

# Always guarantee a winning hand ...

Five in One

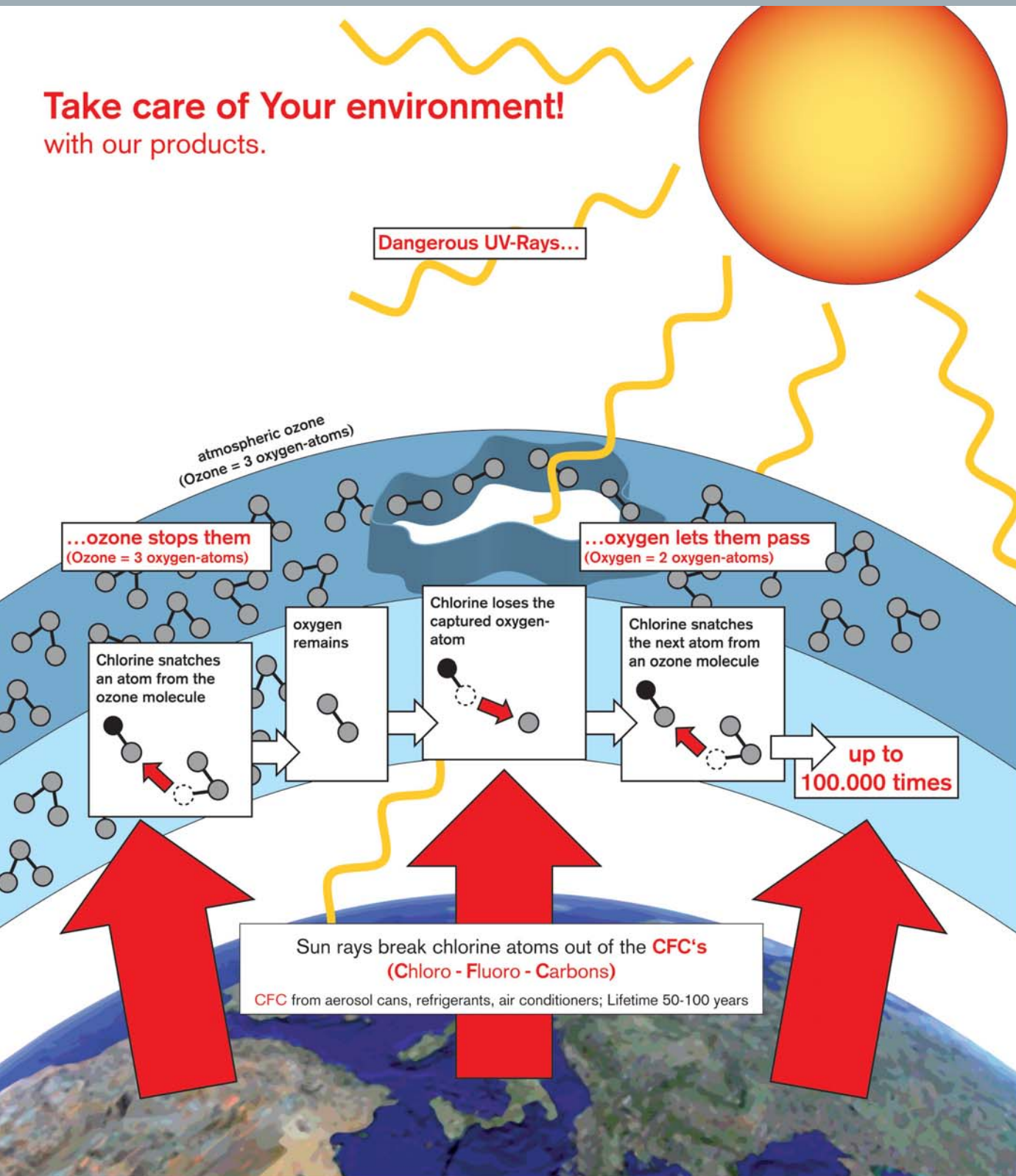


Turn page  
to see how ...

# 15

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AN SPX BRAND

**Take care of Your environment!**  
with our products.



**Danger for man and nature!**

# Play with 5 Aces!



15

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# LEAK DETECTION



# 15

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PROMAX AUTO







## ATP ZX-1A

### Heated Pentode™ Refrigerant Leak Detector



- Heated Pentode™ Sensor technology
- Refrigerant specific detection
- Elimination of false alarms
- Unaffected by rapid temperature change
- Sensor cannot be "poisoned" by excessive refrigerant
- Detects ALL halogenated refrigerants, including R410A
- Sensitivity less than 3 gr/yr
- True mechanical pump provides instant response and clearing
- Tri-color visual leak size indication
- Tactile keypad controls
- Adjustable sensitivity & one touch reset
- Mute feature silences audible alarm
- Sensor status indication
- Battery self test
- 40 cm (16") flexible probe
- Hard carrying case and battery charger included
- Certified to SAE J1627 / E-35422 / EN 14624
- CE approved
- 2 year warranty

Replacement Parts (supplied with product)	Part Number
Heated Pentode™ Sensor	TIF ZX-2
230 V 50 Hz Battery Charger	TIF ZX-3E
Nickel-Metal Hydride (NiMH) Battery Pack	TIF ZX-20
Flexible Probe (includes Filter and Tip)	TIF ZX-10
Filter	TIF ZX-15
Hard Carrying Case	TIF ZX-25

Optional Accessories	Part Number
Remote Battery Charging Base	TIF ZX-6
12 V DC Battery Charger (cigarette lighter style)	TIF ZX-11
Filter and Tip	TIF ZX-14

Specifications	
Ultimate Sensitivity	< 3 gr/yr (0.1 oz/yr) for all halogenated refrigerants
Power Supply	Nickel-Metal Hydride, (Ni-MH) Rechargeable Battery Pack
Battery Life	6 to 8 hours
Sensor Life	100 - 150 hours
Operating Temp	-20° to 50° C



## TIF RX-1A TIF XP-1A Refrigerant Leak Detector

- Microprocessor controlled circuit with Advanced Digital Signal Processing, monitors the sensing tip up to 2000 times per second
- Detects all halogenated refrigerants
- Variable frequency audible alarm 40 cm (14") Flexible stainless probe with Teflon™ liner
- Rubber cushion grip
- Constant power indication
- Power supply: 3 V DC, two "C" cell alkaline batteries (included)
- Sensing tip life: approx. 20 hours (two tips included)
- Operating temp: -20° to 52° C
- Blow molded carrying case included, optional holster
- Certified to SAE J1627
- UL Classified & CE approved
- 2 years warranty

Replacement Parts (supplied with product)	Part Number
Hard Carrying Case	TIF XP-4A
Cover for battery compartment	TIF XP-5A

Optional Accessories	Part Number
Maintenance Kit (3 Tips with protectors)	TIF XP-2

Specifications	TIF RX-1A	TIF XP-1A
Ultimate Sensitivity	< 7 gr/yr (0,25 oz/yr)	< 3 gr/yr (0,1 oz/yr)
True Mechanical Pump	Yes	Yes
Visual Leak Indication Levels	6 (single color)	18 (tri-color)
Sensitivity Levels	2	7
One Touch Reset and Keypad Controls	Yes	Yes
Mute Button	n/a	Yes
Battery Test	n/a	True voltage indication
Battery Life	Approx. 30 hrs.	Approx. 30 hrs.

CE



ATP-C1

- Lightweight, ergonomic design
- Simple, one button operation
- Two sensitivity modes, enabling quick and easy location of large and small leaks
- Sturdy blow-molded carrying case
- Both visual and audible leak detection signal
- Low battery indicator
- Automatic power-off to conserve battery life

Accessoires	Part Number
Replacement sensor	ATP-C2

CE



TIF 5750A

Optional Accessory	Part Number
Maintenance Kit (3 tips, 3 protectors)	TIF 555

## ATP-C1

### CO<sub>2</sub> Leak Detector

The ATP-C1 Carbon Dioxide Gas Leak Detector is the most technologically advanced of its kind. The fully automatic ATP-C1's low power requirements, small size and high sensitivity combine to create a tool which is easy to handle and ultra effective at locating even the most difficult-to-find leaks. The ATP-C1's long life sensor will detect concentrations of carbon dioxide gas as low as 400 ppm over ambient. False alarms are eliminated due to its high selectivity. The ATP-C1 is excellent for servicing carbon dioxide refrigeration systems or any general purpose leak detection application where compressed carbon dioxide can be used as the test gas.

Specifications	
Weight	425 g
Batteries	4 x 1,5 V „AA“ Ni-a Batteries (6 VDC)
Battery Life	20 hours
Sensitivity: High	Less than 400 ppm over ambient / Less than 4000 ppm over ambient
Sensor Life	> 2 years
Operating temperature	0° - 50° C
Warm up time	10 seconds
Calibration	automatic
Response time	1 second
Reset time	1 second
Probe length	12" (30 cm)

## TIF 5750A

### „Super-Scanner™“ Refrigerant Leak Detector

Full featured but easy to use, the original TIF detector. The TIF 5750A offers the detachable, flexible probe with micro-pump, leak intensity indicators, and all the features you have come to know and trust. Includes the patented SCAN mode that revolutionized leak detection.

- LED leak size indicators
- Two sensitivity levels, including our unique SCAN mode
- Reset button for instant recalibration
- Detachable probe
- High efficiency pump
- Certified to SAE J1627, CE, UL
- Detects ALL halogenated refrigerants
- Constant power indication
- Carrying case and spare sensing tip included

Specifications	
Ultimate Sensitivity	< 3 gr/yr (0,1 oz/yr) for R12, R22 and R134a (SAE J1627)
Power Supply	2 x 1,5 V "C" batteries
Battery Life	30 Hours (Alkaline)
Probe / Cord Length	Probe 35 cm (14") Cord 90 cm (36")
Operating Temperature	0° to 52° C (32° to 125°F)





TIF 8900-E

## TIF 8900-E

### Combustible Gas Detector

- Solid state sensor technology, long life and precision
- Broad band of combustible gas detection
- Sensitivity as low as 5 ppm
- Adjustable sensitivity
- Audible „Geiger counter“ signal
- LED Leak Intensity Lights
- Automatic warm up
- Cordless operation
- Flexible 40 cm stainless probe for hard to reach places
- Rechargeable battery and charger included
- Rugged custom carrying case
- UL and CE approved

#### Applications:

TIF8900-E is the perfect tool to be used in a situation where a combustible gas, vapor or residue needs to be found.

- Gas lines and Pipes
- Exhaust and Fuel leaks
- Propane filling stations
- Fuel in marine bilges
- Heat Exchanger leaks
- Check manholes for safety
- Detect arson residue
- IAQ tests
- Liquid or gas fired heating systems

Specifications	
Battery Charger	230 V / 50 Hz
Probe Length	40 cm (16")
Power Supply	2 x 2,4 V Ni-Cad Batteries
Battery Life	4 Hours/Charge
Response Time	Instantaneous
Warm-up Time	30 seconds
Operating Temp	0° to 52° C (32° to 125° F)

Replacement Parts (supplied with product)	Part Number
Sensor	TIF 8801
Rechargeable Ni-Cad batteries (2 each)	TIF 8806A
230 V battery charger	TIF 8806B
Carrying Case	ATP-7038
Battery Cover	527690RED

Compound	Min. detectable concentration
Acetylene	50 ppm
Iso-Butane (R600a)	500 ppm
Methane	500 ppm
Ethane (R170)	500 ppm
Propane (R290)	500 ppm
Ethylene	500 ppm
Hydrogen	500 ppm
Methyl Ether	500 ppm
Vinyl Chloride	5 ppm
Methyl Chloride	5 ppm
Hydrogen Sulfinde	5 ppm
Acetone	50 ppm
Methanol	50 ppm
Ammonia (R717)	20 ppm
Gasoline	1 ppm
Chlorine	1 ppm

Optional Accessories	Part Number
Cigarette lighter adapter	TIF 8805



- Cordless UV light
- Injector
- 6 dye cartridges for ester and mineral oils
- Charger 230 V, 50 Hz
- UV glasses
- Connecting hose (1/4" FFL)
- Date installed" labels
- Dye cleaner
- Protective carrying case
- Great for pinpointing those exclusive hard to find leaks
- Super bright 12 LED array – cordless, rechargeable UV light
- Drop/shock proof light – produces NO heat
- Universal HVAC/R dye cartridges – compatible with ALL lubricants & H(C)FK refrigerants
- Compact injector & cartridgesystem – pre-measured:  
No mess or waste
- For all ester and mineral oils

## ROBINAIR 16331

UV Leak Detection,  
HVAC/R Dye Kit



Specifications	
Battery Type	Nickel Metal Hydride - rechargeable
Battery Life/Charge	3 hours of continuous use
UV LED working life	100.000 hours

Optional Accessories	Part Number
Dye Injector Kit - HVAC R	RA 16332

Replacement Parts (supplied with product)	Part Number
UV Light, LED - Rechargeable (includes 230 V charger)	RA 16353
Injector Gun	RA 16339
Charger, 230 V / 50 Hz	RA 16349
Hose, replacement	RA 16340
Replacement Dye Cartridges, 7,5 ml (1/4 oz/6 ea)	RA 16336
Replacement Dye Cartridges, 15 ml (1/2 oz/6 ea)	RA 16337
Replacement Dye Cartridges, 22,5 ml (3/4 oz/6 ea)	RA 16338
Labels, "Date Installed"	RA 16333
Dye Cleaner, 960 ml (32 oz) Bottle	RA 16263
Glasses, UV	RA 16257



RA 16353

## ROBINAIR 16353 True UV 12 LEDs Leak Detection Light

## ACCESSORIES FOR ROBINAIR 16331

- Cordless and Rechargeable true UV LED Light
- 12 LEDs producing hi-intensity true UV light
- UV enhancing glasses
- Battery charger 230 V / 50 Hz included

Specifications	
Battery Type	Nickel Metal Hydride - rechargeable
Battery Life/Charge	3 hours of continuous use
UV LED working life	100.000 hours



RA 16336

## ROBINAIR 16336 Dye Cartridges for systems containing up to 2,2 kg of refrigerant

- 6 Cartridges 7,5 ml (0,25 oz)
- For medium systems: Residential systems up to 2,2 kg (4,9 lbs) of refrigerant or up to 1,5 l (1,6 qt) of oil
- For all ester and mineral oils • For RA 16331, RA 16332



RA 16337

## ROBINAIR 16337 Dye Cartridges for systems containing 2,3 to 4,5 kg of refrigerant

- 6 Cartridges 15 ml (0,5 oz)
- For medium-large systems: Light commercial & large residential systems 2,3 to 4,5 kg (5 to 9,9 lbs) of refrigerant or 1,6 to 3,0 l (1,7 to 3,2 qt) of oil
- For all ester and mineral oils
- For RA 16331, RA 16332



RA 16338

## ROBINAIR 16338 Dye Cartridges for systems containing 4,6 to 11,4 kg of refrigerant

- 6 Cartridges 22,5 ml (0,75 oz)
- For large systems: Commercial & light industrial, including all split 4,6 to 11,4 kg (10 to 25 lbs) of refrigerant or 3,1 to 7,6 l (3,3 qt to 2 gal) of oil
- For all ester and mineral oils
- For RA 16331, RA 16332



### **ROBINAIR 16341** **IN-LINE Dye Cartridges** **for systems containing** **up to 1,3 kg of refrigerant**

- 6 In-Line Capsules 0,9 ml (0,03 oz)
- For systems using up to 1,3 kg (2,9 lbs) of refrigerant or up to 0,4 l (15 fl. oz) of oil
- For all ester and mineral oils

## **ACCESSORIES FOR** **ROBINAIR 16331**



### **ROBINAIR 16342** **IN-LINE Dye Cartridges for systems containing** **from 1,4 to 2,2 kg of refrigerant**

- 6 In-Line Capsules 15 ml (0,5 oz)
- For use on A/C & R systems containing 1,4 to 2,2 kg (3 to 4,9 lbs) of refrigerant or up to 1,5 l (1,6 qt) of oil
- For all ester and mineral oils



### **ROBINAIR 16343** **IN-LINE Dye Cartridges** **for systems containing from** **2,3 to 4,5 kg of refrigerant**

- 6 In-Line Capsules 15 ml (0,5 oz)
- For use on A/C & R systems containing 2,3 to 4,5 kg (5 to 9,9 lbs) of refrigerant or 1,6 to 3,0 l (1,7 to 3,2 qt) of oil
- For all ester and mineral oils



### **ROBINAIR 16344** **IN-LINE Dye Cartridges for systems containing from** **4,6 to 11,4 kg of refrigerant**

- 6 In-Line Capsules 15 ml (0,5 oz)
- For use on A/C & R systems containing 4,6 to 11,4 kg (10 to 25 lbs) of refrigerant or 3,1 to 7,6 l (3,3 qt to 2 gal) of oil
- For all ester and mineral oils



RA 16455

## ROBINAIR 16455

### TruTrack™ Ultrasonic Leak Detector

TruTrack™ is an ultra-sensitive leak detector, which uses ultra-sound technology to “hear” the sound of a leak. It makes finding a leak fast and accurate because it eliminates annoying false triggering and interference, caused by wind, stray gases or other contaminants. TruTrack is the perfect complement to other forms of leak detection and is ideal for a wide range of service and preventative maintenance applications.

- Detects Refrigeration leaks, pressurized gas leaks, vacuum leaks, dry nitrogen gas leaks, steam leaks, etc. It will detect any gas under pressure or vacuum
- Allows you to identify potential failures in bearings, valves, solenoids and other operational components
- Complete with: headset, solid contact probe, flextube and a padded carrying case
- Adjustable sensitivity
- Audible and visual leak indication
- Powered by one 9 V battery (included)



RA 16451

## ROBINAIR 16451

### TruTrack™ Ultrasonic Sound Generator

Ideal accessory for the RA16455 TruTrack™, it detects seal failures in refrigerators/freezers, vehicle compartments or any other location where a good seal is required.

The battery-operated unit emits a special frequency from inside the test area, which can be heard by the RA16455, anywhere a leak exists.



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# RECOVERY UNITS



15

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RG5010-A EXTREME

## PROMAX RG5410A-EXTREME

# NEW

CE TÜV UL

The RG5410A-Extreme Recovery machine is the next generation of the field proven RG5410-A. A modified version of the unique Promax oil-free compressor, with enlarged displacement, larger intake and exhaust valves and additional improvements provides an increase of 20% in performance and volume – saving you time and money!

