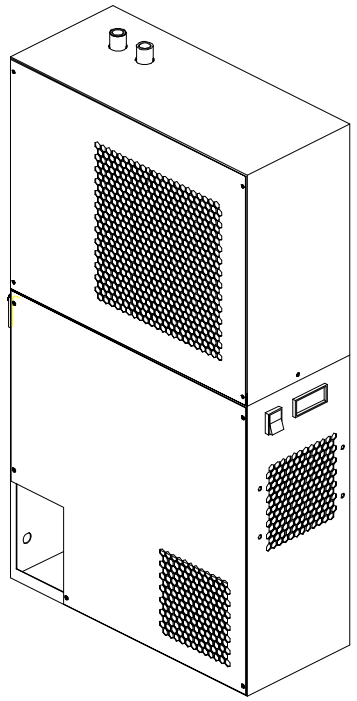


DS15-H–DS100-H

refrigeration dryer (60Hz)

Ingersoll-Rand

DryStar

272716

DATE: 06.11.2002 **ISSUE: 2** **CPN: 85616902**

Index

Safety warnings

Important:

- Keep this manual with the machine throughout its entire service life.
- Carefully read this manual before carrying out any operation on the machine.
- **This machine is designed for PROFESSIONAL USE only. Only use the machine for the purpose for which it is intended. Improper use of the machine absolves the manufacturer from all liability.**

This manual has been compiled to help the final user perform just those operations which do not require removal of the panels.

All other operations which involve the removal of covers from instruments or electrical circuit–breakers using special tools must only be carried out by trained personnel due to the danger of rotating parts or live components.

Each machine is equipped with an electric disconnect device which allows the operator to work on the machine in absolute safety. **This device must always be used to disconnect the mains supply to avoid any risk of danger during maintenance work (electric shocks, scalding, automatic start–up, moving parts and remote control).**

Before servicing the dryer always make sure the compressed air circuit is depressurised.

When requesting technical assistance or ordering spare parts, always quote the model and serial number on the identification plate mounted externally on the unit.

IMPORTANT: data contained in this publication is to be considered as indicative only. The manufacturer reserves the right to modify data without prior notice.

All figures to which the "see Fig." references in this text refer can be found at the end this manual. The language translations for these figures can be found in the Legend (A3–sized page) inserted after all the figures.

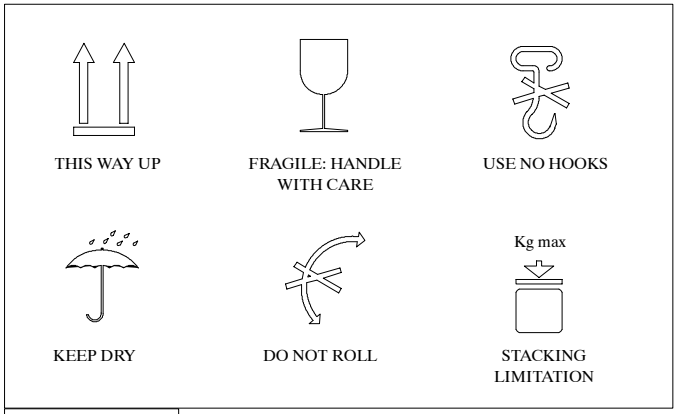
1 Introduction

1.1 Foreword

The ***DS-H*** dryers are designed to guarantee high quality compressed air and minimum maintenance.
Please carefully read this manual to obtain maximum performance from your dryer and ensure its correct installation and start–up in compliance with manufacturer instructions.

1.2 Packaging

The dryer is packaged with a strong cardboard box strapped to a wooden pallet.
Instruction symbols (UNI ISO 780) for the movement, transport and stocking of the product are printed on two sides of the packing.



1.3 Transport

- Keep the unit in an upright position and do not leave it outdoors.
- Use a forklift truck to move the machine.
- Care should be taken to avoid damaging internal components through poor handling during movement, installation or use.
- Unpack the machine as close as possible to the installation site.

1.4 Storage

If stored the packaged units must be kept inside, protected from humidity, direct sunlight and rain.
Moreover, although stacking is permitted the maximum weight must not be more than the value shown on the packaging.

1.5 Inspection

On receipt of the machine, make sure it has incurred no damage during transit.
If any damage is detected promptly contact the haulage company.

2 Installation

2.1 Dryer installation (see Fig. 1)

a) Dryer should be installed indoors; where this is not possible it must however be installed in a clean dry area, with a temperature within the limits 41–115°F (5–46°C), and sheltered from the effects of direct weather (including direct sunlight); do not install the dryer in rooms used for laundry operations.

b) The compressed air inlet temperature must never exceed 200°F (93°C). For different temperatures to those indicated above, consult the manufacturer.

c) For most compressed air applications we recommend following the installation plan (see Fig. 1). This layout ensures optimum compressor, filter and dryer performance and also guarantees excellent air quality whilst minimising operating costs.

d) **Do not obstruct the dryer air grilles.**

e) Allow sufficient gap around the unit to facilitate maintenance and ensure unimpeded air discharge from the condenser.

f) Avoid recirculation of hot condenser air back into the condenser air inlet.

g) If the system is prone to instantaneous pressure surges which exceed the dryer's rated capacity, mount a suitably sized receiver near the overpressure source. For more precise information, contact the manufacturer or distributor.

h) Installing a by–pass line with shut–off valves (supplied as option) is suggested to permit maintenance or calibration without interrupting the compressed air flow to the user.
Pay attention when you by–pass the aftercooler section, as this will cause hot air to flow through the compressed air network.

i) Correctly connect the dryer to the air inlet and outlet connections. If the compressed air network is prone to vibrations, use hoses to make the connections.
If the mains is subject to high levels of pulsation, ensure that the connection is equipped with pulsation dampers.

j) Do not connect condensate drains common to other pressurised drain lines in a closed circuit. Make sure the outflow from the condensate drains is unimpeded.
Connect the condensate piping in such a way to ensure that sound levels are kept to a minimum during drainage.
Ensure that all condensate is disposed of in a responsible manner, in accordance with local norms concerning environmental protection.

k) The ambient air around the dryer and compressor must not contain solid or gaseous contaminants. All compressed and condensed gases can generate acids or chemical products which may damage the compressor or components inside the dryer.
Take particular care with sulphur, ammonia, chlorine and installations in marine environments. For further advice or assistance consult the manufacturer.

