

HVAC Air / Refrigerant Diagnostic Quick Sheet



HVAC SCHOOL
Air Conditioning & Refrigeration

www.HVACSchool.com

Fixed Metering	Suction Pressure	Head Pressure	Super Heat	Subcool	Comp. Amps	ΔT
Low Charge	↓	↓	↑	↓	↓	↓
Over Charge	↑	↑	↓	↑	↑	↑
Low Indoor Airflow/Low R/R Temp	↓	↑	↓	↓	↓	↑
Dirty Condenser	↓	↑	↓	↓	↑	↓
Liquid Line Restriction*	↓	↑	↑	↑	↓	↓
Overized Piston	↑	↑	↓	↓	↓	None
High R/R Temp	↑	↑	↑	↓	↑	↓

TXV System	Suction Pressure	Head Pressure	Super Heat	Subcool	Comp. Amps	ΔT
Liquid Line Restriction*	↓	↑	↑	↑	↓	↓
Overfeed / Loose Bulb Bulb Insulated	↑	↓	↓	↓	↓	↓
Low Charge - Slightly	None	↓	None	↓	↓	None
Over Charge - Slightly	None	↑	None	↑	↑	None
Low Indoor Airflow/Low R/R Temp	↓	↑	↓	↓	↓	↑

*Restriction often in head pressure causes all the head losses of the restriction. Super-heat often greatly increased if a restriction is present. Restriction may also high head with short cycling, or in systems with only short condenser or air restricted have been overcharged in addition to the restriction. In general, condenser and in the liquid line and air leak in the head after sufficient oil time.

WB	Enthalpy
40	15.20
41	15.35
42	15.50
43	15.65
44	15.80
45	15.95
46	16.10
47	16.25
48	16.40
49	16.55
50	16.70
51	16.85
52	17.00
53	17.15
54	17.30
55	17.45
56	17.60
57	17.75
58	17.90
59	18.05
60	18.20
61	18.35
62	18.50
63	18.65
64	18.80
65	18.95
66	19.10
67	19.25
68	19.40
69	19.55
70	19.70
71	19.85
72	20.00
73	20.15
74	20.30
75	20.45
76	20.60
77	20.75
78	20.90
79	21.05

Electric Heat

$$CFM = \frac{\text{Volts} \times \text{Amps} \times 3.412}{\Delta T \times 1.08}$$

OR

Furnace

$$CFM = \frac{\text{Gas FL} \times \text{BTU/Gal} \times \text{Measured} \Delta T}{\Delta T \times 1.08}$$

400 CFM per ton of cooling (Nominal)
12,000 BTU per ton of cooling
BTU Sensible Output = CFM x TD x 1.08
1 Watt = 3.413 BTU/hr
1 Kilowatt = 3,413 BTU/hr
746 Watts = 1 Horsepower

Checking a Gas Meter

$$\text{Input} = \frac{3600 \times \text{Smallest dial size}}{\text{Gas FL} \times \# \text{ of seconds for one revolution}}$$

Testing Capacitors Under Load

$$\frac{2652 \times (\text{Amperes of the start winding})}{\# \text{ (Volts across the capacitor)}}$$

Total Heat = (H1-H2) x 4.5 x CFM
H1 = Return air wet bulb (converted to enthalpy)
H2 = Supply air wet bulb (converted to enthalpy)

Estimated Evaporator TD

AC at 400 CFM/Ton = 20°
Refrigeration Walk in 10°
Refrigeration Reach in 20°

Gas Appliance Output Pressure

Natural Gas 5.5" w.c. / LP = 11" w.c.

CTDA

Estimated Condensing Temp Over Ambient

4-9 SEER = 30°
10-12 SEER = 20°
13-15 SEER = 20°
16+ SEER = 10°

Refrigeration Air Conditioning Troubleshooting Guide

American Council on Education



Refrigeration Air Conditioning Troubleshooting Guide:

Air conditioning and Refrigeration Repair Made Easy Hooman Gohari, 2009-10-19 This comprehensive book has been developed to quickly train an average person for the vast commercial and residential refrigeration and air conditioning market within a short period of time. It provides all the technical knowledge needed to start a successful refrigeration and air conditioning business anywhere in the world.

Air Conditioning Maintenance and Troubleshooting: A Comprehensive Guide to Efficient and Safe HVAC Care Charles Nehme, The importance of air conditioning in our daily lives cannot be overstated. From the comfort of our homes to the productivity of our workplaces, air conditioning systems play a critical role in maintaining an optimal environment. However, like all mechanical systems, air conditioners require regular maintenance and occasional troubleshooting to function efficiently and prolong their lifespan. This book, *Air Conditioning Maintenance and Troubleshooting Guide*, aims to serve as a comprehensive resource for homeowners, technicians, and HVAC professionals alike. Whether you are a novice looking to understand the basics of your home air conditioning system or a seasoned technician seeking advanced troubleshooting tips, this guide is designed to meet your needs.

Why This Guide: Air conditioning systems are complex and involve various components, including compressors, evaporators, condensers, and various electrical parts. Proper maintenance can prevent many common issues and save on costly repairs. This guide covers the essential aspects of air conditioning maintenance, providing step-by-step instructions and detailed explanations to ensure your system runs smoothly.

Key Features:

- Comprehensive Maintenance Tips:** Learn about the routine tasks necessary to keep your air conditioning system in top condition, from cleaning filters to checking refrigerant levels.
- Troubleshooting Techniques:** Diagnose and resolve common problems with clear, practical solutions. This section includes troubleshooting flowcharts and checklists to simplify the process.
- Safety Precautions:** Understand the safety measures you need to take while working with air conditioning systems to prevent accidents and injuries.
- Technical Insights:** Gain deeper knowledge of the components and workings of different types of air conditioning systems, including central air conditioners, split systems, and window units.
- Environmental Considerations:** Learn about the environmental impact of air conditioning systems and how to adopt practices that are both efficient and eco-friendly.