### FEATURES & SPECIFICATIONS

- Newly designed compressor with greater displacement and enlarged valves
- Recovers ALL commonly used CFC, HFC and HCFC refrigerants including R410A
- Designed for use with High Pressure refrigerants
- High Pressure safety "cut off" switch 38,5 bar (550 psi)
- Proprietary "oil-less" compressor capable of handling both liquid and vapor refrigerants
- Extra long 2,5 m removable power cord
- VAC Sensor Select, selectable low pressure ON/OFF switch
- Includes filter-drier
- Ergonomic design for easier handling
- 3/8" – 3-row condenser for maximum performance in even the harshest conditions
- Corrosion proof polyethylene blow molded case
- Self purge feature
- Field serviceable semi-hermetic compressor
- Power source – 230 V 50 / 60 Hz
- Also Available: 115 V / 60 Hz model
- CE, TÜV approved
- Weight: 14 kg
- Dimensions: 343 x 229 x 483 mm (13" x 9" x 19")

International Version	Part Number
UK, 115 V / 60 Hz	RG 5410A-Extreme 115 V/60Hz

Replacement Parts (included with unit)	Part Number
Filter Drier (1/4" MFL x 1/4" MFL)	100343
Hose, Blue 10 cm (4")	100345



RG5410A-E

- Recovers all commonly used CFC, HFC, HCFC refrigerants including R410A
- Designed for use with high pressure refrigerants
- High Pressure safety "cut off" switch 38,5 bar (550 psi)
- Proprietary "oil-less" compressor capable of handling both liquid and vapor refrigerants
- New long 2,5 m removable cable
- VAC Sensor Select, selectable low pressure ON/OFF switch
- New Generation Compressor, new valves and piston
- Easier access to high pressure switch
- Includes filter-drier • Self purge feature
- All new ergonomic design for easier handling
- 3/8" – 3-row condensor for maximum performance in even the hardest conditions
- Corrosion proof polyethylene blow molded case
- Field serviceable semi-hermetic compressor
- Power source – 230 V 50/60 Hz
- Available 115 V / 60 Hz
- CE, TÜV approved
- Weight: 13,5 kg
- Dimensions: 343 x 229 x 483 mm (13" x 9" x 19")



CP1320

New Generation "oil-less"  
compressor CP1320,  
new valves and piston

## PROMAX RG5410A-E High Pressure Recovery Unit



RG5410A-E inside view

International Version	Part Number
UK, 115 V / 60 Hz	RG5410A-E 115 V / 50/60 Hz

Optional Accessories	Part Number
12,5 kg Recovery Tank	RGT30NS
26 kg Recovery Tank	RGT50NS

Replacement Parts (supplied with product)	Part Number
Filter-Drier, 1/4" MFL x 1/4" MFL	100343
Hose, Blue 10cm (4") Long	100345





MINIMAX-E

## MINIMAX-E

High Pressure  
Recovery Unit



- Recovers all commonly used CFC, HFC, HCFC refrigerants including R410A
- Minimum size – maximum performance; ideal for residential and appliance service
- Proprietary “oil-less” compressor capable of handling both liquid and vapor refrigerants
- Ergonomic design for easier handling
- Tough corrosion proof polyethylene blow molded case
- Field serviceable semi-hermetic compressor
- Self purge feature
- Includes filter-drier
- New Generation Compressor, new valves and piston
- New long 2,5 m removable cable
- 38,5 bar (550 psi) safety cut off switch
- Power Source – 230 V 50/60 Hz
- Available 115 V / 60 Hz
- CE, TÜV approved
- Weight: 11 kg
- Dimensions: 250 x 222 x 406 mm (11" x 9" x 16")

International Versions	Model No.
UK, 115 V / 60 Hz	Minimax USA

Optional Accessories	Part Number
12,5 kg Recovery Tank	RGT30NS
26 kg Recovery Tank	RGT50NS

Replacement Parts (supplied with product)	Part Number
Filter-Drier, 1/4" MFL x 1/4" MFL	100343
Hose, Blue 10 cm (4") Long	100345



CP1320

New Generation “oil-less”  
compressor CP1320,  
new valves and piston



PROVAX-E

# PROVAX-E

The combination of Vacuum and Refrigerant Recovery

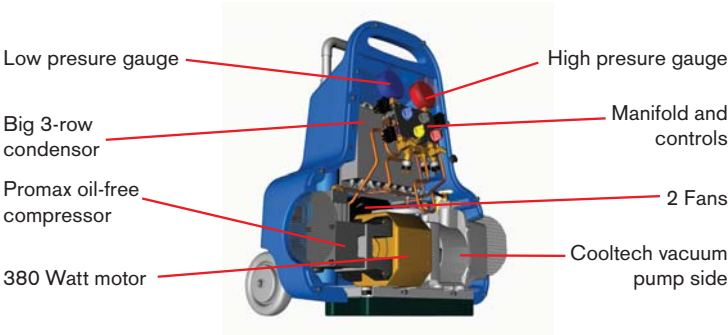


## The portable „all-in-one“ AC/R Service Unit for the next generation.

Portable AC/R Service Unit for the next generation. A revolution in Refrigerant Recovery and Evacuation. The new ProVax™-E system combines the Promax RG5410A-E Recovery unit and the ROBINAIR 15601 vacuum pump (142 l/min). ProVax™-E is suitable for all halogenated refrigerants (CFC/ HCFC/HFC), including R410A. The powerfull electrical motor (1/2 hp) brings you the highest Promax recovery rate and the Robinair vacuum rate of 20 Microns. High recovery through 2 big fans. Recovery and deep vacuum without changing hoses. Could it be easier?

- ProVax™-E oil-free compressor suitable for both liquid and vapour refrigerant stages
- Portable and Mobile through handgrip and wheels
- The 1/2 hp electrical operates the recovery and vacuum process
- Easy operation, no changing of hoses throughout the process
- Weight: 24,5 kg
- Dimensions: 55,8 x 63,5 x 25,4 cm

Replacement Parts	Part Number
Filter Drier, 1/4" MFL x 1/4" MFL	100343
Hose blue, 10 cm lenght	100345
Premium High Vacuum Pump Oil	RA 13201
Full spare parts included in the ProVax™ manual	







RA 25176B



RA 25201B

Optional Accessories for RA 25176B and 25201B	Part Number
12,5 kg Recovery Tank	RGT30NS
26 kg Recovery Tank	RGT50NS
Filter-Drier 1/4" MFL x 1/4" MFL	100343
Hose, Blue 10 cm (4") Long	100345



## ROBINAIR 25176B

### Refrigerant Recovery Machine

- Recovers all commonly used CFC, HCF, HFCF refrigerants, including R410A
- Automatic High Pressure cut-out switch for safety
- Direct liquid recovery without damaging the compressor
- All new proprietary "Oil-less" compressor and 1/2 hp motor
- Field serviceable compressor
- Multi-refrigerant capable with Self-Clearing feature, which prevents cross-contamination
- One 150 cm (60") hose included
- 1/4" MFL fittings
- Power source – 230 V / 50 Hz
- Weight: 15 kg (34 lbs)
- Dimensions: 508 x 318 x 267 mm (20" x 12,5" x 10,5")
- Especially suited for residential and commercial HVAC/R applications
- Efficient fan and large 3-row condenser for high ambient temperatures
- CE and UL certified

International Versions	Model No.
115 V / 60 Hz, °F/psi, CE + UL certified	RA 25175B

## ROBINAIR 25201B

### Refrigerant Recovery Machine

- Designed for the recovery medium and high-pressure refrigerants, including R410A
- Automatically switches from liquid to vapor recovery
- Provides continuous recovery without the need to change the hose or flip a switch
- Automatic high pressure cut-out switch for safety
- Direct liquid recovery without damaging the compressor
- Oil-less compressor allows rapid transfer of large amounts of liquid
- Efficient fan and large condenser can handle high ambient temperatures
- Multi-refrigerant capable with Self-Clearing feature, which prevents cross-contamination
- Four 150 cm (60") hoses, with ball-valves included
- 1/4" MFL fittings
- Power Source: 230 V / 50 Hz
- Weight: 15 kg (32 lbs)
- Dimensions: 502 x 318 x 267 mm (20" x 12,5" x 10,5")
- CE and UL certified

International Version	Model No.
115 V / 60 Hz, °F/psi, CE + UL certified	RA 25200B



PROMAX AUTO 450 PRO

## PROMAX AUTO 450 PRO

### Semi-Automatic A/C Service Station

#### SIMPLE OPERATION WITH SUPERIOR ACCURACY

The PROMAX AUTO 450 PRO is a semi-automatic service station for Automotive R134a air conditioning systems. The best value offering key features, performances & easy use for all level of technicians. The powerful dual stage vacuum pump guaranties a rapid and full dehydration of the A/C system.

#### MAXIMUM FLEXIBILITY- HIGH SPEED PROGRAMMABLE

##### Key functions and features

- Dual operating mode: Expert or Beginner
- Help messages in more than 20 languages
- Guided software and kit to flush AC system with semi-automatic procedure



PROMAX AUTO 550 PRO

## PROMAX AUTO 550 PRO

### Automatic A/C Service Station

#### GUARANTEES ACCURATE AND SPEED SERVICE ALSO ON TRUCKS APPLICATIONS

Automatic A/C station with all the functions and performances required for professional applications on Automotive R134a air conditioning systems. This unit performs manually or automatically accurate recovery, recycling & recharging of refrigerant with an exclusive automatic procedure of service hoses management.



PROMAX AUTO 650 PRO

## PROMAX AUTO 650 PRO

### Full-Automatic A/C Service Station

#### COMBINES PROVEN TECHNOLOGY WITH THE LATEST IN TIME-SAVING FEATURES

The most advanced fully automatic service station developed for minimum action of the operator and intensive use on Automotive R134a air conditioning systems. This unit is fully automatically controlling the recovery, recycling and recharging process for the refrigerant and also the oil compressor without the need of the operator. A manual mode gives also to the user the possibility to control each phase independently. The unit is equipped with a printer for editing a detailed A/C service report.

#### ACCURATE AND PROFESSIONAL SERVICE

An integrated & updated database with more than 3300 A/C system gives refrigerant & oil specifications for each vehicles. Diagnostic software to check AC system efficiency.

# PROMAX AUTO 450 PRO / 550 PRO / 650 PRO

## Technical specification · Main functions · Technical features

Technical specification	AUTO 450 PRO	AUTO 550 PRO	AUTO 650 PRO
Flushing unit	Kit optional	Kit optional	Kit optional
Electronic database	Optional	Standard	Standard
AC diagnostic kit	Optional	Optional	Optional
User database	250 vehicles	250 vehicles	250 vehicles
Database update	Smart cartridge	Smart cartridge	Smart cartridge
Max operating pressure	16 bar	16 bar	16 bar
Operating temperature	10° – 50° C	10° – 50° C	10° – 50° C
Power supply	230 V / 50 Hz	230 V / 50 Hz	230 V / 50 Hz
Dimensions in cm	128 x 69 x 69	128 x 69 x 69	128 x 69 x 69
Weight	100 kg	110 kg	110 kg
Quality & Conformity	Conformity CE / PED	Conformity CE / PED	Conformity CE / PED

Main functions	AUTO 450 PRO	AUTO 550 PRO	AUTO 650 PRO
Manual operating mode	Yes	Yes	Yes
Automatic operating mode	Yes (only charge)	Yes	Yes (fully)
Vacuum phase programmable	Yes	Yes	Yes
Automatic AC system leak test		Yes	Yes
Oil discharge	Manual	Automatic	Automatic with scale
Oil injection	Manual - Visual control control	Manual with solenoid Visual control	Automatic with electronic scale control
UV dye injection	Manual	Manual	Automatic
Automatic refrigerant charging	Yes	Yes with automatic service hoses management	Yes with automatic service hoses
Service hoses compensation	Charge	Charge	Charge
Automatic non condensable discharge	Yes	Yes	Yes
Patent recycle multi-pass during vacuum	Yes	Yes	Yes

Technical features	AUTO 450 PRO	AUTO 550 PRO	AUTO 650 PRO
Gauges	63 mm class 1,6	80 mm class 1	80 mm class 1
Tank Gauges	63 mm	40 mm	40 mm
LCD backlit display 80 characters	Yes	Yes	Yes
Printer	Optional	Optional	Standard
Hermetic compressor high performance	1/4 HP 300 grs / min	1/3 HP 500 grs / min	1/3 HP 500 grs / min
Super-cooled condenser	Yes	Yes	Yes
Vacuum pump Dual stage	180 l/min	180 l/min	180 l/min
Large capacity refrigerant tank	10 kg	20 kg	20 kg
Scale accuracy	± 5 gr	± 5 gr	± 5 gr
Filter dryer high performance	710cc SAE J 2099	710cc SAE J 2099	710cc SAE J 2099



RA 17801B



## ROBINAIR 17801B

### Refrigerant Recovery, Recycle, Evacuate and Recharge Machine

- Recovers, Recycles, Evacuates and Recharges
- Continuous operation – all through one hook up
- In-plant maintenance – Ideal for departments that use different types of refrigerants for various systems
- Multiple Refrigerants – R12, R134a, R22, R500, R502, MP and HP Blends – and many more
- Microprocessor controlled functions prompt you through programming and signal preventative maintenance
- Float Chamber – Automatically adjusts from liquid to vapor for most efficient recovery
- Electronic Scale – Makes it simple to recharge to factory specifications; also weighs recovered refrigerant and provides tank overfill protection
- Cool-Tech Vacuum Pump – 6 CFM, has the capacity to thoroughly evacuate system
- Lockout Panel – Prevents mixing of refrigerants; slides to one side for 1/4" fittings and to the other for 1/2" ACME fittings
- Single Pass Recycling – Makes an initial pass through the filter-drier; additional recycling can be programmed in case of compressor burn-out, or other conditions
- Heavy Duty Filter-Drier – Removes moisture and acid from the refrigerant; can handle up to 136 kg (300 lbs) between changeovers
- Power Supply 230 V / 50 Hz
- Supplied with two 23 kg (50 lbs) tanks; one with 1/4" fittings and the other with 1/2" ACME fittings.
- Includes three sets of hoses – Two sets for refrigerants using 1/4" SAE fittings and one set with R134a field service couplers
- Design certified by UL to meet SAEJ-1770
- CE certified

International Versions	Part Number
115V / 60 Hz readout in lbs	RA 17800B

Replacement Parts (supplied with product)	Part Number
Recycling Filter-Drier	RA 17677
23 kg (50 lbs) Refillable Tank. 1/4" fittings	RA 17506
23 kg (50 lbs) Refillable Tank. 1/2" ACME fittings	RA 34750

# SCALES/CHARGING



# 15

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AN SPX BRAND

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ROBINAIR

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**ATP 9060E**  
**Heavy Duty Aluminium Scale**



**Next generation scale**

- Capacity max 150 kg
- 6 digits LCD-Display
- Easy to handle
- Three units to select from 1. kg 2. lbs 3. lbs & ozs
- Resolution: 10 grams, 0,05 lb and 0,5 oz
- Low Battery indicator (< 7,5 Vdc)
- Platform 350 x 260 mm
- Incl. nylon carrying case
- CE certificated



Specifications	
Range	0,00 to 150,00 kg
Resolution	10 grams, 0,05 lbs and 0,5 oz
Power Supply	1 x 9 V alkaline battery
Round object max	Ø 340 mm
Function	On/Off, Zero, Units
Temperature range	-10° to 50° C
Certificate	CE
Accuracy	< 0,5% of reading
Dimensions	260 x 350 x 53 mm
Load Platform	Anodized aluminium



## TIF 9030E

### Compact Refrigerant Scale



### Next generation scale

- Range up to 100 kg
- Three display modes, Kilograms; lbs/oz; Decimal lbs
- Resolution 10 g
- Easy to use: ON/OFF - UNITS - ZERO buttons
- 9 V battery operated
- Overload protected
- CE certificated

CE

Specifications	
Range	0,00 to 100,00 kg or 0 lbs 0 oz to 199 lbs 15 oz or 0,00 lbs to 199,99 lbs
Resolution	0,01 kg or 0,05 lbs
Accuracy	± 0.5 % of reading
Power Supply	One 9 V alkaline battery
Battery Life	20 hrs (approx.)
Operating Temperature	-10° to 49° C
Weight	2,36 kg
Dimensions	304,8 x 431,8 x 57,1 mm
Standard accessories	Battery and nylon carrying case



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TIF 9010A

**TIF 9010A**  
**„Slimline“**  
**Refrigerant Scale**



TIF 9010 A in use without case

- Touch Key controls
- Three display modes – Kilograms, lbs/oz; Decimal lbs
- Very High Resolution 2 grams/0.1 oz/0.005 lbs
- Extreme Accuracy
- 50 kg/110 Pound capacity
- Auto Zero
- Removable platform and control box with prop stand/hanging hook
- Compact design, completely portable
- Can be used with all refrigerants
- Removable control box with prop stand/hanging hook
- Overload protected
- CE approved
- Two year warranty

A revised and updated version of the classic TIF Slimline scale, the TIF9010A brings greater performance, reliability and usability to the trade. With the greatest resolution in the industry, and no compromise on capacity, this unit offers features and specs that you won't want to do without.

Specifications	
Range	0,000 kg to 50,000 kg, or 0 lbs 0.0 oz. to 110 lbs 0,0 oz, or 0 lbs to 110 lbs
Resolution	2 g / 0,1 oz / 0,005 lbs
Accuracy	± 0,5 % of reading
Operating Temp	-10° to 49° C
Power Supply	9 V Alkaline battery
Battery Life	20 hours
Coil Cord Length	1,8 m (6 ft)



PROMAX ADS-100

## PROMAX ADS-100

„Slimline“  
Refrigerant Scale

A revised and updated version of the classic TIF Slimline scale, the ADS-100 brings greater performance, reliability and usability to the trade. With the greatest resolution in the industry, and no compromise on capacity, this unit offers features and specs that you won't want to do without.