2.2 Electrical connection (see Fig. 5 / Fig. 10)

The dryer is supplied with a 3 x AWG16 power cable complete with plug.

Install an overcurrent and earth leakage circuit breaker upstream from the plant (IDn = 0.03A) with a 0.12 inch (3 mm) gap between contacts when open (refer also to local laws).

2.3 Condensate drain

The dryer is supplied either with a float drain (see Fig. 9), a timed drain or an electronic level sensing drain.
For timed and electronic drains: refer to separate manual supplied with the dryer for specific details concerning the condensate drain.

3 Start–up and operation

3.1 Preliminary checks

Before starting up the dryer, make sure that:

a) the air inlet valves are closed and there is no air flow through the dryer.

b) The mains power supply is commensurate with the dryer voltage.

c) The dryer is installed in compliance with the installation instructions given in Chapter 2.

3.2 Starting the dryer

a) Use the switch to start the dryer.

b) Always start up the dryer before activating the air compressor.

c) **Wait about 5 minutes until the dryer is running at the correct operating temperatures and pressures.**

d) **Slowly open the air inlet valve to pressurise the dryer.**

e) **Slowly open the air outlet valve. The dryer is now operating (drying).**

f) Always leave the dryer running while the air compressor is operating.

g) After stopping the dryer wait at least 3 minutes before starting it again.

3.3 Stopping the dryer

a) Use the switch to stop the dryer.

b) Stop the dryer 2 minutes after shutting down the air compressor or interrupting the air flow to the dryer.

⚠ Avoid allowing compressed air to enter the dryer when the dryer is switched off or when it is in an alarm situation which stops the refrigeration compressor.

3.4 Operation

- The dryer operates automatically. It is factory set for a dew point of 50°F (10°C) and therefore requires no further calibration.
- Do not exceed the machine's design limits, by–pass excess air flow and check the unit model and/or installation.
- For maximum performance from your dryer, follow the maintenance schedule described in Chapter 4.
- The sound pressure level recorded for these dryers 40 inch (at 1 metre) from the machine in free field conditions is less then 50 dB(A) (**models DS15-H**), 55 dB(A) (**models DS25-H–DS100-H**)

Fig. 6 shows the Dryer's refrigeration and air circuits.

N.B.: In the event of aftercooler fan malfunction leading to an increase in the temperature within the filter, to above 149°F (65°C), check the integrity of the filter's element and drain and substitute these components if necessary.

4 Maintenance

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

SAFETY DEVICES
SK overload protector
HP high pressure switch (**installed on models DS50-H–DS100-H**)

COMPRESSOR TYPE
HERMETIC, PISTON (single phase)

N.B.: Always use original spares supplied by the manufacturer.
Failure to do so renders the manufacturer not liable for incorrect unit operation.

4.1 Preventive maintenance

For optimum performance from your dryer follow the periodic maintenance schedule described below.

WEEKLY	**CONDENATE DRAIN** Verify that the condensate drain is draining correctly.
MONTHLY	**COMPRESSOR** Make sure the compressor head temperature is below 200°F (93°C) when running. If this is not the case consult Chapter 7.
EVERY 4 MONTHS	**REFRIGERANT CONDENSER AND AFTERCOOLER** Remove any dust from the condenser/aftercooler fins. **COMPRESSOR** Make sure compressor power consumption complies with data plate specifications. **AFTERCOOLER FAN MOTOR** • Check that the fan rotates freely without any abnormal noise. • Make sure fan power consumption complies with the specifications on the fan's data plate.
YEARLY	**AFTERCOOLER** If necessary (coil blocked) remove the fan and clean the coil in the opposite direction to the air flow using a high pressure water jet (this operation must be performed by a technician to avoid damage). **FILTER ELEMENT** Replace the filter element (see para. 4.2) **CONDENSATE DRAIN** Completely disassemble the drain and clean all its components (see Fig. 9 or separate manual, according to installed drain type).

4.2 Substituting an exhausted element (Fig. 9)

N.B.: Don't touch the element sock with your bare hands; use gloves.
a) Shut off or by–pass air supply to dryer.
b) Depressurise filter using manual or automatic drain valve (18). Leave valve open.
c) Unscrew (anticlockwise) filter body from head.
d) Unscrew and remove element (17).
e) Clean inside of filter if necessary.

f) Insert new element (17) together with new O–ring. Tighten element.
g) Tightly screw (clockwise) filter body onto head.
h) Verify that all components are properly tightened.
i) Slowly open air inlet shut–off valve upstream of dryer.
j) Allow air to flow for a few minutes and then close drain valve (18).
k) Open air outlet shut–off valve downstream of dryer.

4.3 Disassembling the unit

The machine has been designed and constructed to guarantee continuous operation. The long service life of some components such as the fan and compressor depends on good maintenance.
The unit must only be disassembled by a refrigerant specialist.
Refrigerant liquid and lubricating oil inside the refrigeration circuit must be recovered in compliance with current norms in the country where the machine is installed.

RECYCLING DISASSEMBLY	
frame and panels	steel/epoxy resin polyester
heat exchanger (cooler)	copper
pipes	copper
drainage system	polyamide
heat exchanger insulation	EPS (polystyrene sintered)
pipe insulation	gum synthetic
compressor	steel/copper/aluminium/oil
condensator	steel/copper/aluminium
refrigerant	R134a
valve	brass
electrical cable	copper/PVC

4.4 Refrigerant leaks in the refrigeration circuit

FOREWORD

The unit is delivered in perfect working order, already charged as specified in Fig. 5. Refrigerant leaks may be identified by tripping of the compressor overload protector (SK).
IF A LEAK IS DETECTED IN THE REFRIGERANT CIRCUIT SEEK TECHNICAL ASSISTANCE.