Who Should Read This Book:

- Homeowners:** Equip yourself with the knowledge to maintain your home air conditioning system, identify problems early, and possibly avoid expensive service calls.
- HVAC Students:** Use this guide as a supplementary resource to enhance your understanding of air conditioning systems and prepare for a career in HVAC maintenance and repair.
- Professional Technicians:** Update your skills with the latest maintenance and troubleshooting techniques and use this book as a quick reference on the job.

Acknowledgments: This book would not have been possible without the valuable input and feedback from HVAC professionals and industry experts who have generously shared their knowledge and experience. I am also grateful to the publishers and technical reviewers whose efforts have ensured the accuracy and clarity of this guide.

Conclusion: Maintaining and troubleshooting air conditioning systems can seem

daunting but with the right knowledge and tools it becomes manageable and rewarding This guide is intended to empower you with the confidence and skills necessary to keep your air conditioning system running efficiently and reliably Thank you for choosing this guide I hope it serves as a valuable resource and enhances your understanding and enjoyment of air conditioning maintenance and troubleshooting

Chilton's Auto Troubleshooting Guide Chilton Book Company,1978
 Spine title Chilton auto tune up and troubleshooting On t p Major systems of import cars domestic cars and light trucks test equipment and hook ups Chilton's Auto Troubleshooting Guide Chilton Automotive Books,Chilton Automotive Editorial Staff,1982-10 Air Conditioning and Refrigeration Troubleshooting Handbook Billy C. Langley,1980 A complete practical overview of the servicing and troubleshooting of cooling equipment Provides detailed explanations of the purpose of each cooling system component Covers the common problems encountered during troubleshooting Troubleshooting charts provide readers with practical information and are a handy reference Numerous wiring diagrams illustrate the book Suggested procedures for repairs are listed

The 1980 Guide to the Evaluation of Educational Experiences in the Armed Services: Army American Council on Education,1980 **The 1984 Guide to the Evaluation of Educational Experiences in the Armed Services** American Council on Education,1984 **Occupational Outlook Handbook** ,2008

Occupational Outlook Handbook 2010-2011 (Paperback) Labor Dept. (U.S.), Bureau of Labor Statistics,2010 An important resource for employers career counselors and job seekers this handbook contains current information on today s occupations and future hiring trends and features detailed descriptions of more than 250 occupations Find out what occupations entail their working conditions the training and education needed for these positions their earnings and their advancement potential Also includes summary information on 116 additional occupations *Guide to the Evaluation of Educational Experiences in the Armed Services* American Council on Education,1978 **Popular Mechanics** ,1967-08 Popular Mechanics inspires instructs and influences readers to help them master the modern world Whether it s practical DIY home improvement tips gadgets and digital technology information on the newest cars or the latest breakthroughs in science PM is the ultimate guide to our high tech lifestyle

Occupational Outlook Handbook, 2002-2003 United States. Department of Labor,2002 This book is an up to date resource for career information giving details on all major jobs in the United States *Resources in Education* ,1996-04 **Bulletin of the United States Bureau of Labor Statistics** ,1992 **Occupational Outlook Handbook, 2002-03** U. S. Department of Labor, Bureau of Labor Statistics Staff,United States. Bureau of Labor Statistics,2002-04 *Guide for the Preparation of the Directorate, Engineering and Housing Acquisition Package Including Performance Work Statements* ,1985 **Audel Air Conditioning Home and Commercial** Rex Miller,Mark Richard Miller,Edwin P. Anderson,2004-10-28 This guide will keep you cool Like its earlier editions this fully updated guidebook is packed with practical information on installing servicing maintaining and trouble shooting air conditioning systems Whether you re an AC professional an independent repair technician or a cost conscious homeowner

everything you need is here Clearly organized and loaded with diagrams and illustrations it s a vital addition to your toolbox Find concise accurate information on installing and maintaining both residential and commercial systems Understand the physics of air conditioning and filtration Make accurate temperature measurements using various methods and devices Work with room air conditioners water cooling systems and auto air conditioning Learn about refrigerants compressors condensers evaporators and AC motors Service troubleshoot and repair both old and new AC units **Occupational outlook**

handbook, 2010-11 (Paperback) ,1990 *Area Wage Survey* ,1996 **HVAC Troubleshooting Guide** Rex Miller,2009-02-10 A Practical On the Job HVAC Guide Applicable to residential commercial and industrial jobs this essential handbook puts a wealth of real world information at your fingertips HVAC Troubleshooting Guide shows you how to read interpret and prepare schedules mechanical plans and electrical schematics This handy resource will aid you in your everyday tasks and keep you up to date with the latest facts figures and devices The book includes numerous illustrations tables and charts troubleshooting tips safety precautions resource directories and a glossary of terms HVAC Troubleshooting Guide helps you Identify and safely use tools and equipment both new and old Use heat pumps and hot air furnaces Calculate ventilation requirements Work with refrigeration equipment and the new refrigerants Utilize control devices including solenoids and relays Operate select and repair electric motors Work with condensers compressors and evaporators Monitor the flow of refrigerant with valves tubing and filters Comply with the Section 608 refrigerant recycling rule Program thermostats Insulate with batts sheet tubing covers and foam Work with solid state controls Understand electrical and electronic symbols used in schematics

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