- 100 kg or 200 lbs capacity
- Three display modes, Kilograms; lbs/oz; Decimal lbs
- Very high resolution: 4 grams / 0,2 oz / 0,010 lbs
- Compact design and completely portable
- Extreme accuracy
- Auto Zero
- Removable platform and control box with prop stand/ hanging hook
- Charging and recovery capabilities
- Overload protected
- CE approved
- Two year warranty

Specifications	
Range	0,000 kg to 100,000 kg, or 0 lbs 0.0 oz to 199 lbs 15.8 oz, or 0 lbs to 199 lbs
Resolution	4 grams / 0.2 oz / 0.010 lbs
Accuracy	± 0.5 % of reading
Operating Temp	-10° to 49° C
Power Supply	1 x 9 V Alkaline battery
Battery Life	20 hours
Coil Cord Length	1,8 m (6 ft)



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**TIF 9055**  
**Programmable Charging/  
Recovery Meter**

- 100 kg (220 lbs) capacity
- Allows automatic Charging or Recovery operations
- Color-coded keypad controls
- Three display modes – Kilograms; lbs/oz; Decimal lbs
- Very High Resolution – 4 grams / 0,2 oz / 0,010 lbs
- Can be used with all refrigerants, including High Pressure (R410A)
- Advanced Charge and Recovery Modes – uses tare weight & Max. capacity of cylinder to calculate maximum Charge/ Recovery available
- User Programmable memory for up to 99 different stored values
- “Repeat” charge feature
- Removable platform and control box with prop stand/hanging hook
- Compact Design – completely portable, battery powered
- Low battery indicators

Replacement Parts (supplied with product)	Part Number
1/4" FFL to 1/2" ACME Male Adapter	TIF 9021

Specifications	
Range	0,000 kg to 100,000 kg or 0 lbs to 219 lbs or 0 lbs 0,0 oz to 219 lbs 0,0 oz
Resolution	4 grams / 0,2 oz / 0,010 lbs
Accuracy	± 0.5 % of reading
Power Supply	4x 1.5 V batteries and one 9 V alkaline battery
Battery Life	30 hours
Max. Solenoid operating pressure	34,4 bar (500 psi)
Operating Temp.	-10° to 45° C
Inlet/Outlet Ports	1/4" MFL fittings with 1/2" ACME adapters





RGS-2000

## PROMAX RGS-2000

**CERTIFIED Refrigerant Scale**  
up to 150 kg

- RGS-2000 scale legal for trading with refrigerants
- RS 232 C interface for printer and computer
- Protected up to 200 kg (400 lbs)
- Scale class III
- Range (max.) 150 kg (330 lbs)
- Range (min.) 1 kg (2.2 lbs)
- Resolution 50 g
- Accuracy 50 g
- Operating temperature +10° to +40° C (50° to 104° F)
- Tara (range) -150 kg (-330 lbs)
- Response time < 4 sec.
- Warm up time 30 sec.
- Operating platform 300 mm x 300 mm (11,8" x 11,8")
- Power connection 12 V/500 mA DC
- Dimensions 300 x 400 x 85 mm (11,8" x 15,7" x 3,3")
- Weight 8,6 kg



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# MANIFOLDS / GAUGES / HOSES



15

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## ROBINAIR 42248E MANIFOLDS

# NEW



RA 42248E

**ROBINAIR is proud to introduce an ALL NEW complete line of Refrigerant service Manifolds.**

This family includes a full line of both 2-Way and 4-Way solid Aluminum block manifolds. All models include Piston Valves, for full flow, easy shut-off and long term durability and reliability. Large color-coded valve handles with soft touch knobs made of non-reactive and non-allergenic material make operation simple and sure. Large internal bore provides excellent refrigerant flow.

The Top-of-the Line Digital Set is just the beginning – a full range of 80mm Class 1.0 Analog gauges are also available. Units may be ordered alone, with hoses, with carrying case, or with everything!



RA 41148



RA 42240E



Case  
RA 40025E



Refrigerant	Manifold Block	Hose Set	Case	Type Number
Digital Gauges	2-way	90 cm 150 cm	Yes Yes	RA41148E90C RA41148E150C
Digital Gauges	2-way	No	No	RA41148E
Digital Gauges	4-way	90 cm 150 cm	Yes Yes	RA42248E90C RA42248E150C
Digital Gauges	4-way	No	No	RA42248
R410A	2-way	90 cm 150 cm	Yes Yes	RA41148E90C RA41148E150C
R410A	2-way	No	No	RA41148E
R410A	4-way	90 cm 150 cm	Yes Yes	RA42248E90C RA42248E150C
R410A	4-way	No	No	RA42248
R422/R404A/R407C/R134A	2-way	90 cm 150 cm	Yes Yes	RA41182E90C RA41182E150C
R422/R404A/R407C/R134A	2-way	No	No	RA41182E
R422/R404A/R407C/R134A	4-way	90 cm 150 cm	Yes Yes	RA42282E90C RA42282E150C
R422/R404A/R407C/R134A	4-way	No	No	RA42282E
R22/R404A/R407C/R134A	2-way	90 cm 150 cm	Yes Yes	RA41178E90C RA41178E150C
R22/R404A/R407C/R134A	2-way	No	No	RA41148E
R22/R404A/R407C/R134A	4-way	90 cm 150 cm	Yes Yes	RA42278E90C RA42278E150C
R22/R404A/R407C/R134A	4-way	No	No	RA42278E
R12/R22/R502	2-way	90 cm 150 cm	Yes Yes	RA41166E90C RA41166E150C
R12/R22/R502	2-way	No	No	RA41166E
R12/R22/R502	4-way	90 cm 150 cm	Yes Yes	RA42266E90C RA42266E150C
R12/R22/R502	4-way	No	No	RA42266E

## Manifold Blocks

2-way RA 41140E  
4-way RA 42240E  
Case RA 40025E

**NEW**



RA 41140E



RA 42240E



RA 41148LP



RA 41148HP



RA 41178LP



RA 41178HP



RA 41182LP



RA 41182HP



RA 41166LP



RA 41166HP

Gauges:	LP	HP
R410A	RA41148LP	RA41148HP
R22	RA41178LP	RA41178HP
R404A		
R407C		
R134a		
R422D	RA41182LP	RA41182HP
R404A		
R407C		
R134A		
R12	RA41166LP	RA41166HP
R22		
R502		



RA 40020HP

RA 40020LP

## RA 40020HP/RA 40020LP

Red RA 40020HP

Blue RA 40010LP



RA 894A

## RA 894A

Adapter 3/8" FFL x 1/4" MFL

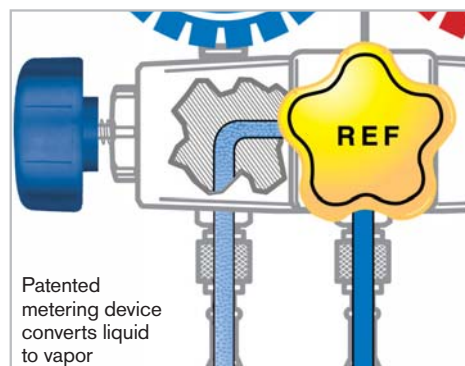




740-CB

## 740-CB/745-CB SERVICE MANIFOLD

Kwik-Charge® Manifold



- Dual Action Valve - Operates as a conventional manifold, or engage the Kwik-Charge valve and the manifold accepts liquid refrigerant from cylinder and discharges into the low side of the system. Charging rate is up to eight times faster than vapor charging
- Safe - Internal metering element reduces liquid flow to a level below capacity of the compressor. Assures a safe, fast charge without endangering the compressor
- All-In-One - No connecting or disconnecting special adapters for charging new blended refrigerants
- No Pressure Drop-In Cylinder - No need to heat refrigerant cylinder
- Works With All Refrigerants - CFC, HFC, HCFC, Zeotropic and Azeotropic
- Filters In All Manifold Port Fittings - To keep out particulate material that may be present during recovery or reclaim or in recovered refrigerant. Filters are easily serviceable.
- Deep Vacuum Valve Design - Proven diaphragm type, soft seat valves require only fingertip pressure to close completely. One turn to full open/close. Superior for deep vacuum service
- Precision Gauges & Protective Boots - Unique gauges provide superior resistance to shock, vibration & pulsation for accurate performance and extended gauge life
- Ergonomic Handles – Durable, soft touch non-slip surface, even with oily fingers
- Svivel Hanger

Charging the system is faster and easier than ever. Imperial® has designed manifolds with built-in Kwik-Charge®.

Item	Refrigerant	Manifold port	Units
740-CB	R404, R407, R134a	1/4" SAE	bar, °C
745-CB	R410A	1/4" SAE	bar, °C

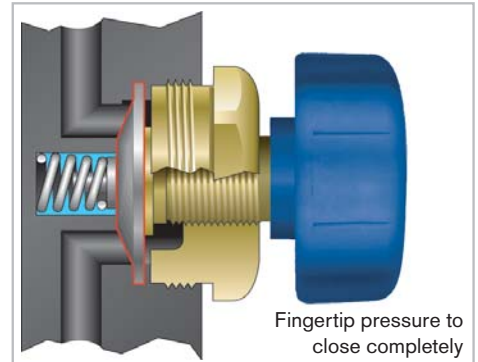




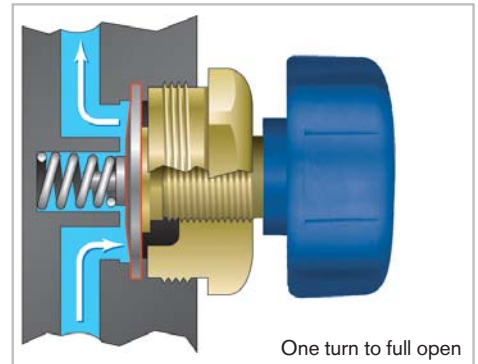
640-CB

## 640-CB/660-CB SERVICE MANIFOLD

### 4-Valve Manifold



- 4-Valve Efficiency - Vacuum, low side, high side, and refrigerant lines are individually connected and controlled. No need to switch charging lines
- 4 Times Faster Evacuation - 3/8" vacuum port and oversize internal passages evacuate systems four times faster than ordinary manifolds. 3/8" port has greater area than combined inlets of high and low side lines
- Deep Vacuum Valve Design - Proven diaphragm type, soft seat valves require only fingertip pressure to close completely. One turn to full open/close. Superior for deep vacuum service
- Precision Gauges & Protective Boots - Unique design with easy to read color-coded scales provides superior resistance to shock, vibration and pulsation for superior performance and extended gauge life
- UL® Recognized - The 600 Series manifold is recognized by UL
- Ergonomic Handles – Durable, soft touch non-slip surface, even with oily fingers
- Svivel Hanger



Item	Refrigerant	Manifold port	Units
640-CB	R410A	1/4" and 3/8" SAE	bar, °C
660-CB	R404, R407, R134a	1/4" SAE	bar, °C



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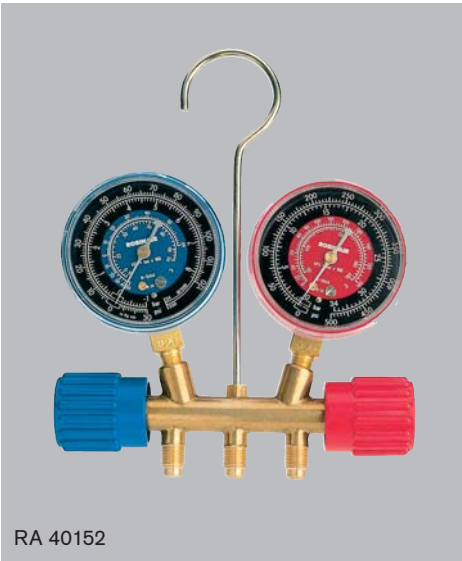
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# ROBINAIR 40152

## Two Way Brass Manifolds

- Our popular Side Wheel Manifold is easy to use and designed for accuracy
- Bar – Solid forged brass for long life; handwheels are durable, color-coded Lexan®
- Universal Gauges – Clearly marked so they're easy to read and protected with Lexan™ lenses
- Field Proven Face Seal Valves – Provide a tight seal, less wear and improved flow
- R22 and R134a scale pressure gauges
- Available with 80 mm (3.1") diameter gauges or Celsius temperature scale

RA 40152	Two-Way Standard Side Wheel Manifold with color-coded gauges, brass bar and hanging hook – No hoses included
RA 40153	Two-Way Standard Side Wheel Manifold Set – includes Model 40152 with three 90 cm (36") color coded (1/4" FFL) standard hoses and standard fittings RA 40159

International Version	
RA 40151	Two-Way Standard Side Wheel Manifold with color-coded gauges, temperature readings in degrees Celsius, brass bar and hanging hook – No hoses include



# ROBINAIR 825 GN 50

## NITROGEN REGULATOR SET

- Solid and stable Nitrogen pressure regulator
- Easy one handle system
- Max pressure overload security of 50 bar
- 1/4" SAE standard connection
- One step front pressure till 200 bar
- Standard nitrogen bottle connection
- (W24, 32 x 1/14")



## ROBINAIR 41670

### High Pressure Brass Manifold Set

- Designed for today's High Pressure Refrigerants
- R-410A Scale Pressure Gauges, plus a Pressure/Temperature Chart for a wide range of refrigerants
- Protective Holster – Flexible cover provides protection during use and storage
- Includes Enviro-Guard™ Hose Set, rated at 51 bar (740 psi) working pressure, 255 bar (3700 psi) burst pressure; with ball valve fittings
- Vibration free Gauges

RA 41671	High Pressure Manifold – No hoses included
RA 41670	High Pressure Manifold Set – include RA 41671 with three 150 cm (60") color coded (1/4" FFL) Enviro-Guard™ Hoses with in-line ball valve fittings



## ROBINAIR 41600

### Two Way Manifolds

- Use the 41600 for almost every job, instead of carrying several manifolds with 1/4" fittings
- Gauges show R22 and 134a temperature scales
- Pressure/Temperature Chart – included for other refrigerants, conveniently mounted on the rear of the holster
- Protective Holster – Flexible cover provides protection during use and storage, holds P/T chart
- Face Seal Valves – Provide a tight seal, less wear and improved flow

RA 41600	Two-Way Side Wheel Manifold with protective holster, color-coded gauges, brass bar and hanging hook – No hoses included
RA 41620	Two-Way Side Wheel Manifold Set – includes Model 41600 with three 180 cm (72") color coded (1/4") standard hoses and standard fittings
RA 41630	Two-Way Side Wheel Manifold Set – includes Model 41600 with three 180 cm (72") color coded (1/4") standard hoses and Quick Seal™ Fittings
RA 41640	Two-Way Side Wheel Manifold Set – includes Model 41600 with three 180 cm (72") color coded (1/4") Enviro-Guard™ hoses with Quick Seal™ Fittings

International Version	
RA 41612	Two-Way Side Wheel Manifold, Temperature readings in degrees Celsius – No hoses included



RA 11910-E

The NEW Robinair Digital Gauges, item RA 11910-E - Low Side, and item RA 11920-E - High Side, are the latest refrigerant service instruments from Robinair - SPX. The gauges display both pressure and vacuum (in 4 user selectable scales), as well as the corresponding temperature charts for 17 common refrigerants.

Each gauge is individually protected by a color coded rubber boot. The gauges are self powered with a battery life of nearly 150 hours; provide high accuracy; are protected against overpressure; are compact and lightweight and display all data on a large easy to read, back-lit LCD screen.

## ROBINAIR 11910-E

### Digital Gauge (Low Pressure)

- Displays pressure and temperature charts for 17 refrigerants: R12, R22, R123, R124, R134a, R401A, R401B, R402A, R402B, R404A, R407C, R409A, R410A, R422A, R422D, R502, R507, AIR
- Backlit LCD, for easy reading in all conditions
- Simple two button operation
- Self powered by "AAA" batteries
- Low Side gauge measures and displays vacuum
- 4 user selectable pressure scales – bar, psi, kg/cm<sup>2</sup> and MPa
- Temperature can be displayed in both degrees Celsius or Fahrenheit
- Auto Shut Off Feature
- High Accuracy
- Overpressure protected to 150% of range; pressure overload indication
- Multi panel displays; 4 digit LCD for pressure, 3 digits for temperature
- Units supplied with standard 1/8" NPT fitting for mounting to any manifold or panel application
- Low Battery Indication
- Tare function to zero the gauge at any pressure
- High Impact ABS housing and protective rubber boot

Specifications	
Operating Range	0 to 17,5 bar / 0 to 250 psi / 0 to 35,2 kg/cm <sup>2</sup> / 0 to 3,450 MPa Vacuum: 0 to 760 mmHg / 0 to 30 inHg / 0 to -0,100 MPa
Accuracy	±1% full pressure
Resolution	0,05 bar / 0,2 psi / 0,05 kg/cm <sup>2</sup> / 0,005 MPa / 0,1 inHg / 0,5 mmHg Temperature: 1°C / 1°F
Overpressure	150% of the range. overpressure is 26,25 bar
Burst Pressure	5 times nominal pressure range
Measurement Units	Bar / PSI / kg/cm <sup>2</sup> / MPa. Vacuum is in Hg / mmHg / MPa Temperature: °C / °F
Display	Display type: Positive LCD with BLUE backlight. LCD size: 50 x 30 mm
Power Supply	3 x 1,5 V AAA alkaline batteries replaceable. Battery Life: Approximately 140 hours
Input Connection	1/8" - 27 NPT Male Fitting



RA 11920-E

The NEW Robinair Digital Gauges, item RA 11910-E - Low Side, and item RA 11920-E - High Side, are the latest refrigerant service instruments from Robinair - SPX. The gauges display both pressure and vacuum (in 4 user selectable scales), as well as the corresponding temperature charts for 17 common refrigerants.

Each gauge is individually protected by a color coded rubber boot. The gauges are self powered with a battery life of nearly 150 hours; provide high accuracy; are protected against overpressure; are compact and lightweight and display all data on a large easy to read, back-lit LCD screen.

## ROBINAIR 11920-E

### Digital Gauge (High Pressure)

- Displays pressure and temperature charts for 17 refrigerants: R12, R22, R123, R124, R134a, R401A, R401B, R402A, R402B, R404A, R407C, R409A, R410A, R422A, R422D, R502, R507, AIR
- Backlit LCD, for easy reading in all conditions
- Simple two button operation
- Self powered by "AAA" batteries
- Low Side gauge measures and displays vacuum
- 4 user selectable pressure scales – Bar, PSI, kg/cm<sup>2</sup> and MPa
- Temperature can be displayed in both degrees
- Celsius or Fahrenheit
- Auto Shut Off Feature
- High Accuracy
- Overpressure protected to 150 % of range; pressure overload indication
- Multi panel displays; 4 digit LCD for pressure, 3 digits for temperature
- Units supplied with standard 1/8" NPT fitting for mounting to any manifold or panel application
- Low Battery Indication
- Tare function to zero the gauge at any pressure
- High Impact ABS housing and protective rubber boot

Specifications	
Operating Range	0 to 55,15 bar / 0 to 800 psi / 0 to 56,25 kg/cm <sup>2</sup> / 0 to 5,515 MPa Vacuum: 0 to 760 mmHg / 0 to 30 inHg / 0 to -0,100 MPa
Accuracy	±1 % full pressure for 0 to 34,47 bar (0-500 psi) range ±2,5 % full pressure for 34,47 bar to 55,15 bar (500-800 psi) range
Resolution	0,05 bar / 0,5 Psi / 0,05 kg/cm <sup>2</sup> / 0,005 MPa / 0,1 inHg / 0,5 mmHg Temperature: 1° C / 1° F
Overpressure	150 % of the range overpressure is 87,72 bar
Burst Pressure	5 times nominal pressure range
Measurement Units	Bar / PSI / kg/cm <sup>2</sup> / MPa. Vacuum is in Hg / mmHg / MPa Temperature: °C / °F
Display	Display type: Positive LCD with BLUE backlight. LCD size: 50 x 30 mm
Power Supply	3 x 1,5 V AAA alkaline batteries replaceable. Battery Life: Approximately 140 hours
Input Connection	1/8" - 27 NPT Male Fitting



TIF 9675MB Low Pressure



TIF 9685MB High Pressure

# TIF 9675MB, 9685MB

## Digital Gauges

TIF has designed these gauges with the latest state of the art technology. Their digital display means you can have quick, easy to read, and accurate readings. These gauges allow you to read both pressure and vacuum. The high side will allow you to measure from 0 to 34,4 bar, while the low side ranges from – 1,0 to 6,8 bar. Gauges are compatible with all refrigerants and are individually powered by one 9 V battery.