4.5 Refrigerant charging (see Fig. 5)

THIS OPERATION MUST ONLY BE PERFORMED BY A REFRIGERANT SPECIALIST.
WHEN REPAIRING THE REFRIGERANT CIRCUIT, COLLECT ALL THE REFRIGERANT IN A CONTAINER AND DISPOSE OF IT IN THE APPROPRIATE MANNER.

Characteristics of refrigerant R134a

In normal temperature and pressure conditions the above refrigerant is a colourless, class A1/A1 gas with TVL value of 1000 ppm (ASHRAE classification).
If a refrigerant leak occurs thoroughly air the room before commencing work.

5 Calibration

The dryer is supplied factory set with the values shown in Fig. 7 and therefore requires no further calibration.

6 Spare parts list (see. Fig. 8)

This list contains the principal spare parts. When ordering spare parts always quote the quantity, part CPN and machine serial number.

7 Trouble shooting

The following diagram lists the various problems which may occur during the dryer's service life. In the case of serious difficulties however, contact a refrigerant specialist.

NOTE: Always by–pass the dryer when it is out of service.

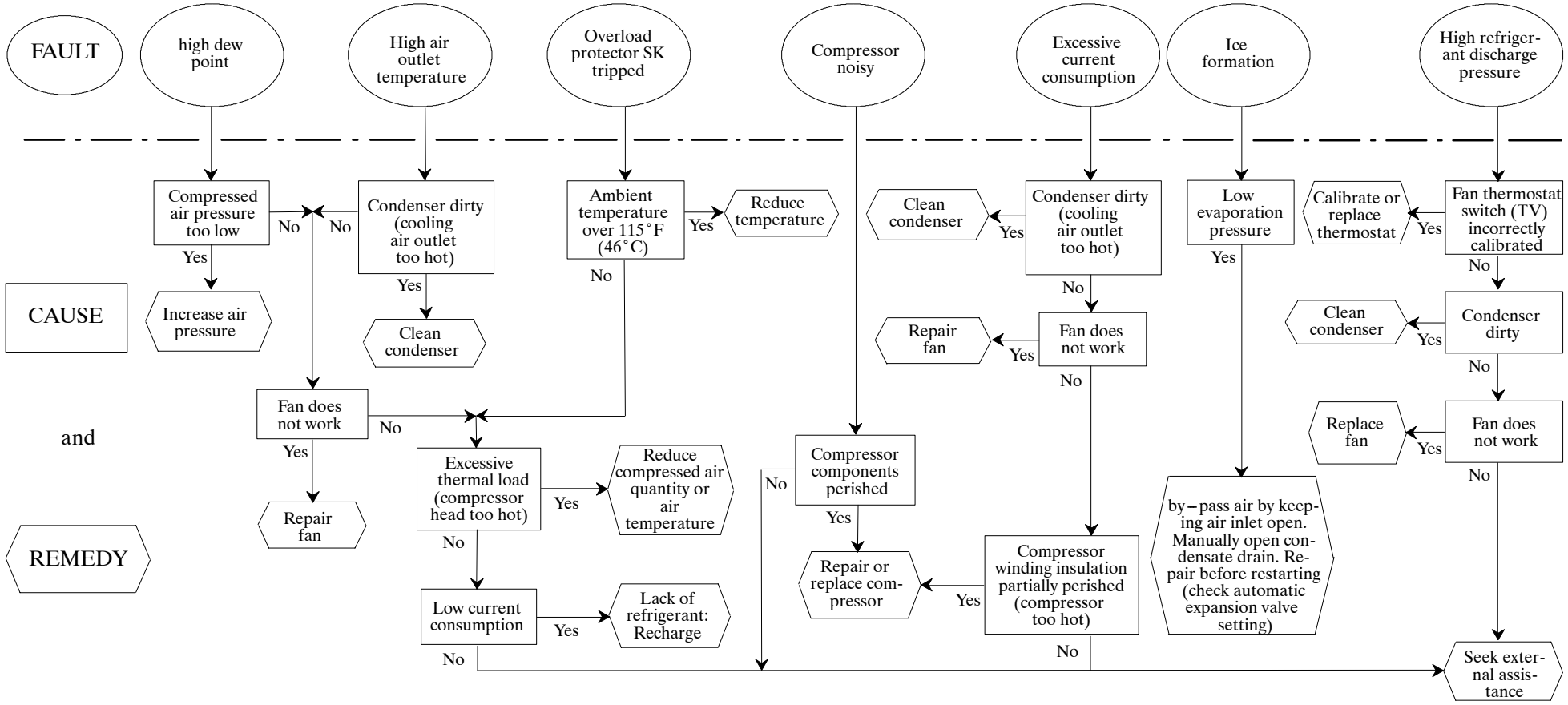


Fig. 1 Installation

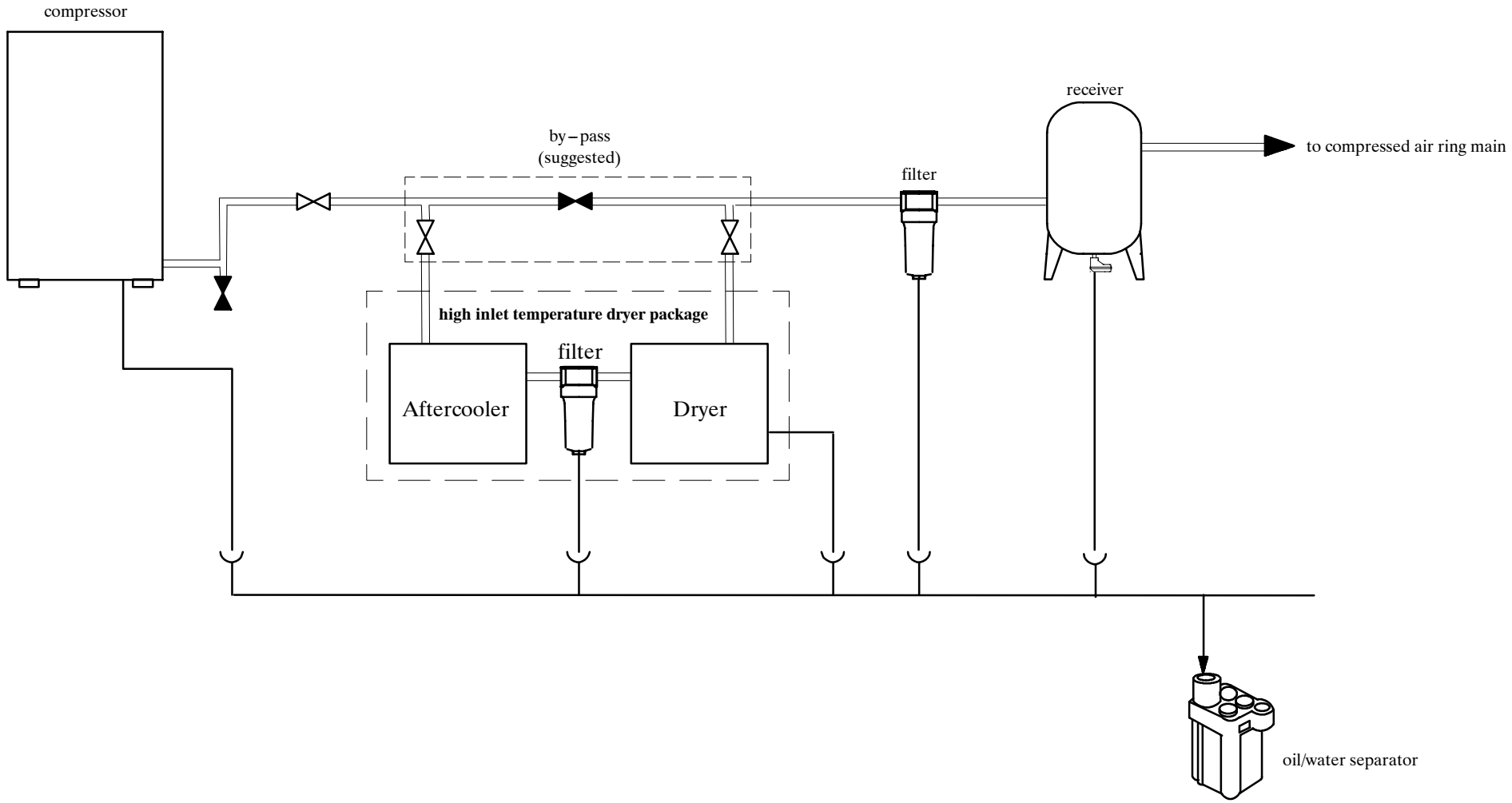


Fig. 2 Safety and description labels on dryer

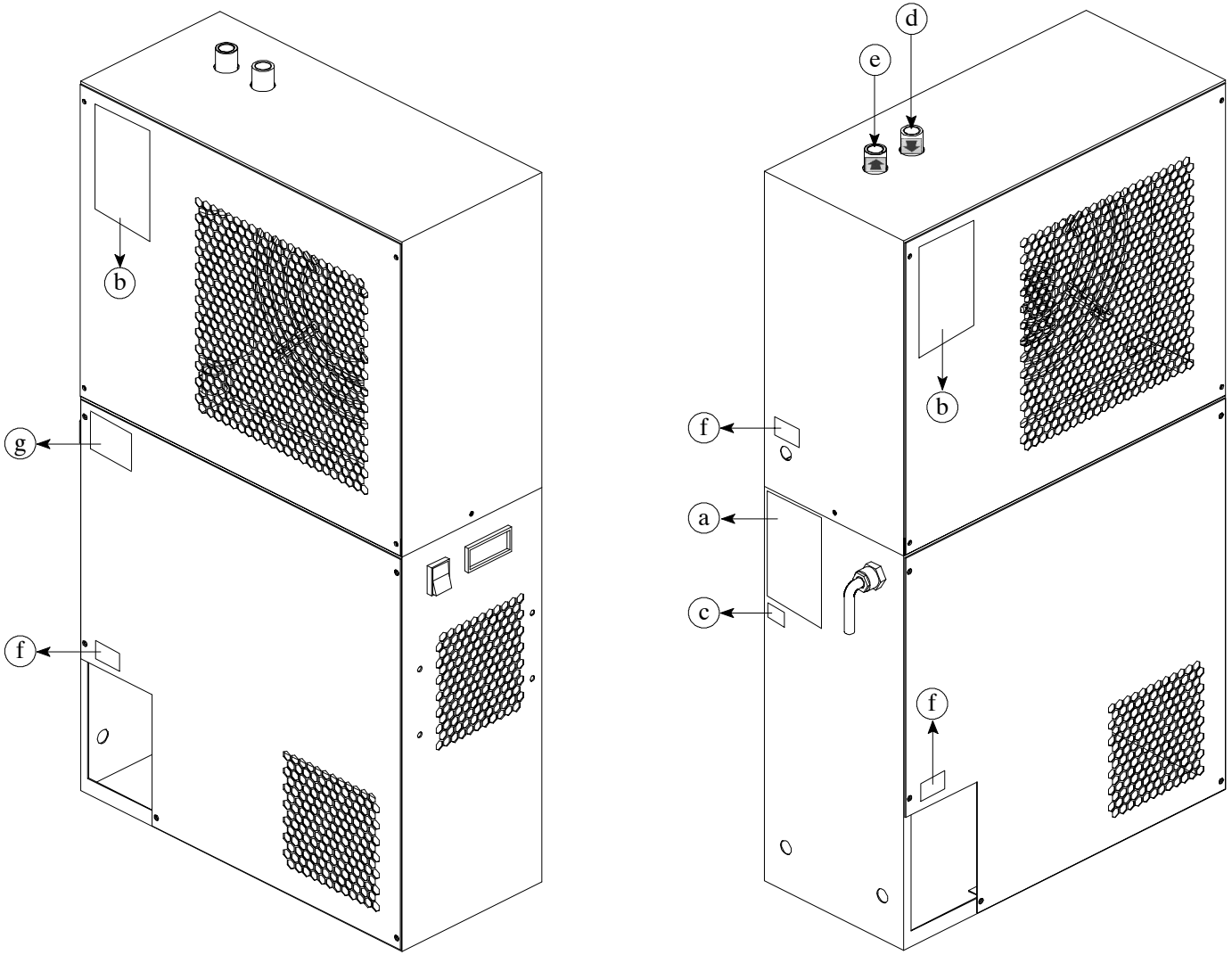
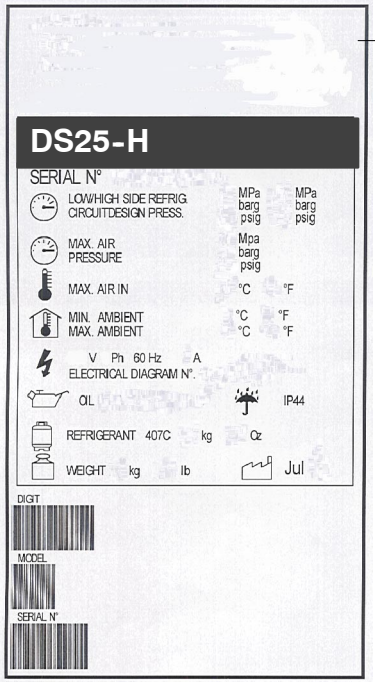


