off.
2. Disconnect main power supply to dryer.
3. Depressurize unit
4. Lock out and tag power supply in accordance with OSHA requirements.

⚠ WARNING If power supply is not disconnected and unit is not depressurized before disassembly, serious personal injury and valve damage may result.

5. Remove screw and washer from front of the drain valve.
6. Remove the power supply connector and gasket (with the timer assembly if attached) from the solenoid coil housing. Do not damage or lose the gasket.
7. Remove coil fixing nut and spring washer from top of solenoid coil housing.
8. Lift solenoid coil housing off solenoid core in valve body.
9. Unscrew solenoid core from valve body.

Once the drain valve is disassembled, the following maintenance can be performed.

1. Inspect internal parts of valve body; clean or replace as required.

NOTE: Replace solenoid valve if component damage is observed

2. Remove debris from valve body.
3. Wipe solenoid core components with a clean cloth or blow out debris with compressed air from an OSHA-approved air nozzle that limits its discharge pressure to 30 psiG.
4. Check that the plunger assembly is clean and moves freely in housing.
5. If timer is attached to valve body, check electrical continuity across timer assembly.

To reassemble the drain valve, reverse the sequence of the preceding steps. After the drain valve is reassembled, connect the main power supply to the dryer. When the dryer is returned to service, check the drain valve for air or condensate leaks; tighten connections as required to correct leaks. Check the drain cycle; adjust the timer according to the procedure in the drain valve adjustment section.

Returns to Manufacturer

If the dryer or a component of the dryer must be returned to the manufacturer, first call your local distributor for a return authorization number and shipping address. Your distributor will inform you whether the dryer or only a component must be returned. Mark the package with the return authorization number and ship freight prepaid as directed by your local distributor.

Repair Parts

Item	25	35	50	75
Refrigerant Compressor	3149273	3146980	3149274	3149274
Condenser	3149275	3149275	3149275	1283269
Fan Blades	-	-	-	3041954
Fan Motor	-	-	-	3142592
Liquid Receiver/Filter Dryer	1283369	1283369	1283369	1283369
Constant Press. Exp. Valve	3041489	3041489	3041489	3041489
Electronic Drain Valve	3044463	3044463	3044463	3044463
Fan Pressure Switch	-	-	-	3142601
Color Indicator	3041493	3041493	3041493	3041493
On/Off Switch	3041494	3041494	3041494	3041494
Heat Exchanger	3149278	3149279	3149280	3149281
Side Cover (1)	3149283	3149283	3149283	3149284
Side Cover (2)	3149285	3149285	3149285	3149286
Top Cover	3149288	3149288	3149288	3149289
Base Frame	3149291	3149291	3149291	3149292

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Speedaire® by Dayton® Refrigerated Compressed Air Dryers

LIMITED WARRANTY

DAYTON ONE-YEAR LIMITED WARRANTY. Speedaire by Dayton refrigerated compressed air dryers, Models covered in this manual, are warranted by Dayton Electric Mfg. Co. (Dayton) to the original user against defects in workmanship or materials under normal use for one year after date of purchase. Any part which is determined to be defective in material or workmanship and returned to an authorized service location, as Dayton designates, shipping costs prepaid, will be, as the exclusive remedy, repaired or replaced at Dayton's option. For limited warranty claim procedures, see PROMPT DISPOSITION below. This limited warranty gives purchasers specific legal rights which vary from jurisdiction to jurisdiction.

LIMITATION OF LIABILITY. To the extent allowable under applicable law, Dayton's liability for consequential and incidental damages is expressly disclaimed. Dayton's liability in all events is limited to, and shall not exceed, the purchase price paid.

WARRANTY DISCLAIMER. Dayton has made a diligent effort to provide product information and illustrate the products in this literature accurately; however, such information and illustrations are for the sole purpose of identification, and do not express or imply a warranty that the products are MERCHANTABLE, or FIT FOR A PARTICULAR PURPOSE, or that the products will necessarily conform to the illustrations or descriptions. Except as provided below, no warranty or affirmation of fact, expressed or implied, other than as stated in "LIMITED WARRANTY" above is made or authorized by Dayton.

PRODUCT SUITABILITY. Many jurisdictions have codes and regulations governing sales, construction, installation, and/or use of products for certain purposes; which may vary from those in neighboring areas. While Dayton attempts to assure that its products comply with such codes, it cannot guarantee compliance, and cannot be responsible for how the product is installed or used. Before purchase and use of a product, review the product applications, and all applicable national and local codes and regulations, and be sure that the product, installation, and use will comply with them.

Certain aspects of disclaimers are not applicable to consumer products; e.g., (a) some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you; (b) also, some jurisdictions do not allow limitations on how long an implied warranty lasts, consequently the above limitation may not apply to you; and (c) by law, during the period of the Limited Warranty, any implied warranties of merchantability or fitness for a particular purpose applicable to consumer products purchased by consumers, may not be excluded or otherwise disclaimed.

PROMPT DISPOSITION. Dayton will make a good faith effort for prompt correction or other adjustment with respect to any product which proves to be defective within limited warranty. For any product believed to be defective within limited warranty, first write or call dealer from whom product was purchased. Dealer will give additional directions. If unable to resolve satisfactorily, write to Dayton at address below, giving dealer's name, address, date and number of dealer's invoice, and describing the nature of the defect. Title and risk of loss pass to buyer on delivery to common carrier. If product was damaged in transit to you, file claim with carrier.

Manufactured for Dayton Electric Mfg. Co., 5959 W. Howard St., Niles, IL 60714 U.S.A.