Specifications	
Accuracy	± 2 % of reading
Operating Temp	0° to 52° C (32° to 125° F)
Power Supply	9 V battery
Battery Life	> 100 hours (alkaline)



# REPLACEMENT PARTS

## Gauges



RA 11795

### RA 11795

- High Side, universal Replacement Gauge, psi/bar pressure readings, R22 and R134a temperature readings in degrees Fahrenheit



RA 11798

### RA 11798

- High Side, universal Replacement Gauge, psi/bar pressure readings, R22 and R134a temperature readings in degrees Celsius



TIF 9525B

### TIF 9525B

- 63 mm (2.5"), Zero-Adjustable Low Side Compound Gauge, psi readings, R12/R22/R502 temperature readings in degrees Fahrenheit



TIF 9550R

### TIF 9550R

- 63 mm (2.5"), Zero-Adjustable High Side Gauge, psi readings, R12/R22/R502 temperature readings in degrees Fahrenheit



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# REPLACEMENT PARTS

## Gauges



TIF 9622B

### TIF 9622B

- 63 mm (2,5"), Glycerin Filled Zero-Adjustable Low Side Compound Gauge, psi readings, R12/R22/R502 temperature readings in degrees Fahrenheit



TIF 9632R

### TIF 9622BMB

- 63 mm (2,5"), Glycerin Filled Zero-Adjustable Low Side Compound Gauge, bar readings, R12/R22/R502 temperature readings in degrees Celsius



RA 11794

### TIF 9632R

- 63 mm (2,5"), Glycerin Filled Zero-Adjustable High Side Gauge, psi readings, R12/R22/R502 temperature readings in degrees Fahrenheit

### TIF 9632RMB

- 63 mm (2,5"), Glycerin Filled Zero-Adjustable High Side Gauge, bar readings, R12/R22/R502 temperature readings in degrees Celsius



RA 11796

### RA 11794

- Low Side, universal compound Replacement Gauge, psi/bar pressure readings, R22 and R134a temperature readings in degrees Fahrenheit

### RA 11796

- Replacement Gauge Lens, quarter turn on-off

### RA 11797

- Low Side, universal compound Replacement Gauge, psi/bar pressure readings, R22 and R134a temperature readings in degrees Celsius



RA 17026

## ROBINAIR 17026

### HVAC Replacement Parts Kit

Contains an assortment of the most commonly needed replacement parts for repairing manifolds, hoses and various other A/C tools. Kit contains:

- 2 Manifold Stem Repair Kits (Conical Seal)
- 2 Manifold Stem Repair Kits (Face Seal)
- 6 Quick Seal Caps, 1/4"
- 6 Quick Seal Gaskets
- 12 Valve Cores
- 12 Valve Core Depressors, 1/4"
- 12 Hose Gaskets
- O-rings for Quick Seal Fittings
- 1 Valve Core Remover/Installer with 6 Valve Cores
- 2 Sets of Color-coded Lexan®&Mac226; Handwheels (red and blue)



805-MRS

## 805-MRS

### PolarShield® Premium Hi-Performance Charging Hose

- All Imperial PolarShield charging hoses are UL recognized and meet UL-1963, SAE-J2196 & EPA requirements for strength, pressure and refrigerant permeation
- Rugged, Multi-Refrigerant Nylon Barrier Construction - PolarShield hoses are compatible with all CFC, HCFC & HFC refrigerants (R410A, R404A, R407C, R134a)
- High-Pressure - PolarShield hoses feature 55 bar (800 psi) working pressure and 276 bar (4,000 psi) burst pressure with a 5-to-1 safety factor
- Selection - PolarShield hoses are available with a variety of end connections, in yellow, red or blue, individually or in sets of three. Consult factory for lengths and end connections not listed below
- With standard 1/4" fitting (5/16" fittings available)
- Length 152 cm (60")/Set of three (blue, yellow, red)



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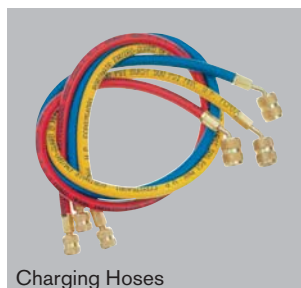
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## ROBINAIR REFRIGERANT CHARGING HOSES

Robinair Premium Refrigerant Charging Hoses are built for long life and dependability. A strong, six-sided crimp provides a reliable connection between the hose and the barb, even at maximum pressure. The coupler nuts are deeply knurled for quick finger-tightening. Enviro-Guard™ hoses are ideal for high pressure applications, including R410A systems.

- Enviro-Guard™ Hoses – Special barrier material prevents permeation of refrigerant, yet remains flexible 51 bar (740 psi) working pressure/255 bar (3700 psi) burst pressure
- Standard Hoses – Neoprene-coated for flexibility and wear resistance, 34,4 bar (500 psi) working pressure/172 bar (2500 psi) burst pressure
- Tech-Plus™ – Economy hoses
- Quick Seal™ Fittings – Automatically seal and prevent refrigerant from discharging when hoses are disconnected
- All hoses are equipped with a 45° bend fitting on one end, for convenient access to the system

## ROBINAIR HOSE SELECTION CHART

- 1/4" FFL Enviro-Guard™ High Pressure (R410A) Hoses with standard fittings 51 bar (740 psi) working pressure/255 bar (3700 psi) burst pressure

Length	Yellow	Blue	Red	Set (Yellow, Blue, Red)
180 cm/72"	RA 67172	RA 67272	RA 67372	RA 67072

- 1/4" FFL Enviro-Guard™ High Pressure (R410A) Hoses with Quick Seal™ fittings 51 bar (740 psi) working pressure/255 bar (3700 psi) burst pressure

Length	Yellow	Blue	Red	Set (Yellow, Blue, Red)
90 cm/36"	RA 68136A	RA 68236A	RA 68336A	RA 69036A
150 cm/60"	RA 68160A	RA 68260A	RA 68360A	RA 69060A
180 cm/72"	RA 68172A	RA 68272A	RA 68372A	RA 69072A
240 cm/94"	RA 68196A	RA 68296A	RA 68396A	RA 69096A

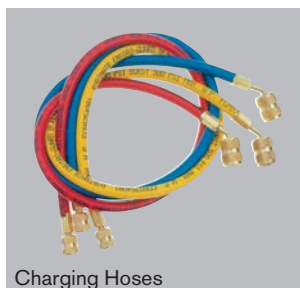
- 1/4" FFL Standard Hoses with standard fittings 34,4 bar (500 psi) working pressure/172 bar (2500 psi) burst pressure

Length	Yellow	Blue	Red	Set (Yellow, Blue, Red)
90 cm/36"	RA 31036	RA 32036	RA 33036	RA 30036
150 cm/60"	RA 31060	RA 32060	RA 33060	RA 30060
180 cm/72"	RA 31078	RA 32072	RA 31079	RA 30072
240 cm/94"	RA 31096	RA 32096	RA 33096	N/A

- 1/4" FFL Standard Hoses with Quick Seal™ fittings 34,4 bar (500 psi) working pressure/172 bar (2500 psi) burst pressure

Length	Yellow	Blue	Red	Set (Yellow, Blue, Red)
180 cm/72"	RA 38172A	RA 38272A	RA 38372A	RA 39072A

## ROBINAIR SPECIAL HOSES FOR SPECIAL JOBS



- **Enviro-Guard™ Hoses with Ball Valves**  
In-line ball valves control refrigerant flow with a quarter turn

RA 65060	150 cm (60") Enviro-Guard™, 1/4" FFL hoses, with Ball Valves – Set of three (Yellow, Blue, Red)
RA 65160	150 cm (60") Enviro-Guard™, 1/4" FFL hose, with Ball Valve – Yellow
RA 65260	150 cm (60") Enviro-Guard™, 1/4" FFL hose, with Ball Valve – Blue
RA 65360	50 cm (60") Enviro-Guard™, 1/4" FFL hose, with Ball Valve – Red

- **3/8" FFL Charging and Vacuum Hoses** These larger diameter hoses reduce pull-down time by as much as 40%

RA 68060	150 cm (60") Enviro-Guard™ Hose, 3/8" FFL, with standard straight fittings – Black
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- **20" Charging Hoses**

RA 68020	50 cm (20") Enviro-Guard™, 1/4" FFL hose, with standard fittings – Set, Red and Blue
RA 68420	50 cm (20") Enviro-Guard™, 1/4" FFL hose, with Quick Seal™ fittings – Set, Red and Blue

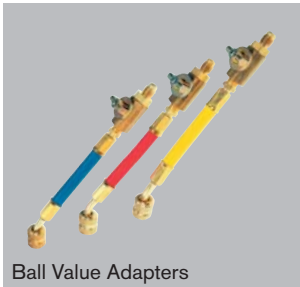


# ROBINAIR REPLACEMENT PARTS

For Hoses, Adapters and Couplers

## ROBINAIR Replacement Parts for Hoses, Adapters and Couplers

RA 40653B	3/16" Valve Core Depressors for Hoses & Adapters, pkg/6
RA 40082	1/4" Valve Core Depressors for Hoses & Adapters, pkg/6
RA 40677	3/16" Gaskets for Hoses & Adapters, pkg/6
RA 40083	1/4" Gaskets for Hoses & Adapters, pkg/6
RA 40084	3/8" Gaskets for Hoses & Adapters, pkg/6



## ROBINAIR Brass Caps

RA 40572	1/4" solid brass Quick Seal™ caps, pkg/6
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## Ball Valve Adapters

These 15 cm (6") adapters connect to any 1/4" FFL charging hose for convenient in-line control of refrigerant flow. The ball valve opens and closes in just a quarter turn. The fitting features a 45° bend for easier connections, even in tight spots.

RA 18501	1/4" MFL x 1/4" FFL, Blue
RA 18512	1/4" MFL x 1/4" FFL, Red
RA 18513	1/4" MFL x 1/4" FFL, Yellow
RA 18514	1/4" MFL x 1/4" FFL, Blue, Red and Yellow (set of 3)
RA 18511	1/4" MFL x 3/16" FFL, Red

## Flexible Adapters

Flexible adapters feature brass fittings and durable neoprenecoated hose, 6"

RA 10293	1/4" MFL x 1/8" FFL, Blue
RA 10470A	1/4" MFL x 3/16" FFL, Red
RA 10778	1/4" MFL x 1/4" FFL, Yellow





## 90° Style Adapters

Solid brass fitting is ideal for tight spots

RA 10469A	1/4" MFL x 3/16" FFL
RA 40560A	1/4" MFL x 1/4" FFL

## Straight Style Adapters

Solid brass fitting is ideal for tight spots

RA 10468A	1/4" MFL x 3/16" FFL
RA 40563A	1/4" MFL x 1/4" FFL



## QUICK SEAL™ Adapters

Quick Seal™ fitting automatically shuts off the charging hose when you disconnect it from the system, so any refrigerant left in the hose is not released. This also prevents "finger burn" and adds an extra measure of safety. Made of solid brass.

RA 10292	1/4" MFL to 1/4" FFL
RA 40560A	1/4" MFL x 1/4" FFL
RA 10250	1/4" MFL to 1/4" FFL, 90° Elbow

## QUICK SEAL™ Repair Kits (For Hoses and Adapters)

RA 18451	45°, 1/4" Quick Seal Repair Kit
RA 18180	1/4" Quick Seal O-Rings Set, pkg/6
TIF 4312	1/4" Anti-blow back, "O"-Rings, Red, pkg/3
TIF 9627	1/4" End Seals, Black, (Manifold side), pkg/6



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# VACUUM PUMPS



15

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# ROBINAIR VACUUM PUMPS

## Overview



**COOLTECH™**



SPX ROBINAIR  
**VacuMaster®**  
HIGH PERFORMANCE VACUUM PUMP

Robinair Vacuum Pumps are engineered specifically to meet your HVAC/R maintenance needs and to give you trouble-free operation. Take advantage of Robinair's years of experience and know-how developing pumps to help you do your job faster and better.

### COOLTECH™ AND VACUMASTER™ FEATURES

- Two Stage Design – second stage starts pumping at a lower pressure to pull a deeper ultimate vacuum
- Integral Check Valve – prevents pump oil from being sucked into the system if a power loss occurs
- Die-Cast Aluminium housing – lightweight but durable
- Molded Base – Durable polycarbonate base improves pump balance and minimizes vibration

### ADDITIONAL COOLTECH™ FEATURES

- Offset Rotary Vanes – Our proven design creates the deep vacuum conditions needed for a thorough evacuation
- Gas Ballast feature – helps keep the pump oil clean by reducing condensation of moisture
- Iso-Valve™ – isolates pump from the system with just a 1/4 turn, making it simple to measure rate of rise

**Oil Fill Port** – Makes adding oil simple since the port is accessible from the front or either side. The sight glass on the front of the pump shows you when enough oil has been added.

**Heavy-Duty Motor** – High torque design for easy start-up and efficient operation.

**Offset Rotary Vanes** – Our proven design builds a powerful compression within the pumping chamber to reduce system pressure and vaporize moisture so it can be exhausted along with air.

**Molded Base** – Durable polycarbonate base improves pump balance and minimizes vibration during operation.

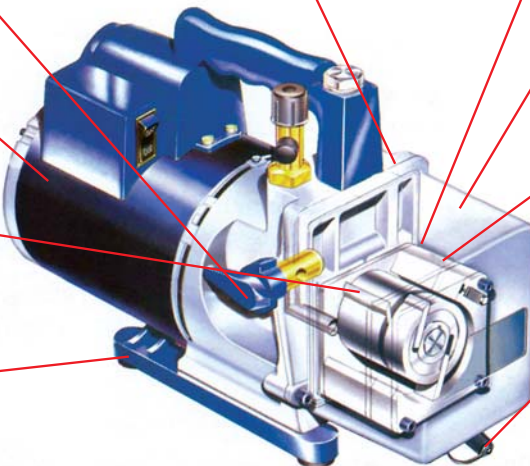
**Gas Ballast** – Moisture laden air passing through the pump mixes with relatively dry air to such a degree that compression does not cause condensation

**Iso-Valve™** – Isolates the pump from the system with just a quarter-turn.

**Die-cast Aluminium Housing** – Cast aluminium housings make the pumps lightweight but durable.

**Two Stage Design** – Cleans the system more thoroughly than a single-stage pump; the second stage starts pumping at a lower pressure so you can pull a deeper, ultimate vacuum.

**Oil Drain Valve** – Positioned at the bottom of the oil reservoir and angled for faster, more complete draining.



## ROBINAIR VACUUM PUMPS

ROBINAIR Vacuum Pumps at Top Quality

Model 15401 - 4 CFM

Specifications	Model 15401 - 4 CFM
Capacity	93 l/min.
No. of Stages	2
Endvacuum	20 Micron
Intake Fittings UNF	1/4" MFL + 1/2" MFLT
Oil Capacity	445 ml (15 oz)
Motor Size	244 W (1/3 HP)
Power Supply	230 V, 50 Hz / 115 V, 60 Hz
Weight	12,2 kg (27 lbs)
Dimensions	24,7 x 14,25 x 38,1 cm (9,5" x 5,5" x 15")



RA 15401

ROBINAIR Vacuum Pumps at Top Quality

Model 15601 - 6 CFM

Specifications	Model 15601 - 6 CFM
Capacity	142 l/min
No. of Stages	2
Endvacuum	20 Micron
Intake Fittings UNF	1/4" MFL + 1/2" MFLT
Oil Capacity	445 ml (15 oz)
Motor Size	366 W (1/2 HP)
Power Supply	230 V, 50 Hz / 115 V, 60 Hz
Weight	12,2 kg (27 lbs)
Dimensions	24,7 x 14,25 x 38,1 cm (9,5" x 5,5" x 15")



RA 15601

ROBINAIR Vacuum Pumps at Top Quality

Model 15225 - 1,2 CFM

Specifications	Model 15225 - 1,2 CFM
Capacity	28 l/min.
No. of Stages	2
Endvacuum	50 Micron
Intake Fittings UNF	1/4" MFL
Oil Capacity	148 ml
Motor Size	92 W (1/8 HP)
Power Supply	230 V, 50 Hz
Weight	4,5 kg (9,9 lbs)
Dimensions	11,4 x 25 x 21,6 cm (4,5" x 9,8" x 8,5")



RA 15225



## ROBINAIR VACUUM PUMPS

The Additional New Generation of ROBINAIR Vacuum Pumps

### ROBINAIR VacuMaster Model 15301-E/15501-E

- The additional new generation of ROBINAIR vacuum pumps
- Built with Robinair's proven offset rotary vane for fast, thorough evacuation
- High pumping capacity reduces evacuation time

Specifications	Model 15301-E	Model 15501-E
Capacity	71 l/min	118 l/min
No. of Stages	2	2
Endvacuum	40 Mikron	40 Mikron
Intake Fittings UNF	1/4" SAE - 3/8" SAE	1/4" SAE - 3/8" SAE
Oil Capacity	220 ml (7.5 oz)	220 ml
Motor Size	1/3 HP (244 W)	1/3 HP (244 W)
Power Supply	230 V 50 Hz	230 V 50 Hz
Weight	10 kg (22 lbs)	12,5 kg (27,5 lbs)
Dimensions	255 x 123 x 385 mm (10" x 4,8" x 15,1")	255 x 123 x 385 mm (10" x 4,8" x 15,1")



RA 15301-E



RA 15501-E

- Best performance and quality at fair prices
- Including Vacuum Gauge
- Solenoid Valve for keeping the vacuum when power loss occurs
- Including one bottle of vacuum pump oil

## ROBINAIR POCKET-ROBI GOLD

Robinair's NEW Pocket-Robi GOLD is designed specifically for A/C service. This NEW ultra-compact pump is extremely small and has no electric motor. It is operated by any hand drill up to a maximum of 2000RPM. When used with a cordless (battery operated) drill, the Pocket-Robi GOLD can be used in areas without AC power available. Thus the Pocket-Robi GOLD is not only the world's smallest vacuum pump, but also the world's most portable and convenient. For any application with restricted access, this is the ideal tool to use!



RA 15800GDP



Specifications	
Displacement	4 Liters/Minute @ 1000RPM; Maximum 8L/min @ 2000RPM
Ultimate Vacuum	400 Microns
Intake Fitting	5/16" MFL ( UNF 1/2-20)
Maximum Operating Cycle	30 minutes
Oil Capacity	6 ml
Weight	500 grams
Dimensions H x W x D	82 x 62 x 55 mm

Comes shipped with 30 ml of Robinair Premium Vacuum Pump Oil (RA 15800 GDP-3 Oil)

# ACCESSORIES FOR ROBINAIR VACUUM PUMPS

Valves / Adapters / Installers / Premium High Vacuum Pump Oil



RA 13047A



RA 10459



RA 13203

## VACUUM VALVE ASSEMBLY

Valve assemblies give the service technician maximum control during evacuation and recharging. Installed directly to the vacuum pump, they connect the pump, manifold and thermistor gauge, providing one central control. Saves time – no need to connect/disconnect hoses. Made of durable forged brass for long life.