Fig. 3 Safety and description labels on dryer



a

- Model
- Serial No.
- Low/High side refrigeration circuit design pressure
- Max air pressure
- Max air inlet
- Min. ambient
  Max ambient
- Power supply
  Electrical diagram no.
- Oil
- Refrigerant
- Weight

REMEMBER

TO CHANGE YOUR FILTER ELEMENT

element installed on:

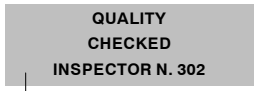
We strongly recommend filter elements be changed once a year or after 8000 working hours, whichever comes first.

Only use genuine Ingersoll Rand elements.

Refer to User Manual for correct replacement element.

b

REMEMBER
TO CHANGE YOUR
FILTER ELEMENT
element installed on:
We strongly recommend filter elements be changed once a year or after 8000 working hours, whichever comes first.
Only use genuine Ingersoll Rand elements.
Refer to User Manual for correct replacement element.

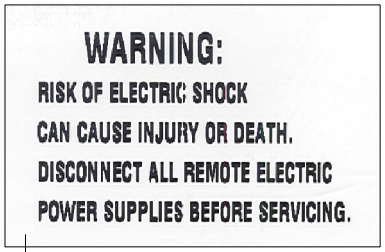


c QUALITY CHECKED
INSPECTOR N. 302

d Air inlet

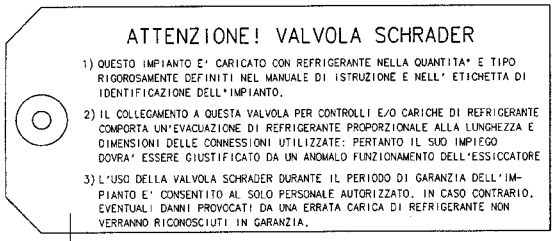
e Air outlet

f Condensate drain connection



g WARNING:
Risk of electric shock
can cause injury or death.
Disconnect all remote electric
power supplies before servicing.

Internal dryer



h

ATTENTION: SCHRADER VALVE

1 This unit is equipped with refrigerant as for quantity and kind clearly shown in operating manual and with identification label.
2 Any ordinary test and / or refrigerant recharge by means of connections can take place only after refrigerant evacuation. The evacuation must be proportional to dimensions and length of the connections used. The use of the valve can be justified only when the dryer is not in working order.
3 During the unit guarantee period, the Schrader valve can be used by authorized staff only, otherwise any damage caused by a wrong refrigerant recharge will not be under warranty.