RA 13047A	1/2" FFL Coupler x 1/4" MFL x 3/8" MFL, Large internal porting for high CFM flow
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## OPTIONAL VACUUM PUMP INTAKE FITTING ADAPTERS

RA 10459	1/2" FFL to 1/4" MFL
RA 13110	3/8" FFL to 1/4" MFL
RA 13066	1/2" FFL to 3/8" MFL

## ROBINAIR 14599, 18561 VALVE CORE REMOVER/INSTALLERS

- These handy tools remove valve cores without losing the system charge
- They are designed specifically for use during evacuation or recharging on any system with valve core type access ports

## ROBINAIR PREMIUM HIGH VACUUM PUMP OIL

- Chemically engineered to maintain maximum viscosity at high running temperatures and to improve cold weather starts
- Thermal stability – resists break-down due to heat
- Lower moisture content – due to special packaging and handling procedures
- Performance of your pump depends largely on the quality and purity of the vacuum pump oil that you use

RA 13119	Premium High Vacuum Pump Oil, Pint Bottle 0,475 l (16 oz) (case of 12 bottles)
RA 13203	Premium High Vacuum Pump Oil, Quart Bottle 0,95 l (32 oz) (case of 12 bottles)
RA 13204	Premium High Vacuum Pump Oil, Gallon Bottle 3,8 l (128.5 oz) (case of 4 bottles)

Optional Accessories	
RA 17191	Flexible Plastic Oil Spout, 25 cm (10") long; Fits on Quart Bottle (RA 13203)



# VACUUM GAUGES



# 15

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TIF 9450D

Replacement Parts (supplied with product)	Part Number
Sensing Probe Assembly	TIF 9453
Connector hose with Filter	TIF 9454

## TIF 9450D

### Digital Micron Gauge

- Patented sensor technology – requires no calibration for fluctuating ambient and/or sensor housing temperatures
- Not affected by the specific gas being evacuated
- Liquid Crystal Display (LCD) –
- Reads 500.000 to 200 microns
- Dual power supply – 9 V battery or A/C adapter (not included)
- Three foot sensor cord
- Built into ABS Carrying Case

Specifications	
Range	500,000 to 200 microns (auto ranging)
Resolution	100/10/1 microns
Vacuum fitting	1/4" FFL
Power Supply	9 V battery or 9 VDC optional adapte
Battery Life	8 hours (Alkaline)
Probe Cord Length	92 cm
Operating Temp	0° to 52° C (32° to 125° F)



RA 14010A

Replacement Parts (supplied with product)	Part Number
Replacement Thermistor Tube	RA 17162

## ROBINAIR 14010A

### Thermistor Vacuum Gauge

- Large analog meter – clearly marked for easy reading of micron levels
- Indicates actual vacuum level in the system
- Measures from 25.000 to 0 microns
- Two operation modes – select between the null method for greatest accuracy or direct meter reading for continuous monitoring of the evacuation process
- Proven bridge circuit compensates for changes in ambient temperature from -1° to 49° C (30° to 120° F) and also for variances in battery voltage
- Rugged Carrying Case, protects unit during transit and use

Specifications	
Range	25,000 to 0 microns
Vacuum Fitting	1/4" FFL
Power Supply	6 x 1,5 V "C" cell batteries

Optional Accessories	Part Number
Optional A/C Power Adapter	RA 17160 (115 V / 60H z)



RA 14830A

## ROBINAIR 14830A

### Thermistor Vacuum Gauge

- Solid state instrument – constantly monitors and visually indicates vacuum level
- Measures from 25.000 to 50 microns
- 10 segment – LCD screen, can be read in direct sunlight
- No adjustments or calibrations required for atmospheric pressure or altitude
- Includes 60 cm (24") connector hose
- Durable Carrying Case, protects the instrument and has a built-in storage compartment

Specifications	
Range	25.000 to 50 microns
Vacuum Fitting	1/4" FFL
Power Supply	4 x 1,5 V "D" cell batteries



RA 14777

## ROBINAIR 14777

### Compact Electronic Thermistor Vacuum Gauge

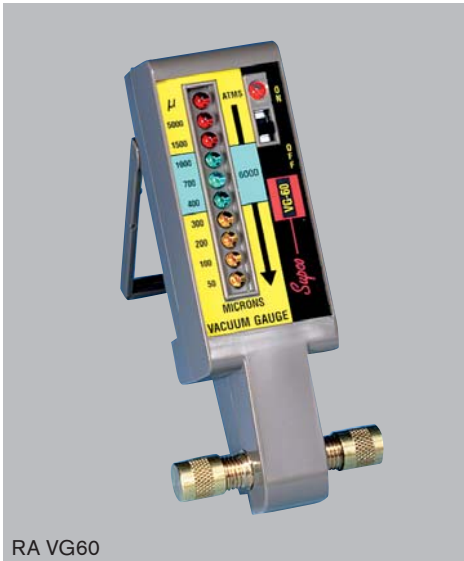
- Compact, pocket-size – 64 x 76 mm (2,5" x 3")
- Takes guess work out of evacuation – accurately indicates when system is ready for recharge
- Designed for use under high vacuum, reads down to 10 microns
- Easy-to-read LCD, automatically registers smaller numeric segments as system pulls down
- 6' long lead and magnetic mounting strip – allows for convenient, easy to read, positioning

Specification	
Range	25.000 to 10 microns
Vacuum Fitting	1/4" FFL
Power Supply	9 V battery (included)



RA VG64

- Easy to use
- LCD-Display allows easy readings
- Sensor type: Thermistor
- 1/4" connections
- Power supply: 9 V Battery
- Rugged plastic case
- Convenient built-in hanger
- Cleaning pat provides quick cleaning and drying of sensor



RA VG60

## ROBINAIR VG64

### Digital Vacuum Gauge

A durable self-contained battery powered vacuum gauge with LCD-Display. Allows reading from 12.000 to 0 microns. The unique design of the RA VG64 allows in-line connection through the system or directly at the vacuum pump.

Specifications	
Dimension	135 x 75 x 40mm
Connections	1/4" MFL
Power Supply	9 V Battery
Sensor Type	Thermistor
Response Time	0,5 sec.
Units	Micron, psi, InHg, Millibar, Pascal, Torr, Millitor
Battery Life	Approx. 30 hours
Automatic Shutt Off	After 10 minutes of vacuum readings are above 12000 microns
Resolution	0-200: 1 micron 201-500: 5 micron 501-1000: 10 micron 1001-2000: 50 micron 2001-5000: 250 micron 5001-8000: 500 micron 8001-12000: 1000 micron
Accuracy	±10 % of reading
Maximum Pressure	20 bar / 300 psi
Operating Temperature	2° to 52° C

## ROBINAIR VG60

### Vacuum Gauge

A durable self-contained battery powered vacuum gauge which displays the level of vacuum on a LED color coded read our. Allows for reading in 10 segments from 12.000 to 50 microns. The unique design of the RA VG60 allows in-line connection through the system or directly at the vacuum pump.

- Dimension: 140 x 45 x 40 mm
- Connections: 1/4" MFL
- Power Supply: 9 V Battery
- Sensor replacement not necessary, just clean it!
- Single switch operation, no adjustments required
- Low Battery Indicator
- Color coded LED display
- Built-In hanger and stand support for remote connections
- Rugged plastic case

# GENERAL TOOLS AND ACCESSOIRES



# 15

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## IMPERIAL® TUBE CUTTERS

### TC-1050

#### Metal Tubing



TC-1050

#### For 1/8" to 5/8" O.D. tubing.

- Big capacity, small size tube cutters designed for use in tight quarters where other cutters won't fit
- Enclosed feed screw minimizes contamination assuring continued smooth operation
- Corrosion resistant stainless steel rollers positioned at bottom of cutter allows for easier cutter engagement on tubing and smoother cutting action
- All Imperial tube cutters are 100% factory tested to ensure accurate spiral free cutting
- For 1/8" to 5/8" and 4 to 15 mm O.D. tubing
- Includes (1) S32633 general-purpose cutter wheel
- Swing radius 1-1/4" • Length 1 - 3/4" (4,5 cm) • Weight 0,07 kg

## 174-F "BIG IMP"®

#### Metal Tubing



174-F

#### „Big capacity in small size“

- For 3/8" to 1-1/8" (10mm to 28mm) O.D. tubing.
- Includes (2) S75015 general-purpose cutter wheels
- Swing radius 1-15/16" (2-1/4" swing radius with 1-1/8" tube)
- Length 2-11/16" (7 cm) • Weight 140 g

## 206-FB

#### Adjust-O-Matic® Tube Cutter



206-FB

#### For 3/8" to 2-5/8" tubing.

- Ratchet feed mechanism speeds up cutting operation
- Extra wide rollers with flare cut-off groove stabilize tubing
- Spare cutting wheel included under handle cap
- Enclosed screw-type feed mechanism; light weight aluminum alloy body
- For 3/8" to 2-5/8" and 10 to 66 mm O.D. tubing
- Includes (2) S74761 general-purpose cutter wheels
- Length closed 7 - 3/4" (20 cm) • Weight 910 g

## TC-1500

#### Hi-Duty™ Tube Cutter



TC-1500

#### For 1/8" to 1-1/8" (4 - 28 mm) O.D. tubing.

- Lower profile swing radius – 4-1/4"
- Retractable rotary style reamer – can be used right- or left-handed, and with a clockwise or counterclockwise motion for better ergonomic control
- Rollers feature flare cut-off groove to reduce tube loss when damaged flare is removed
- Lightweight die-cast solid aluminum body – lighter than similar cutters
- Imperial's unique design eliminates spiraling for clean right angle cuts
- Our high precision machining and construction method permits one-piece screw-type axle for easy access to cutting wheel – no clip to lose or replace
- Imperial cutter wheels are made of the highest quality wear and abrasion-resistant chromium steel and precision machined to exacting specifications for accurate cutting and long life. Each tool is supplied with a spare cutter wheel.
- Available in "Try Me" clamshell packaging.





312-FC

**TC-1000**

For 1/8" to 1-1/8" (4 to 28 mm) O.D. tubing. Includes (2) S75015 general-purpose cutter wheels. Length 5" (13 cm). Weight 0,18 kg.

**312-FC**

For 1/4" to 1-5/8" (7 to 41 mm) O.D. tubing. Includes (2) S75015 general-purpose cutter wheels. Length 5-1/2" (13 cm). Weight 0,20 kg.

## TC-1000 / 312-FC

### Hi-Duty® Tube Cutters

**For 1/8" to 1-1/8" and 1/4" to 1-5/8" O.D. tubing.**

- Enclosed hardened steel, thrust bearing feed mechanism for smoothest cutting action and trouble free operation
- Imperial's unique design eliminates spiraling for clean right angle cuts. Our high precision machining and construction method permits one-piece screw type axle for easy access to cutting wheel - no clip to lose or replace
- Rugged aluminum alloy body designed for handling ease. Body is hand buffed and nickel chrome plated to a high luster finish
- Foldaway hardened steel reamer with turned cutting edge removes inside burrs cleanly. Filing surface removes outside burrs
- Rollers feature flare cut-off groove to reduce tube loss when damaged flare is removed
- Imperial cutter wheels are made of the highest quality wear & abrasion resistant chromium steel and precision machined to exacting specifications for accurate cutting and long life. Each tool is supplied with a spare cutter wheel
- All Imperial tube cutters are 100 % factory tested to ensure accurate spiral free cutting



TC-1050-RH

## TC-1050-RH

### Ratcheting Mini Tube Cutter

**For 1/8" to 5/8" and 4 to 15mm O.D. tubing.**

- Minimal clearance radius of 1-1/4"
- Easily completes a full revolution, maximizing leverage
- TC-1050RH cutter can easily be removed from the handle. Includes (1) S32633 general purpose cutter wheel
- Ergonomic handle with non-slip grip
- 100% factory tested to ensure accurate spiral-free cutting
- Six independent drive pawls provide 15" arc-swing
- 5" (13 cm) nominal length



227-FA

## 227-FA

### Junior Tube Cutter

**For 1/8" to 3/4" (4 mm to 19 mm) O.D. tubing.**

- Includes S32633 general-purpose cutter wheel
- Swing radius 2" (5,1 cm)
- Length 3-1/2" (9 cm)
- Weight 140g



RA 42090



RA 42024



RA 42080



RA 42071



RA 42028



RA 42022



RA 42035

# ROBINAIR TUBE CUTTERS

## ROBINAIR 42022

Mini Tubing Cutter

- Short swing radius for tight spots
- Wide capacity range
- For 1/8" to 1-1/8" O.D. tubing

## ROBINAIR 42024

Mini Tubing Cutter

- Smallest cutting radius
- Ideal for extremely tight places
- Fine thread screw provides easier tightening
- For 1/8" to 5/8" O.D. tubing

## ROBINAIR 42028

Tubing Cutter with Deburring Tool

- Aluminum alloy body and nickel-chrome durable finish
- Includes tubing deburring tool located on the head of cutter
- For use on copper, aluminum, steel and stainless steel tubing
- Wide capacity range
- For 1/4" to 1-1/2" tubing

## ROBINAIR 42071, 42080, 42090

Ratcheting Tubing Cutter

- Designed for confined spaces
- Unique ratcheting action operates like a socket ratchet but cuts copper, aluminum, stainless steel, and PVC
- Spring-loaded adjusting screw applies continuous pressure while cutting

RA 42071	Ratcheting tubing cutter for 1/8" to 1/2" tubing
RA 42080	Ratcheting tubing cutter for 1/4" to 7/8" tubing
RA 42090	Ratcheting tubing cutter for 1/4" to 1-1/8" tubing

## ROBINAIR 42035

Slip-Adjust Tubing Cutter

- All metal construction
- Spring-loades cutting tool for faster cutting
- Two locations for spare cutting wheels (included)
- Includes attached reaming tool
- For 1/4" to 2" tubing

**144-F****New Tube Cutter Service Center**

**For 1/8" to 4-1/8" O.D. tubing.**

Selling Imperial® replacement cutter wheels, reamer blades and fasteners just got easier. Our new Service Center organizes a popular selection of replacement parts for Imperial cutters. Display on the counter or bring it with you when making sales calls. You can even sell the whole unit to customers!

**144-F Imperial Tube Cutter Service Center**
















- 15 most common replacement parts stocked in one handy container
- Includes a visual replacement chart for quick and easy identification



144-F

Part #	Quantity	Description	Cutter
S75015	10	General Purpose Cutter Wheel	TC-1000, TC-1010, 312-FC, 174-F, TC-2050
S75046	5	Cutter Wheel for Stainless Steel	TC-1000, TC-1010, 312-FC, 174-F, TC-2050
S32633	10	Cutter Wheel	TC-1050, 227-FA
S74761	5	Cutter Wheel	206-FB, 206-FBP
S74762	5	Cutter Wheel Retaining Screw	TC-1000, TC-1010, 312-FC, 174-F, TC-2050
S74833	3	Cutter Wheel	406-FA
S26883	3	Cutter Wheel Retaining Screw	TC-1050
S77511	3	Cutter Wheel Retaining Screw	206-FB, 206-FBP
S74834	3	Cutter Wheel Retaining Screw	406-FA
S76637	3	Constrictor Roller Wheel	TC-1000, TC-1010, TC-1020, 312-FC
S16003162	5	Cutter Wheel for Soft Copper Only	TC-1000, TC-1010, 312-FC, 174-F, TC-2050
S10000770	3	Cutter Wheel for PVC	206-FB, 206-FBP
S7931801	3	Reamer Blade	TC-1000, TC-1010, 312-FC
S8201501	3	Retaining Screw for Reamer Blade	TC-1000, TC-1010, 312-FC
S74197	3	Spring Washer for Reamer Blade	TC-1000, TC-1010, 312-FC
144FB	1	Container only	



<p><b>CUTTER WHEEL</b> Part# S74833 for Cutter # 406-FA</p> 	<p><b>CUTTER WHEEL FOR PVC</b> Part# S10000770 for Cutters # 206-FB, 206-FBP</p> 	<p><b>UTTER WHEEL</b> Part# S74761 for Cutters # 206-FB, 206-FBP</p> 
<p><b>GENERAL PURPOSE CUTTER WHEEL</b> Part# S75015 for Cutters # TC-1000, TC-1010, 312-FC, 174-F, TC-2050</p> 	<p><b>CUTTER WHEEL FOR SOFT COPPER ONLY</b> Part# S16003162 for Cutters # TC-1000, TC-1010, 312-FC, 174-F, TC-2050</p> 	<p><b>CONSTRUCTOR ROLLER WHEEL</b> Part# S76637 for Cutters # TC-1000, TC-1010, TC-1020, 312-FC</p> 
<p><b>CUTTER WHEEL FOR STAINLESS STEEL</b> Part# S75046 for Cutters # TC-1000, TC-1010, 312-FC, 174-F, TC-2050</p> 	<p><b>CUTTER WHEEL</b> Part # S32633 for Cutters # TC-1050, 227-FA</p> 	<p><b>SPRING WASHER FOR REAMER BLADE</b> Part# S74197 for Cutters # TC-1000, TC-1010, 312-FC</p> 
<p><b>REAMER BLADE</b> Part # S7931801 for Cutters # TC-1000, TC-1010, 312-FC</p> 	<p><b>CUTTER WHEEL RETAINING SCREW</b> Part# S26883 for Cutter# TC-1050</p> 	<p><b>CUTTER WHEEL RETAINING SCREW</b> Part# S74834 for Cutter # 406-FA</p> 
<p><b>CUTTER WHEEL RETAINING SCREW</b> Part # S77511 for Cutters # 206-FB, 206-FBP</p> 	<p><b>CUTTER WHEEL RETAINING SCREW</b> Part # S74762 for Cutters # TC-1000, TC-1010, 312-FC, 174-F, TC-2050</p> 	<p><b>RETAINING SCREW FOR REAMER BLADE</b> Part # S8201501 for Cutters # TC-1000, TC-1010, 312-FC</p> 

All Products of  
IMPERIAL available  
(more than 1.600 products).



# IMPERIAL® TUBE BENDER

## 370-FH

### Tripple-Head 180° Tube Bender



370-FH

Bend 4 of the most popular sizes of soft copper, aluminum and thin wall steel tubing with one rugged, precise tool!

- Bends 1/4", 3/16", 3/8" and 1/2" Tubing
- Makes Smooth, Tight Radius 180° Bends
- Calibrated Markings - for making accurate left-hand, right-hand and offset bends
- Adjustable hook
- Optimum Bending Radius - for each tubing size
- Cushion Grips - for extreme comfort
- Made of Lightweight Die-Cast Aluminum
- Clamshell packaging available

Item	Tube O.D.	Radius to center of tube
370-FH	1/4"	11/16"
	3/8"	1-1/8"
	1/2"	1-1/2"

## 367-FH / 368-FH

### IMP® Tripple-Head Benders



367-FH

368-FH

For soft copper, aluminum and thin wall steel tubing. For 1/8", 3/16", 1/4", 5/16", 3/8" O.D. tubing. Makes up to 90° bends.

Calibrated markings for making accurate left-hand, right and offset bends. Ninety degree start requires less effort – making bending fast and easy. For soft copper, aluminum and steel.

367-FH	For 1/8", 3/16" and 1/4" (3, 4 and 6 mm) O.D. tubing. 9/16" (14.2 mm) radius to center of tube. Weight 0.2 kg.
368-FH	For 3/16", 1/4", 5/16" and 3/8" (6 and 8 mm) O.D. tubing. 15/16" (17.5 mm) radius to center of tube. Weight 0.450 kg.



Each tool bends one size. Open side type which slips over tube at any point. Makes smooth, tight radius bends up to 180° with minimum effort. No scoring or flattening of tubing. Calibrated to show angle of bend. Wide hook grips tubing securely.

**364-FHA**  
**Lever Type Tube Benders**

**For 1/8" to 1" (6mm to 12 mm) O.D. tubing.**

Item	Tube O.D.	Radius to Center of Tube	Weight each
364-FH-02	1/8"	3/8" (9,5 mm)	0,23 kg
364-FH-03	3/16"	7/16" (11 mm)	0,23 kg
364-FHA-04	1/4"	9/16" (14 mm)	0,45 kg
364-FHA-05	5/16"	11/16" (17 mm)	0,45 kg
364-FHA-06	3/8"	15/16" (24 mm)	0,8 kg
364-FHA-07	7/16"	1-1/2" (38 mm)	1,6 kg
364-FHA-08	1/2"	1-1/2" (38 mm)	1,6 kg
364-FHA-10*	5/8"	2-1/4" (57 mm)	2,5 kg
364-FHA-12*	3/4"	3" (76 mm)	3,2 kg
364-FHA-14*	7/8"	3" (76 mm)	4,76 kg
364-FHA-16*	1"	3-1/2" (89 mm)	4,76 kg

Each tool bends only one size. Conforms to Federal Specifications GGG-B-191a Type III, Class 2. \*For bending annealed copper and aluminum tubing only.

Metric Size Bending Tools	Tube O.D.	Radius to Center of Tube	Weight each
364-FHAM-6 mm	6 mm	9/16" (14 mm)	0,45 kg
364-FHAM-8 mm	8 mm	11/16" (17,5 mm)	0,45 kg
364-FHAM-10 mm	10 mm	15/16" (24 mm)	0,80 kg
364-FHAM-12 mm	12 mm	1-1/2" (38 mm)	1,60 kg

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364-FHB-06

## 364-FHB

### Swivel Handle Tube Benders

**For 1/4" to 1/2" (6 mm to 12 mm) O.D. tubing.**

The patented 364-FHB series has a swivel handle that can be repositioned midway through a bend when both handles begin to meet. This simple feature allows easy fabrication of bends up to 180° with reduced effort, better control and without the crossing of handles, typical of most other lever type benders.

Item	Tube O.D.	Radius to center of tube	Weight each
364-FHB-04	1/4"	9/16" (14 mm)	0,45 kg
364-FHB-05	5/16"	11/16" (17,5 mm)	0,45 kg
364-FHB-06	3/8"	15/16" (24 mm)	0,80 kg
364-FHB-07	7/16"	1-1/2" (38 mm)	1,60 kg
364-FHB-08	1/2"	1-1/2" (38 mm)	1,60 kg

Metric Size Bending Tools	Tube O.D.	Radius to center of tube	Weight each
364-FHBM-6 mm	6 mm	9/16" (14 mm)	0,45 kg
364-FHBM-8 mm	8 mm	11/16" (17,5 mm)	0,45 kg
364-FHBM-10 mm	10 mm	15/16" (24 mm)	0,80 kg
364-FHBM-12 mm	12 mm	1-1/2" (38 mm)	1,60 kg



470-FH

## 470-FH

### Tube Bender

**Tripple Head 180° Tube Bender with Roto-Lok™ Indexing Handle**

- Bends 3/16", 1/4", 5/16" and 3/8" O.D. Tubing
- Patented, quick-action indexing lever repositions two-stage handle midway through bend when both handles begin to meet. This feature allows easy fabrication of bends up to 180° with reduced effort, better control and no crossing of handles
- Optimum Bending Radius – for each tubing size
- Calibrated markings – for making accurate left-hand, right-hand and offset bends
- Compact design for working in tight spaces
- Cushion grips – for comfort and stability
- Made of lightweight, die-cast aluminum

Tube O.D.	Radius to center of tube
3/16"	7/16" (11 mm)
1/4"	9/16" (14 mm)
5/16"	11/16" (17 mm)
3/8"	15/16" (24 mm)



**464-FHT-04/06/08**  
**Tube Bender**

**Heavy-Duty 180° Tube Bender with Roto-Lok™ Indexing Handle**

- For 1/4" to 1/2" O.D. tubing
- New design for accurate bends up to 180° in stainless steel and other tough metals
- Patented, quick action trigger release repositions two-stage handle midway through bend when both handles begin to meet. This feature allows easy fabrication of bends up to 180° with reduced effort, better control and no crossing of handles
- Rollers in bending handle reduce friction and bending effort; eliminate scoring of tubing
- Comfortable and durable ergonomically molded cushion grips
- Vise lug for mounting in vise

Item	Tube O.D.	Radius to center of tube	Weight each
464-FHT-04*	1/4"	9/16" (14 mm)	0,50 kg
464-FHT-06*	3/8"	1-1/8" (29 mm)	1,70 kg
464-FH-08*	1/2"	1-1/2" (38 mm)	3,40 kg

\*Optimized tight bend radius



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RA 18548

## ROBINAIR TUBE BENDER

### ROBINAIR 18548

#### 4-IN-1 Tube Bender

- Bends four sizes of soft or annealed tubing
- Prevents crimping, flattening or scratching
- Calibration allows duplication of any angle
- Long handles 22 cm no extensions required
- „Glass/plastic“ construction combines strength with lightweight durability
- For use on 3/16", 1/4", 5/16" and 3/8" tubing



RA 6515

### ROBINAIR 6515

#### Three-In-One 180° Tubing Bender

- Capable of making 180° bends in copper, brass, aluminium and steel tubing
- Just one tool works on three sizes of tubing 1/4", 5/16", 3/8"

## IMPERIAL® SPRING TYPE TUBE BENDERS

### 102-F-06/08/10/12

#### Spring Type Tube Benders

**For soft copper and aluminum tubing.  
For 3/8" to 3/4" O.D. tubing.**

Tools allow hand bending of soft tubing to any shape without collapsing walls. Special spring steel, zinc finish. End belled for quick tube removal.



102-F-06

Item	Tube O.D.	Length	Weight each
102-F-06	3/8"	254 mm (10")	0,11 kg
102-F-08	1/2"	305 mm (12")	0,18 kg
102-F-10	5/8"	305 mm (12")	0,23 kg
102-F-12	3/4"	305 mm (12")	0,28 kg

# IMPERIAL® FLARING TOOLS

## 195-FC

### 45° Flaring Tool

**For 3/16", 1/4", 5/16", 3/8", 7/16", 1/2" and 5/8" O.D. tubing.**

Flares 7 sizes of tubing. Rugged forged steel slip-on yoke and hardened flaring bar. Positive clamping action of bars prevents tube slippage. Self centering yoke with swivel-type, hardened steel, chromefinished flaring cone forms better flares with less effort. Design of yoke permits flaring where there is little space between nut and tube end. Satin finish nickel-chrome plated. Weight 0.907 kg.

Outside Tube Diameter	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"
Wall Thickness	.028"	.035"	.035"	.035"	.035"	.035"	.035"



195-FC

## 375-FS

### 45° Large Size Flaring Tool

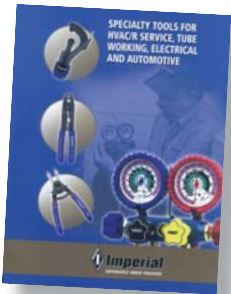
**For sizes 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8" and 3/4" O.D. tubing.**

Flares larger tube sizes. Quick slip-on yoke with hard chrome-finished, swivel flaring cone reduces effort. Positive clamping action of flaring bar eliminates tube movement. Nickel chrome finish. Conforms to Federal Specification GGG-F-451a Type 1, Class 2. Style A. Weight 1,7 kg.



375-FS

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500-FC

## 500-FC

### 45° Rol-Air Flaring Tool

**Flares and burnishes 3/16", 1/4", 5/16", 3/8", 1/2" and 5/8" O.D. tubing.**

Faceted, hardened steel, chrome-finished cone rolls out perfect 45° flares above die block, and automatically burnishes flare face reducing the need for deburring. Original wall thickness is maintained at base of flare. New slip-on yoke permits use in tight quarters, where there is little space between nut and tube end. Larger handle, with better leverage, and precision threads on feed screw make flaring effortless. Heat treated dies grip tubing without scoring. Satin chrome and black finish. Weight 0,680 kg.

Outside Tube Diameter	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"
Wall Thickness	.028"	.035"	.035"	.035"	.035"	.035"



500-FCM

## 500-FCM

### Metric Size 45° Rol-Air Flaring Tool

**Flares and burnishes 6, 8, 10, 12, 15 and 16 mm O.D. tubing.**

Faceted, hardened steel, chrome-finished cone rolls out perfect 45° flares above die block, and automatically burnishes flare face reducing the need for deburring. Original wall thickness is maintained at base of flare. New slip-on yoke permits use in tight quarters, where there is little space between nut and tube end. Larger handle, with better leverage, and precision threads on feed screw make flaring effortless. Heat treated dies grip tubing without scoring. Satin chrome and black finish. Weight 680 g.

Outside Tube Diameter	6 mm	8 mm	10 mm	12 mm	15 mm	16 mm
Wall Thickness	1,0 mm	1,0 mm	1,0 mm	1,0 mm	1,0 mm	1,0 mm



525-F

## 525-F

### "Grabber"® 45° Rol-Air Flaring Tool

**Universal application. Adjustable opening holds all sizes. Flares and burnishes 3/16" to 5/8" (4.75 to 16mm) O.D. tubing.**

Unique, self-adjusting, tube holding mechanism permits flaring any size tubing within the range of 3/16" to 5/8" (4.75 to 16 mm) O.D. tubing. Innovative, single opening design is more compact and easier to use than conventional multi-opening flaring bars. Faceted, hardened steel, chrome-finished cone rolls out and burnishes perfect 45° flare above the tube holding mechanism reducing need for deburring. Original wall thickness is maintained at base of flare. Slip-on self-centering yoke permits use in tight quarters. Large handle, with better leverage, and precision threads on feed screw make flaring effortless. High quality construction with satin chrome and black finish. Weight 0.800 kg.

Outside Tube Diameter	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"
Wall Thickness	.028"	.035"	.035"	.035"	.035"	.035"

Outside Tube Diameter in mm	4,75	6	8	10	12	15	16
Wall Thickness in mm	1,0	1,0	1,0	1,0	1,0	1,0	1,0



95-S

## 95-S

### Punch Type Swaging Tools

Use these tools for making tubing connections without fittings. Enlarge end of tube, insert another tube of original O.D. size and solder together like a sweat fitting.

- One tool swages 3/16", 1/4", 5/16", 3/8", 1/2", 5/8" O.D. tubing
- Hi-alloy steel, heat-treated for rugged use
- Hex design for ease of extraction
- Precision machined surface for ease of forming

Outside Tube Diameter	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"
Wall Thickness	.028"	.035"	.035"	.035"	.035"	.035"

Item	Tube O.D.	Wall Thickness	Weight
93-S-04	1/4"	.035"	90 g
93-S-06	3/8"	.035"	113 g





193-S

## 193-S

### Punch Type Swaging Tools

Use these tools for making tubing connections without fittings. Enlarge end of tube, insert another tube of original O.D. size and solder together like a sweat fitting.

Vinyl case contains 4 swaging punches 1/4", 3/8", 1/2" and 5/8" O.D. tubing. Weight 0,453 kg.

#### Individual Swaging Tools

Item	Tube O.D.	Wall Thickness	Weight
93-S-04	1/4"	.035"	90 g
93-S-06	3/8"	.035"	113 g



275-FS

## 275-FS

### Flaring (45°) & Swaging Tool

**For 1/8" to 3/4" and 4 to 22 mm O.D. tubing.**

- Flares and swages
- Converts quickly. Screw-type feed
- Ideal for use in close quarters
- Two bars included cover 9 sizes
- Swivel-type swaging adapters and flaring cone are hardened steel chrome-finished for easy operation
- Self-centering, slip-on forged steel yoke
- In tool case
- Weight 1,6 kg

Flares 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8" and 3/4" O.D. Includes 5 swage adapters that swage 7 tube sizes 3/16", 1/4", 5/16", 3/8", 1/2", 5/8", 3/4" O.D.

#### Replacement parts:

278-FS-03X04X06	Adapter 3/16", 1/4", 3/8"
278-FS-05	Adapter 5/16"
278-FS-08	Adapter 1/2"
278-FS-10	Adapter 5/8"
278-FS-12	Adapter 3/4"
S38600	Flaring Cone



275-FSC

## 275-FSC

### 45° Flaring, Cutting and Swaging Kit

**For soft copper, aluminum, steel, stainless steel and brass tubing.**

Kit contains a TC-1000 tube cutter for 1/8" to 1-1/8" O.D. tubing and 275-FS 45° flaring and swaging tool. In tool case. Weight 1.361 kg.

**Flares:** 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8" and 3/4" O.D. tubing.

**Swages:** 3/16", 1/4", 5/16", 3/8", 1/2", 5/8" and 3/4" O.D. tubing.

## IMPERIAL® RATCHET WRENCHES

### 127-C

Compressor access valve wrench. Chrome plated. Has 1/4", 3/8", 3/16" and 5/16" square drive ratchets and is specially designed for use on compressors with access valves in hard to reach places. Reversible ratchets.



127-C

### 127-CO

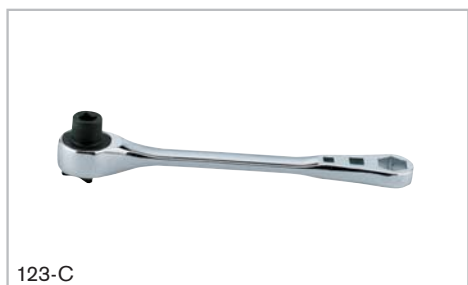
Same as 127-C except with unique 25° offset that provides additional convenience in hard to reach places.



127-CO

### 123-C

Rugged steel forged wrench. For use on small refrigerant cylinders, shut-off valves, packing gland nuts, etc. Ratchet has 1/4" square drive and raised face. Handle has 3/16" and 1/4" square drives and 1/2" hex.



123-C

All Products of  
IMPERIAL available  
(more than 1.600 products).



**124-C**

Combination wrench with the four sizes most needed for servicing air-conditioning and refrigerator equipment:

- 9/16" hex for dust cap on access valves and plug oil check on compressor.
- 1/2" hex for compressor mounting bolts.
- 1/4" square for valve stem and service valves and old style compressor valves.
- 3/16" square for valve refrigerant charging tanks.

**125-C**

Rugged, steel forged wrench with four sizes covering almost any application. Ratchet has 1/4" drive on one end; other end has 3/16" and 5/16" square openings, plus 9/16" hex opening.

**126-C**

Economy compressor access valve wrench. Chrome plated. Has 1/4", 3/8", 3/16" and 5/16" square drive ratchets and is specially designed for use on compressors with access valves in hard to reach places. Reversible ratchets.

## ROBINAIR RATCHET WRENCHES

### RA 10559 Ratchet Wrenches

Reversible, 1/2" and 9/16" hex openings on one end, 3/16" and 1/4" SQUARE on the other

### RA 10696 Ratchet Wrenches

Reversible, four square openings, 1/4" and 3/16" on one end, 3/8" and 5/16" on the other

### RA 11012 Ratchet Wrenches

Reversible, with 25° offset, four square openings, 1/4" and 3/16" on one end, 3/8" and 5/16" on the other



RA 10696



RA 11012

## IMPERIAL® DEBURRING TOOL

### 208-F

#### Inner-/Outer Reaming and Deburring Tool

- For 3/16" to 1-1/2" OD tubing
- Reams both inside and outside edges of tube with 3 hollow ground cutters
- Tough die cast body
- Deburrs both clockwise and counterclockwise
- Fluted body is shaped to fit comfortably in palm
- Reamer for copper, aluminum and brass tubing
- Hardened steel cutter blades
- Blue finish
- Weight 285 g



208-F

### 210-F

#### Deburring Tool

Rotary style blade is perfect for removing burrs from holes and edges of any size. Large ergonomic handle reduces user fatigue, encloses handy storage cavity for extra blades. Ships complete with two heavy duty blades for copper, steel, aluminum, zinc, cast iron, brass and plastic tubing.



210-F

## ROBINAIR FIN STRAIGHTENER

### RA 18400

#### Fin Straightener

- Six-in-one Fins
- Cleans & straightens condenser and evaporator coil fins
- Each section clearly marked with fin size
- Compact size
- 8, 9, 10, 12, 14, & 15 fins per inch



RA 18400



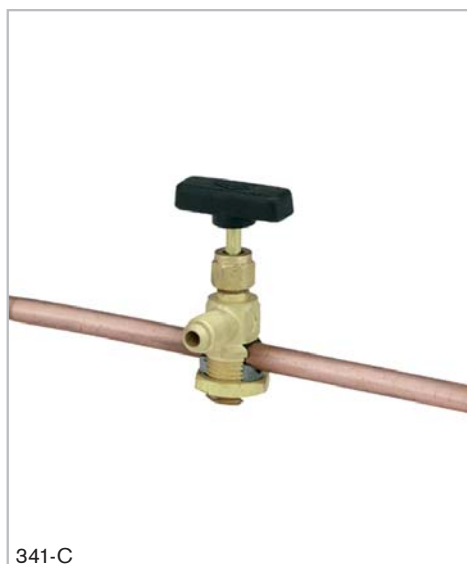
PT-109

## PT-109 KWIK-VISE®

### Line piercing / refrigerant recovery tool

Line piercing/refrigerant recovery tool pierces, seals and locks on to copper lines in one swift motion. Self adjusting! No need to adjust the tool for different sizes of tubing. The patented tension system automatically locks pliers on copper tubing 1/4" to 1/2" (6 - 12 mm) O.D. tubing. To use simply position the PT-109 on the tubing to be pierced. Close the pliers quickly and firmly. The pliers will automatically adjust and lock into a tightly sealed, secure position.