Fig. 4 Overall dimensions

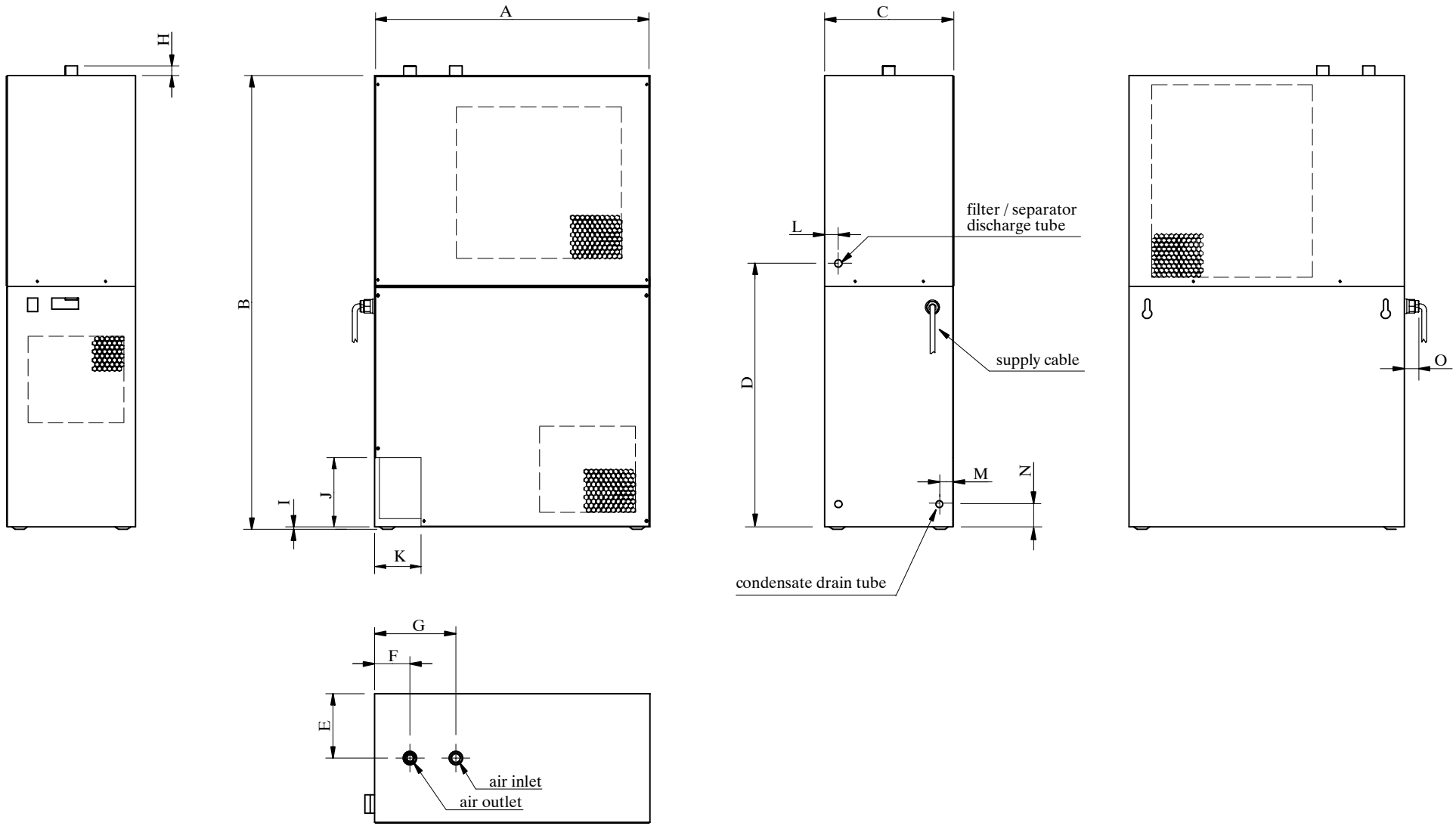


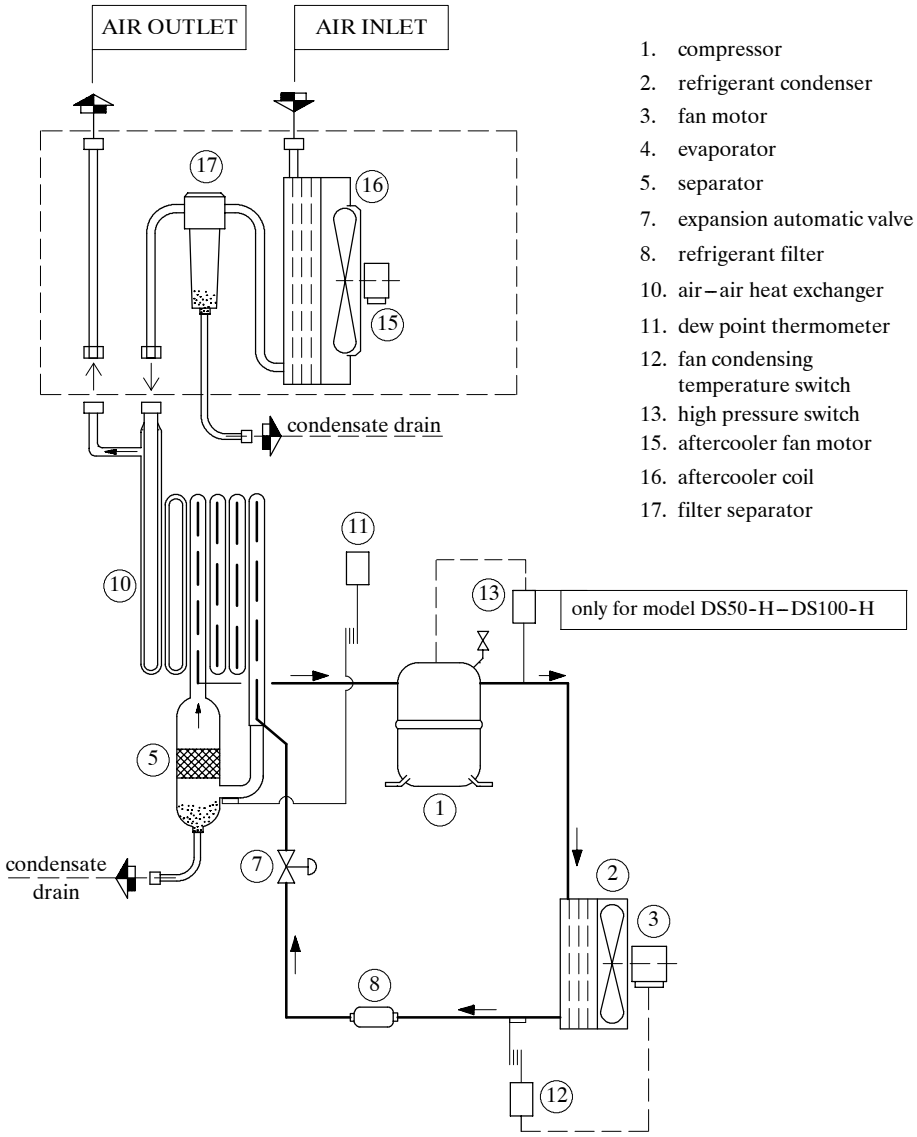
Fig. 4 Overall dimensions

model	dimensions – inches (mm)													
	A	B	C	D	E	F	G	H	I	J	K	L / M	N	O
DS15-H	17.7 (450)	32.1 (815)	7.6 (197)	19.7 (500)	2.9 (73)	3.2 (82)	5.2 (133)	0.9 (22)	0.2 (5)	6.0 (152)	4.0 (102)	1.2 (30)	2.0 (50)	0.9 (22)
DS25-H	23.6 (600)	39.0 (990)	11.1 (282)	22.6 (575)	5.5 (140)	3.0 (77)	7.0 (177)							
DS35-H														
DS50-H	27.6 (700)	47.7 (1212)	13.9 (352)	25.6 (650)		3.3 (83.5)	7.2 (183.5)							
DS75-H														
DS100-H														