- Replaceable hardened, stainless steel pierce and brass valve assembly
- Capacity: 1/4" thru 1/2" O.D. refrigerant copper tubing
- Durable: made with high carbon, heat treated, steel jaws
- Works with all refrigerants CFC, HFC, HCFC and Zeotropic, Azeotropic
- 90° elbow valve eliminates tangling and interference problems



341-C

## 341-C TAP-A-LINE®

### Universal Line Piercing Valve

A quick and economical way to tap into a line at any point for charging, testing or evacuating hermetically sealed units. Valve fits 3/16" to 3/8" O.D. tubing and has 1/4" flare connections for charging lines. Valve clamps on tubing line, one end of charging line is attached to 1/4" flare connection on valve and other end to testing unit or refrigerant tank. Valve stem is turned forward until sharp needle pierces tubing. Stem is then backed off for testing or charging. After service is completed, valve is closed and left on line for future service. Valve has T-Grip handle and forged brass body. Sealing gasket is confined to prevent falling out. V-block centers valve on tube, and is attached to nut so that it can't be lost.



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PROMAX AUTO





RA 40464



RA 40380



RA 40288



RA 40330



RA 40472



RA RG180-5-4



RA RG 0,90-5-4

## ROBINAIR VALVES

### General Purpose Valves

#### Straight Type

RA 40464	Straight Type 1/4" MFL x 1/4" MFL
RA 13144	Straight Type 1/4" MFL x 1/4" FPT

#### Quick Coupler Style Valve

RA 40380	Quick Coupler Style Valve 1/4" FFL Coupler x 1/4" MFL
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#### Gauge Cocks

Brass Tee Handle

RA 40479	1/4" FPT x 1/4" MPT
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## ROBINAIR PIERCING VALVES

### Piercing Valves with Flow Control And 1/4 S.A.E. Connector size

RA 40288	Fits 3/16", 1/4", 5/16", 3/8" OD
RA 13139	Fits 1/2", 9/16", 5/8" OD
RA 40291	Gaskets for RA 40288/RA 40330, pkg/3

### Piercing Valves with Valve Cores

RA 40330	Fits 3/16", 1/4", 5/6", 3/8" OD
RA 40336	Fits 1/2", 5/8" OD

### Straight Line Top Valves

RA 40472	Fits 1/4", 5/16", 3/8" OD
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### Couplers

RA RG180-5-4	5/16", Female x 1/4" Male SAE
RA RG 0,90-5-4	5/16", Female x 1/4" Male SAE, 90°

### "Easy Tap" Line Piercing Valves

RA 14809	90° Line Tap (R-2) Fits 1/2", 5/8" OD
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# ROBINAIR FITTINGS

## Tees/Fittings



RA 40386



RA 40396

RA 40384	1/4" MFL Branch with core x 3/8" OD tube or 1/2" OD solder, pkg/3*
RA 40386	1/4" MFL run x 1/4" FFL run with depressor x 1/4" MFL Branch with core, pkg/3
RA 40396	1/4" MFL Branch with core 1/4" MFL run x 1/4" FFL swivel run, pkg/3
RA 40390	1/4" MFL Branch with core x 1/8" MPT run x 1/8" MPT, pkg/3
RA 40423	1/8" MPT Branch x 1/4" MFL run x 1/4" MFL run with core, pkg/3
RA 40398	1/4" FFL Swivel Branch with depressor x 1/4" MFL run with core x 1/4" MFL run, pkg/3
RA 40399	1/4" FFL Swivel Branch x 1/4" MFL run x 1/4" MFL run with core, pkg/3

\*Comes with RA 13145 Valve Core Remover

## FFL Coupling



RA 40398

RA 40410	1/4" MFL with core x 1/4" FFL with copper gasket, pkg/6
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## Quick Couplers with Depressors



RA 40410

RA 40553	1/8" FPT x 1/4" FFL
RA 40555	1/4" FPT x 1/4" FFL

## Solder Union Type



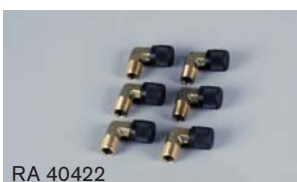
RA 40553

RA 40417

RA 40416	1/4" MFL x 1/8" OD Copper Tube Ext., pkg/6
RA 40417	1/4" MFL x 3/16" OD Copper Tube Ext., pkg/6
RA 40418	1/4" MFL x 1/4" OD Copper Tube Ext., pkg/6
RA 40419	1/4" MFL x 5/16" OD Copper Tube Ext., pkg/3*
RA 40420	1/4" MFL x 3/8" OD Copper Tube Ext., pkg/3*
RA 40424	1/4" MFL x 1/4" OD or 3/8" ID Solder with cap and chain*
RA 40427	1/4" MFL x 1/4" OD or 3/8" ID Solder, pkg/6*

\*Comes with RA 13145 Valve Core Remover

## Elbow Access Fitting



RA 40422

RA 40422	1/4" MFL with core x 1/8" MPT Elbow, pkg/6
----------	--

# ROBINAIR 42640

## High Flow Fitting



RA 42640

- Increase flow rate by six times, just by changing a fitting!
- Replaces standard Schraeder™ valve core service connection
- Charging and evacuation time is drastically reduced, saving time and money
- Easy to install – solders to 1/4" tubing
- Includes double seal cap



RA 13145

## ROBINAIR VALVE TOOLS

### ROBINAIR 13145

#### 1/4" Valve Core Remover / Installers

Including 6 valve cores



RA 14599

### ROBINAIR 14599

#### Valve Core Remover / Installers

Remove and install valve cores from a 1/4" male flare access fitting without the loss of refrigerant. Durable, solid brass tool has a ball valve that can be opened or closed in just a quarter-turn, rather than a stem-type valve. Designed with a stainless steel ball and brazed side fitting for durability and long life.

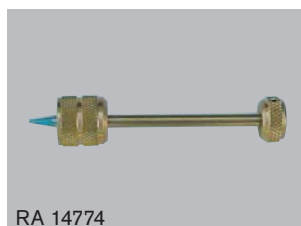


RA 18561

### ROBINAIR 18561

#### Valve Core Remover / Installers

Replace leaking valve cores quickly and easily, or remove the valve core and hold it out of place for evacuation or charging. Features a solid brass body with a convenient handle that opens and closes in a quarter-turn to speed service. Compact design easily fits most locations.



RA 14774

### ROBINAIR 14774

#### Pick Extractor

For use with RA 14599 or RA 18561, extractor lets you remove damaged cores in the service line while the system is fully charged, without releasing refrigerant into the atmosphere.



RA 40352

### ROBINAIR 40352

#### Valve Cores

Package of 6 pcs



RA 12294

### ROBINAIR 12294

#### Pinch-Off Tool

- Patented clamping mechanism quickly and securely pinches off tubing and cloth-reinforced hose
- Comfortable cushion grip
- Ideal for closing off compressor process tubes
- For 3/16", 1/4", 5/16" and 3/8" tubing



RA 14388

## ROBINAIR 14388

### Refrigerant Oil-Pump

- Oil-Pump design allows you to add refrigerant oil to a system under pressure
- Designed for larger systems
- Siphon hose allows for the removal of old oil, preventing over-charging
- Pump universally mounts directly to one-gallon containers
- Allows the pumping of oil directly from the container, keeping oil free from dirt & moisture
- Pump can remain mounted on oil container during storage
- Oil is pumped at a rate of 90 ml (3 oz) per stroke



Click Locks

## CLICK LOCKS

### The seal of approval



The best possibility to protect a refrigerant or air-condition system against unauthorised access. Just „click“ the „Click Locks“ around the service valve of a stationary or mobile refrigerant or air-condition system; the blue one on the low pressure side, the red one on the high pressure side. Afterwards, mark the Click Locks with the supplied labels and copy the data to your records. To ensure authorised access the Click Locks can not be removed without damaging them.

### The advantages are obvious:

- Prove the quality of your work and offer your customer a permanent protection of his refrigerant plant.
- Protect your system against contamination with old refrigerants.
- Only qualified personnel can access the system.
- Reduce questionable cases of warranty.

Type-No.	Description
RACLA50	Kit of each 25 Click Locks (Blue and Red) for mobile refrigerant systems
RACLR50	Kit of each 25 Click Locks (Blue and Red) for 1/4" SAE fittings.
RACL450	Kit of each 25 Click Locks (Blue and Red) for 5/16" SAE ports for refrigerants R410A

**Assure professional work to your customer.**  
**Use the Click Locks as your „seal of approval“.**



# NEW

## ROBINAIR REFRIGERANT SAVER COUPLINGS

With valve core Depressors

This family of service fittings provides a convenient, safe and reliable way of connecting to refrigeration or air conditioning systems without releasing refrigerant to the environment. Each valve attaches to the system without depressing the valve core. Once installed, opening the knob depresses the valve core on the system and simultaneously opens the valve inside.

### FEATURES

- Solid Brass construction
- Two sizes of straight valve
- Ultra-compact right angle valve for tight spaces
- Fitting does not depress Schrader™ during installation – easier to install, no refrigerant loss
- Seals compatible with all refrigerants and oils
- Diamond knurl for easy grip
- Available in either 1/4" or 5/16" Flare sizes

### SPECIFICATIONS

#### Straight Valves

- RA 1000F – 1/4" MFL x 1/4" FFL; 70mm High
- RA 1000H – 5/16" MFL x 5/16" FFL; 70mm High
- RA 1000FS – 1/4" MFL x 1/4" FFL; 58mm High
- RA 1000HS – 5/16" MFL x 5/16" FFL; 58mm High

#### Right Angle (90°) Valves

- RA 1000MFS – 1/4" MFL x 1/4" FFL; 44 x 43 mm
- RA 1000 MHS – 5/16" MFL x 5/16" FFL; 44 x 43mm



## 16-C/17-C/18-C/26-C/27-C

### Kwik-Coupler® - Services Hose Shut-Off



17-C



16-C

The Kwik-Coupler® set is intended for use with refrigeration and air-conditioning service hoses when connecting to core valve type access fittings. Conventional threaded connecting is converted to push/pull operation which is faster, easier and positive sealing at all times. Valve cores are depressed automatically without adjustments or loss of refrigerant. Disconnecting is also accomplished without loss of refrigerant. An automatic shut-off valve retains refrigerant pressure in a disconnected hose. This feature permits transferring high side hose refrigerant through the service manifold into the low side, thereby eliminating waste and hazardous high pressure discharge and atmospheric damage.

- Automatic full depression of core valves without adjustment, regardless of core position
- Coupler halves separately connect to access fitting and hose end, then easy push/pull operation automatically opens or closes system without loss of refrigerant
- Automatic shut-off of hose ends permits discharging high side hose through manifold into low side
- Eliminates hazardous discharge of refrigerant and oil from system when disconnecting hose
- Simplifies operation of charging critical amount of refrigerant into small systems
- Prevents finger burn when disconnecting - especially servicing heat pumps in cold weather
- Core depressors in hose ends no longer necessary - speeds servicing of systems with hand valves

Item	Description
16-C	Straight Coupler (45° Flare) 1/4" female x 1/4" male
17-C	90° Elbow Coupler (45° Flare) 1/4" female x 1/4" male
18-C	(Set) includes 16-C and 17-C
26-C	Straight Coupler (45° Flare) 5/16" female x 5/16" male
27-C	90° Elbow Coupler (45° Flare) 5/16" female

(26-C and 27-C Not UL Approved)



535-C

535-C	Kwik-Charge 1/4" female SAE flare inlet, 1/4" male SAE flare outlet
545-C	Kwik-Charge 5/16" female SAE flare inlet, 5/16" male SAE flare outlet

**535-C / 545-C**  
**KWIK-CHARGE®**  
**Liquid low side charger**

- Up to 8 times faster than vapor charging.
- No need to heat refrigerant cylinder.
- Built-in check valve opens for drawing unrestricted vacuum.
- No pressure drop in cylinder.
- One charger services all units 1/2 ton or larger.

Liquid low side charger provides fast, safe charge essential when using tracing dye. Kwik-Charge accepts liquid refrigerant from the cylinder and discharges into low side of the system. Charging rate is up to eight times faster than vapor charging. In addition, liquid charging is required when using R410A and other blended refrigerants. Kwik-Charge is attached to the low side of the charging manifold. Charging hose is connected from Kwik-Charge outlet to low side of refrigeration system. Internal Kwik-Charge metering element reduces liquid flow to a level below capacity of compressor. This assures a safe, fast charge without endangering the compressor. A built-in ball check valve automatically opens when drawing a vacuum to assure rapid, unrestricted evacuation. Can be used with all fluorinated hydrocarbon refrigerant systems.



RA 18190A + RA 18191A

**ROBINAIR 18190A**  
**Low Side Coupler R134a**  
**ROBINAIR 18191A**  
**High Side Coupler R-134a**

- R-134a Side Service Coupler
- Compact design.
  - Automotive use.
  - Six-ball coupler to provide a more stable grip on the fitting.



# DIAGNOSTIC



# 15

Advanced Test Products Europe  
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## ATP-T1

### Type K Thermocouple Digital Thermometer

- K-type thermocouple
- °C / °F selection
- T1, T2, ΔT selection
- Data hold function
- Min / Max
- Water resistance (IEC 529 - IPX 3)
- Low Battery indication
- Auto Power off selection

Specifications	
Input	Dual K-type Thermocouples
Temperature Range	-58° to 2462° F (-50° to 1350° C)
Resolution	0,1° C / °F : Up to 999,9° C / °F 0,1° C / °F : above 1000° C / °F
Display	4 digits, 9999 counts
Accuracy	± 1,6° C (± 3° F) : -50° to 0° C (-58° F to 32° F) ± 0,3% rdg + 1,8° F : 0° to 600° C (32° F to 1100° F) ± 0,4% rdg + 1,8° F : 600° to 1350° C (1100° to 2462° F)
Accuracy after ice-bucket calibration	± 1°F : -1° to 49° CF (30° to 120° )
Update Rate	2,5 times / second
Battery	Alkaline 9 V
Size (H x L x W)	34 x 144 x 70 mm with Boot : 40 x 153 x 77 mm
Weight	(with Boot) 285 g
Ambient Operating Temperature	0° C to 50° C (32° F to 120° F)
Storage Temperature	-25° to 70° C (-13° F to 158° F) without battery
Relative Humidity	10 % to 95 % RH non-condensing
Standard Accessories	Battery, Two K-type Thermocouples, Boot, Case



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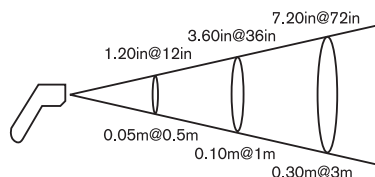
**ROBINAIR.**

PROMAX AUTO





TIF 7610



## TIF 7610

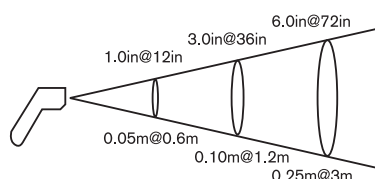
### IR-Thermometer with laser pointer, 10:1

Contactless temperature measurement in seconds by the use of innovative infrared technology.

- SoC (System-on-a-Chip) Technology – Complete IR design incorporated on a single chip, creating compact and lightweight design.
- Temperature measurement range: -60° to +500° C
- Reactiontime: 0,5 sec.
- Backlit LCD display
- Battery level indication
- Automatic Power Off after 15 sec.
- Automatic MAX and Data HOLD for 10 sec.
- Laser pointer - Simply point at desired target and press the trigger for temperature reading.
- High and low pass filters with audible alarms for out of range measurements
- Temperature modes - Maximum (MAX)
- Innovative optical lens - high accuracy measurements over wide temperature ranges. 10:1 distance to spot (D:S) ratios available
- After the measurment, the actual data and MAX data will be hold in display by the HOLD function.



TIF 7612



## TIF 7612

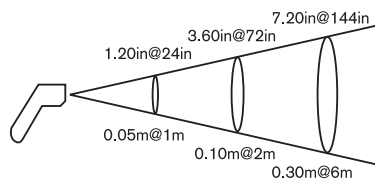
### IR-Thermometer with laser pointer, 12:1

Contactless temperature measurement in seconds by the use of innovative infrared technology.

- SoC (System-on-a-Chip) Technology - Complete IR design incorporated on a single chip, creating compact and lightweight design.
- Temperature measurement range: -60° to +500° C
- Reactiontime: 0,5 sec.
- Backlit LCD display
- Battery level indication
- Automatic Power Off after 15 sec.
- Automatic MAX and Data HOLD for 10 sec.
- High and low pass filters with audible alarms for out of range measurements
- Temperature modes - Maximum (MAX), Minimum (MIN), Difference (DIF) and Average (AVG)
- Adjustable emission factor
- External temperature port can extend temperatures up to 1400° C / 1999° F
- Laser pointer - Simply point at desired target and press the trigger for temperature reading.
- Innovative optical lens - high accuracy measurements over wide temperature ranges. 12:1 distance to spot (D:S) ratios available
- After the measurment, the actual data and MAX data will be hold in display by the HOLD function.



TIF 7620



## TIF 7620

### IR-Thermometer with laser pointer, 20:1

Contactless temperature measurement in seconds by the use of innovative infrared technology.

- SoC (System-on-a-Chip) Technology – Complete IR design incorporated on a single chip, creating compact and lightweight design.
- Temperature measurement range:  $-60^{\circ}$  to  $+750^{\circ}$  C
- Reactiontime: 0,5 sec.
- Backlit LCD display
- Automatic Power Off after 15 sec.
- Innovative optical lens - high accuracy measurements over wide temperature ranges. 20:1 distance to spot (D:S) ratios available
- Laser pointer - Simply point at desired target and press the trigger for temperature reading.
- External temperature port can extend temperatures up to  $1400^{\circ}$  C /  $1999^{\circ}$  F
- High and low pass filters with audible alarms for out of range measurements
- Temperature modes - Maximum (MAX), Minimum (MIN), Difference (DIF) and Average (AVG)
- Battery level indication
- Automatic MAX and Data HOLD for 10 sec.
- High and low pass filters with audible alarms for out of range measurements
- Adjustable emission factor
- After the measurement, the actual data and MAX data will be hold in display by the HOLD function.

#### Typical Applications:

Check temperature of high voltage equipment and transformers from a safe distance. Detect heating of problem fuses, wires, insulators, connectors, splices, switches, neutrals Overload motors due to possible Harmonic currents

#### How Infrared Thermometers Work:

To measure a surface temperature, the user aims the IR Thermometer at the target, presses a button, and reads the temperature display. The device has an optical lens that collects the radiated infrared energy from the object and focuses it on the detector. The detector converts the energy into an electrical signal that's amplified and displayed as a temperature reading. An infrared thermometer measures temperature by sensing the magnitude of radiated energy at infrared frequencies. Using this data and the actual temperature of the detector, the thermometer calculates the temperature of the surface that emitted the energy.