Fig. 5 Technical data

model	weight		refrigerant / charge R134a		F.L.A. [A]	air connections	max. air inlet temp.	ambient temperature		max air pressure
	(kg)	(lb)	(gr)	(oz)	115V 1~ 60Hz			min.	max.	
DS15-H	25	55	130	4.59	3.7	3/8” NPT-F	200°F 93°C	41°F 5°C	115°F 46°C	232 PSI 16 bar
DS25-H	42	93	195	6.88	5.6	1/2” NPT-F				
DS35-H	43	95	200	7.05	7.0					
DS50-H	61	134	240	8.46	8.8	3/4” NPT-F				
DS75-H	70	154	320	11.29	11.0					
DS100-H	73	161			13.6					

Fig. 6 Refrigerant diagram



1. compressor
2. refrigerant condenser
3. fan motor
4. evaporator
5. separator
7. expansion automatic valve
8. refrigerant filter
10. air–air heat exchanger
11. dew point thermometer
12. fan condensing temperature switch
13. high pressure switch
15. aftercooler fan motor
16. aftercooler coil
17. filter separator

Fig. 7 Calibration

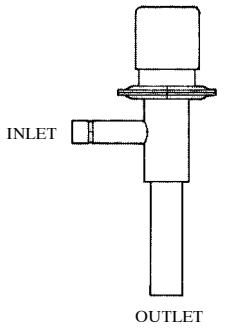
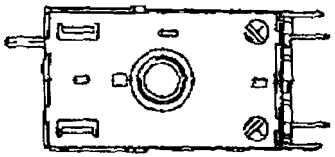
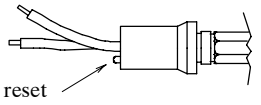
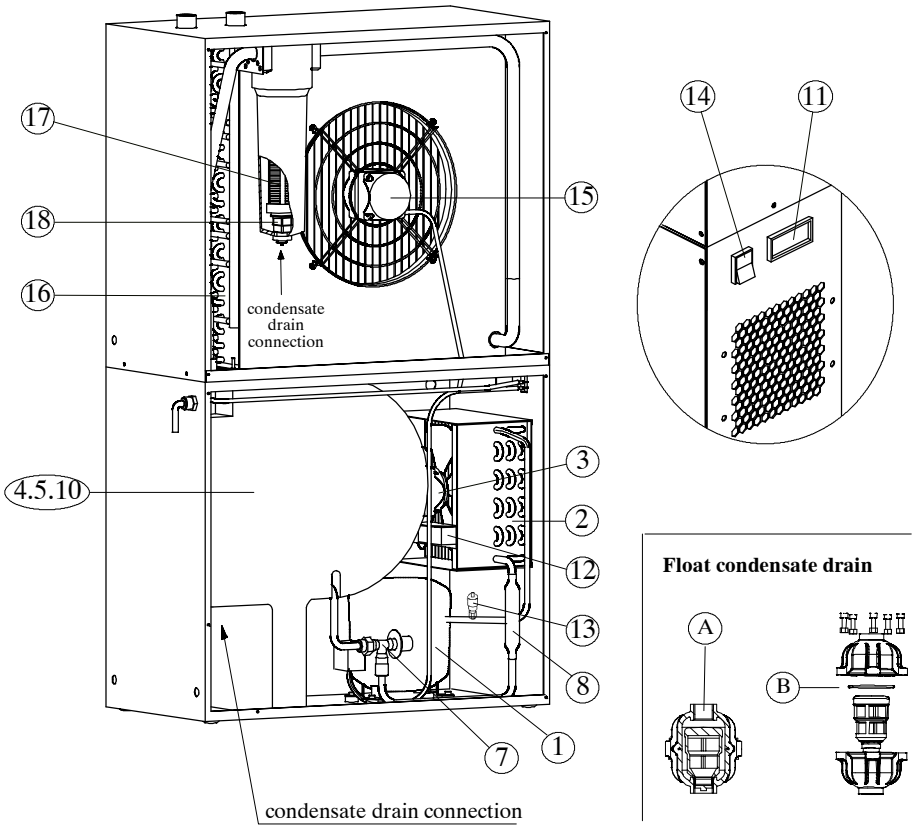
MODEL	SETTING	COMPONENT
DS15-H–DS100-H	31.9 PSI (+0.15, –0) (2.2 bar) (+0.1, –0)	(7) Automatic expansion valve 
DS15-H–DS100-H	START: 113°F (45°C) (STOP: 104°F) (40°C)	(12) Fan condensing temperature switch (TV) 
DS50-H–DS100-H	STOP: 406 PSI (28 bar) (START: 319 PSI (22 bar)	(13) High pressure switch (HP) 

Fig. 8 Spare Parts List (see Fig. 9)

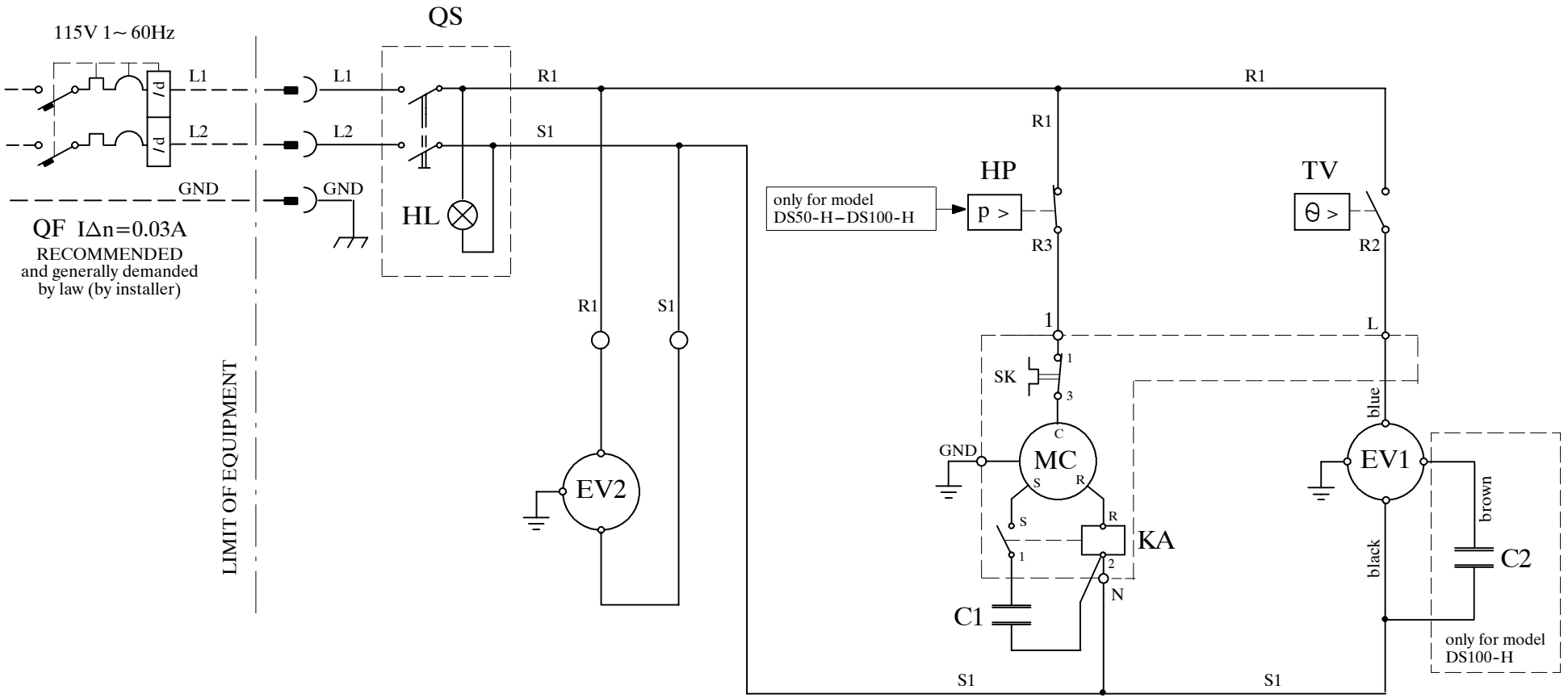
Part	Codes					
	DS15-H	DS25-H	DS35-H	DS50-H	DS75-H	DS100-H
1.	89328223	89328231	89328249	89328256	89327704	85611879
2.	89327712	89327720		89327738	89327746	89320691
3.	89327811	89327829+89327761		89327837+ 89327787	89327837+ 89327803	85611887
4. 5. 10.	85613016	85613024		85613032	85613040	85613057
7.	89327902					89321038
8.	89327910					
11.	89236145					
12.	89327928					
13.	–			38333209		
14.	38333217					
15.	85616829	85616837				
16.	85616845	85616852		85616860		
17.	85616878	85616886			85616894	
18.	89327944					
CONDENSATE DRAIN						
A.	89327936					
B.	89327951					

Fig. 9 Parts



1. compressor
2. refrigerant condenser
3. fan motor
4.5.10. evaporator/separator/air – air heat exchanger
7. expansion automatic valve
8. refrigerant filter
11. dew point thermometer
12. fan condensing temperature switch
13. high pressure switch
14. main switch with on lamp
15. aftercooler fan motor
16. aftercooler coil
17. filter separator
18. drain valve
A. condensate drain (complete)
B. O – ring

Fig. 10 Electrical diagram



English -- Legend

LABELS

a
- Model
- Serial No.
- Low/High side refrigeration circuit design pressure
- Max air pressure
- Max air inlet
- Min. ambient
  Max ambient
- Power supply
  Electrical diagram no.
- Oil
- Refrigerant
- Weight

b. REMEMBER
TO CHANGE YOUR FILTER ELEMENT
element installed on:
We strongly recommend filter elements be changed once a year or after 8000 working hours, whichever comes first.

Only use genuine Ingersoll Rand elements.

Refer to User Manual for correct replacement element.

c QUALITY CHECKED INSPECTOR N. 302

d. Air inlet

e. Air outlet

f. Condensate drain connection

g. WARNING:
Risk of electric shock can cause injury or death.
Disconnect all remote electric power supplies before servicing.

Internal Dryer

h. **ATTENTION: SCHRADER VALVE**

1 This unit is equipped with refrigerant as for quantity and kind clearly shown in operating manual and with identification label.

2 Any ordinary test and / or refrigerant recharge by means of connections can take place only after refrigerant evacuation. The evacuation must be proportional to dimensions and length of the connections used. The use of the valve can be justified only when the dryer is not in working order.

3 During the unit guarantee period, the Schrader valve can be used by authorized staff only, otherwise any damage caused by a wrong refrigerant recharge will not be under warranty.

DRAWINGS

1.	MC	compressor
2.		refrigerant condenser
3.	EV1	fan motor
4.		evaporator
5.		separator
7.		expansion automatic valve
8.		refrigerant filter
10.		air – air heat exchanger
11.		dew point thermometer
12.	TV	fan condensing temperature switch
13	HP	high pressure switch
14.	QS – HL	main switch with on lamp (green)
15.	EV2	aftercooler fan motor
16.		aftercooler coil
17.		filter separator
18		drain valve
	SK	overload protector
	KA	starting relay
	C1	compressor starting capacitor
	C2	fan motor run capacitor
	QF	residual current circuit – breaker (by installer)
A.		condensate drain (complete)
B.		O – ring