Specifications	TIF 7610	TIF 7612	TIF 7620
Measurement Range	-60° to +500° C (-76° to +932° F)	-60° to +500° C (-76° to +932° F)	-60° to +760° C (-76° to +1400° F)
Distance:Spot	10:1	12:1	20:1
Resolution	0,1° C / 0,1° F (1° below 9,9° C and above 199,9° C)		
Emissivity	0,95 fixed	Adjustable	Adjustable
High and Low temperature alarms	no	yes	yes
Thermocouple Measurement Range	n/a	-64° C to +1400° C (-83.2° F to +1999° F)	-64° C to +1400° C (-83.2° F to +1999° F)
Accuracy	±2 % of reading or 2° C (4° F)		
Response Time (90%)	0,5 sec		
Dimensions	175,2 x 39,0 x 71,9 mm		
Weight	179 g		
Batterie Life	appr. 18 hours		
Batteries	2 x 1,5 V batteries (AAA)		
Standard Accessories	Including batteries, thermocouple and protective case		



TIF 7201

## TIF 7201

**Contactless temperature measurement  
in seconds by the use of innovative  
infrared technology.**

Mini-IR-thermometer for accurate measuring at lightning speed even on small places. After the measurement, the measurand and the MAX value will be displayed in the display and hold by the Hold-Function.

- Extra small and handy
- Temperature measurement range: -33° to +220° C (-27° to +428° F)
- Reaction time 0,5 sec. • Automatic MAX function
- Backlit LCD display with dual readings
- Battery level indication • Distance to Spot (D/S): 1:1

Specifications	
Temperature measurement range	-33° C to +220° C (-27° F to +428° F)
Distance to Spot	1:1 optical
Resolution	0.1 °C/°F
Emissivity setting	0,95 fixed
Accuracy	±2 % of reading or ±2° C (4° F)
Operating temperature range	-10° to +50° C (14° to +122° F)
Dimensions	35 x 100 x 25 mm
Battery Life	Typ 25 hours / Min. 20 hours continuous use
Weight	40 g
Battery	1 x CR2032 lithium cell battery
Standard Accessories	Including battery



TIF 750

## TIF 750

### Digital Thermometer

- 1-1/4" diameter dial
- Temp. Range from -58° F to 302° F
- 5" (12,7 cm) stainless stem
- Protective sheath with pocket clip



RA 43240

## ROBINAIR 43240

### Digital Thermometer

- Rugged plunge probe of stainless steel
- Durable case includes a cover to protect the probe
- Temperature measurements in °C or °F  
-40° to + 200° C / -40° to + 390° F
- DATA HOLD
- Water resistant
- Shock proof
- Auto power off after 3 minutes





RA 43230

## ROBINAIR 43230

### Swivel-Head Digital Thermometer

- Head swivels 180° – easy to see at any angle
- Compact size – convenient to carry & store
- Selectable – Celsius and Fahrenheit
- Reliable readings over entire range
- For surface, liquid and air temperatures
- Protective sheath with pocket clip

Specifications	
Temp Range	-50° to 150° C (-58° to 302° F)
Accuracy	± 1° C between -20° and 120° C (otherwise ± 2° C or ± 4° F) ± 2° F between - 4° and 248° F
Display Resolution	0,1° between - 19,9 and 199,9, otherwise 1°
Auto Power off	After 10 minutes
Battery	1 x 1,5 V, size LR44



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# TIF 8500A

## Carbon Monoxide Analyzer

The TIF8500A is a professional grade service tool for accurate measurements of Carbon Monoxide (CO) levels in any environment or application, including ambient, appliance surroundings and furnace flues. The TIF8500A has an industry first, "Voice" feature which allows the unit to actually speak out the measured reading.

- Measures level of Carbon Monoxide (CO) in any environment
- Voice feature for audible read out
- Tactile keypad controls
- Protective Rubber "Boot"
- 40 cm (15") Stainless Probe, with 1,5 m hose
- Field replaceable electrochemical sensor
- Rapid warm up
- Headphones included for high noise areas
- Cordless and portable
- Ranges from 1 - 10.000 ppm with resolution of 1 ppm

Replacement Parts (supplied with product)	Part Number
Replacement Filter	TIF 8501
Replacement Sensor	TIF 8505
Sensor Cover and Tubing	TIF 8507



# TIF 4000A

## Electronic Sightglass

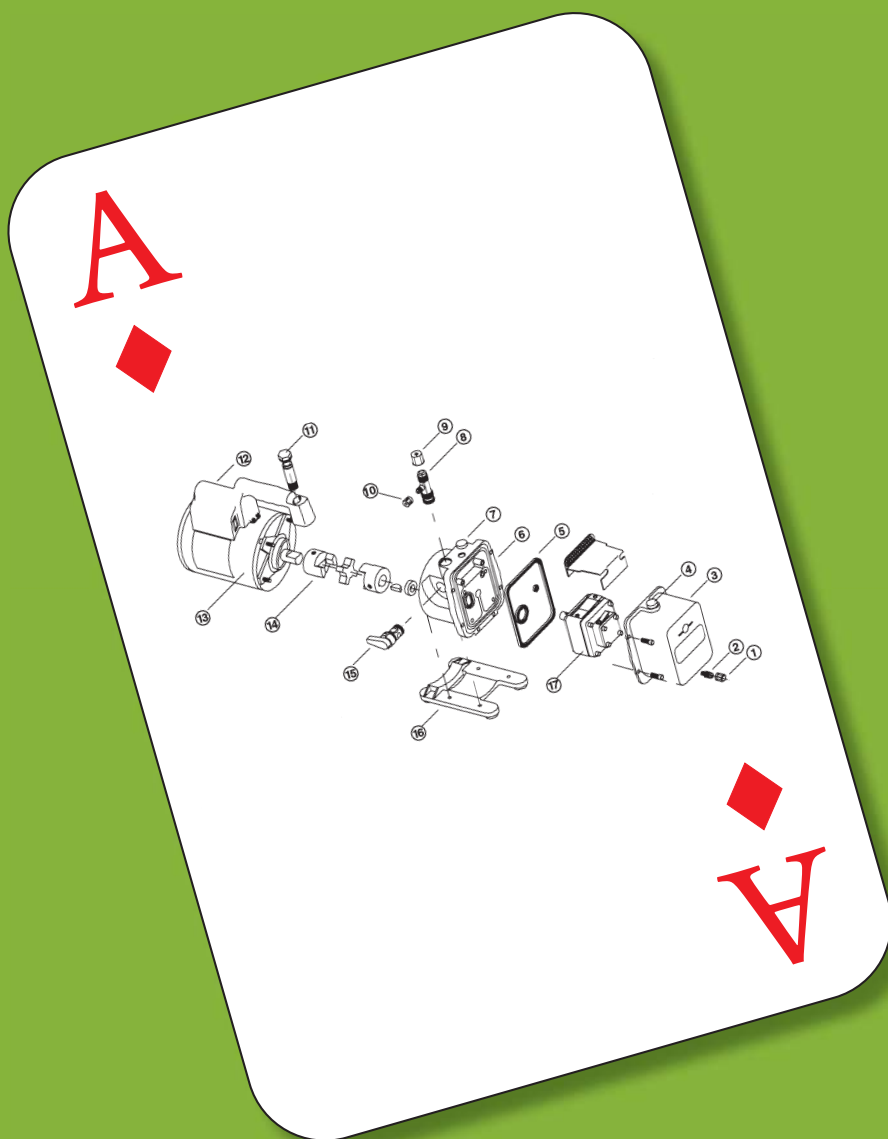
The TIF4000A „sees“ into the refrigerant tubing by means of ultrasonics. Two sensors are used, one for transmitting and one for receiving. These sensors are in the form of clamps which attach to any metallic refrigeration tubing. An audible beeping sound quickens as bubbles or floodback are sensed, and a row of LED's light, simulating bubble movement in the tubing.

- Optimizes refrigerant charge for maximum cooling
- Operates on any metal tubing
- 120cm (48") cord

Specifications	
Operating Temp	0° to 52° C (32° to 125° F)
Power Supply	9 V battery
Battery Life	60 hours (alkaline)
Response Time	Instantaneous
Probe/Cord Length	120 cm (48")

- Operates through use of ultrasonics
- Eliminates the need for an optical sight glass
- Checks for refrigerant floodback
- Built into ABS carrying case

# GENERAL TECHNICAL INFORMATION

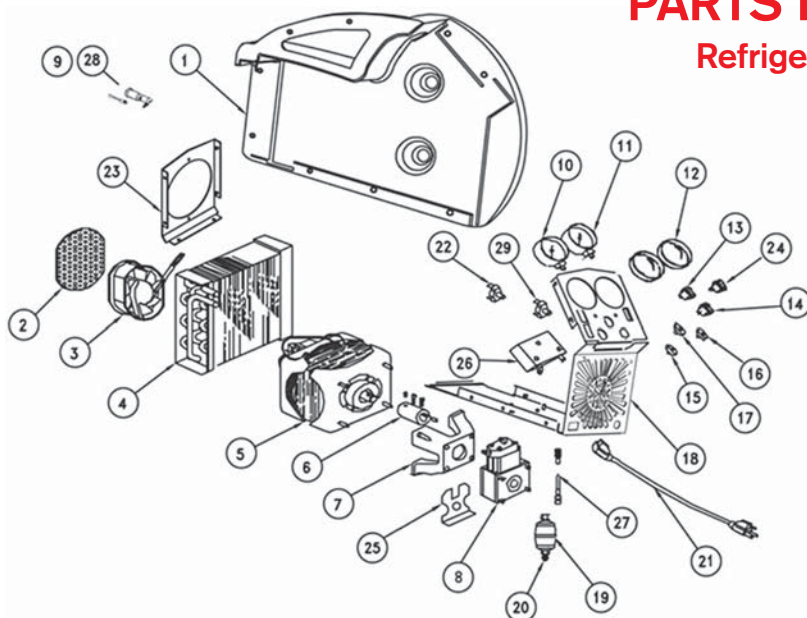


# 15

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## PARTS LIST RG5410A-E

### Refrigerant Recovery Machine, RG5410A-E Parts List



Item	Description	Part Number
1	Plastic case	100134 L&R
2	Fan grill	100505
3	Axial fan 230 V	EL1818
4	Condenser	CD1201
5	Motor 230 V	EL1822
6	Coupler	CP1315
7	Bell housing	CP1001
8	Compressor	CP1320
9	Fuse - 5 x 20 mm	100406
10	Input gauge	GA1500
11	Output gauge	GA0800
12	Gauge lens	GA1000
13	On/Off switch	EL1310
14	Start switch	EL1309
15	Blue knob	100123

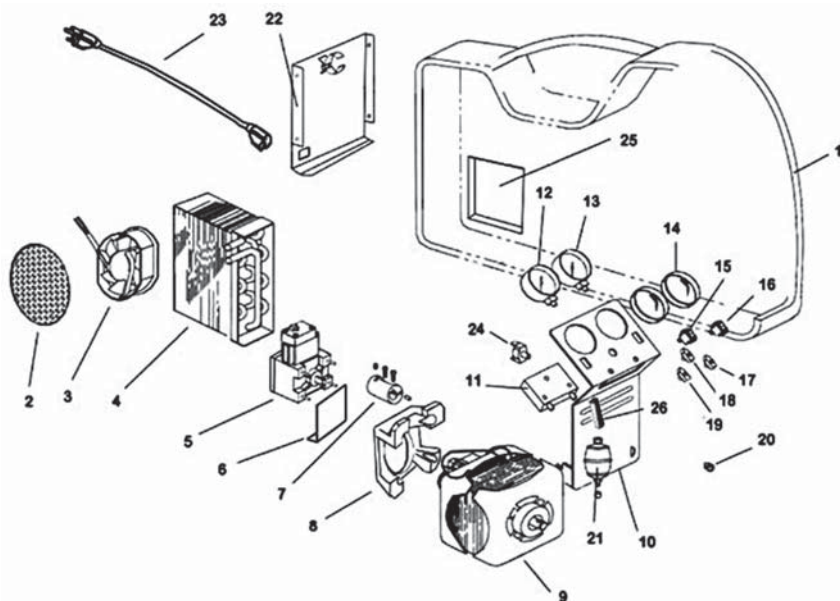
Item	Description	Part Number
16	Red knob	100124
17	Black knob	100122
18	Front panel complete	700077
19	Filter	100343
20	Flare cap	NB6501
21	Powercord	135-200341-001
22	High Pressure switch	EL2802
23	Rear panel	100318
24	Select Switch	105-200396-001
25	Compressor Bracket	100207
26	Manifold complete	700009
27	Hose 4"	100345
28	Fuse holder	100419
29	VAC Sensor	RA 18752

### Replacement Kits & Accessories

Part#	Description
KT3302	Piston seal replacement (middle section of compressor)
KT3303	Valve replacement kit (top section of compressor)
KT3307	Compressor repair kit (all three sections of compressor)
KT3308	Shaft replacement kit (bottom section of compressor)
RGT30NS	12,5 kg recovery tank, 24,1 bar (350 psi) working pressure
RGT50NS	26 kg recovery tank, 24,1 bar (350 psi) working Pressure

## PARTS LIST MINIMAX-E

### Refrigerant Recovery Machine, MINIMAX-E Parts List



Item	Description	Part Number
1	Plastic case	100118
2	Fan grill	100179
3	Axial fan 230 V	100242
4	Condenser	100139
5	Compressor	CP1320
6	Compressorbracket	100207
7	Coupler	CP1315
8	Bell housing	CP1001
9	Motor 230 V	EL1822
10	Frontpanel complete	700079
11	Manifold	700009
12	Input gauge	GA1500
13	Output gauge	GA0800

Item	Description	Part Number
14	Gauge lens	GA1000
15	ON/OFF switch	EL1310
16	Starts switch	EL1309
17	Red knob	100124
18	Black knob	100122
19	Blue knob	100123
20	Flare cap	NB6501
21	Filter	100343
22	Rear panel	105-200430-001
23	Powercord	135-200341-001
24	Pressure switch	EL2802
25	Fan grill inlet	100180
26	Filterconnector	100345

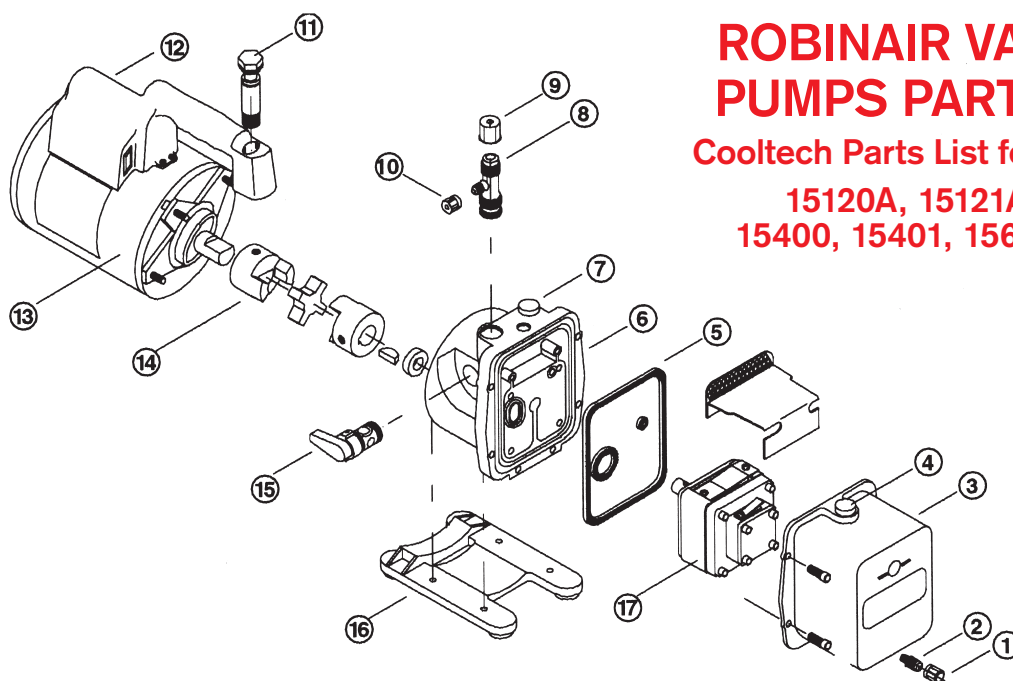
### Replacement Kits & Accessories

Part#	Description
KT3302	Piston seal replacement (middle section of compressor)
KT3303	Valve replacement kit (top section of compressor)
KT3307	Compressor repair kit (all three sections of compressor)
KT3308	Shaft replacement kit (bottom section of compressor)
RGT30NS	12,5 kg recovery tank, 24,1 bar (350 psi) working pressure
RGT50NS	26 kg recovery tank, 24,1 bar (350 psi) working Pressure

# ROBINAIR VACUUM PUMPS PARTS LIST

Cooltech Parts List for Models:

**15120A, 15121A, 15122A,  
15400, 15401, 15600, 15601**



Item	Description	Part Number
1	Oil Drain Cap (6)	RA 40572
3	Module Cover Kit (includes No. 1, 2, 4, 5)	RA 15337
4	Oil Fill Cap	RA 15371
8	Intake Fitting (includes No. 9, 10)	RA 15364
11	Vent Bolt (includes O-Rings)	RA 15338
12	Handle, Power Cord and Switch Assembly (230 V)	RA 15466
13	Motor for RA 15401	RA 116214
13	Motor for RA 15601	RA 116214
13	Motor for RA 15121A	RA 118638

Item	Description	Part Number
14	Coupling	RA 13192
15	Iso-Valve™ Assembly	RA 15368
16	Base and Foot Assembly	RA 15369
17	Pump Assembly, less motor (incl. 3 & 6) for RA 15401	RA 15547
17	Pump Assembly, less motor (incl. 3 & 6) for RA 15601	RA 15548
17	Pump Assembly, less motor (incl. 3 & 6) for RA 15121A	RA 15144
--	Seal Replacement Kit (not show)	RA 15367





TIF 555

Used on  
TIF 5550  
TIF 5550A  
TIF 5650  
TIF 5650A  
TIF 5750  
TIF 5750A  
H10A



TIF XP-2

Used on  
TIF XL-1  
TIF XL-1A  
TIF RX-1  
TIF RX-1A  
TIF XP-1  
TIF XP-1A



TIF ZX-2

Used on  
TIF ZX-1  
TIF ZX-1E



TIF ZX-14

Used on  
TIF ZX-1E



TIF ZX-15

Used on  
TIF ZX-1E

## TIF Refrigerant Leak Detector Replacement Sensor Tips and Filters



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# APPENDIX

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ALL PRODUCTS**

INDEX — ALL PRODUCTS			
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AC-DC	71	SA 1109	79
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AC-DC	71	SA 1111	79
AC-DC	71	SA 1112	79
AC-DC	71	SA 1113	79
AC-DC	71	SA 1114	79
AC-DC	71	SA 1115	79
AC-DC	71	SA 1116	79
AC-DC	71	SA 1117	79
AC-DC	71	SA 1118	79
AC-DC	71	SA 1119	79
AC-DC	71	SA 1120	79
AC-DC	71	SA 1121	79
AC-DC	71	SA 1122	79
AC-DC	71	SA 1123	79
AC-DC	71	SA 1124	79
AC-DC	71	SA 1125	79
AC-DC	71	SA 1126	79
AC-DC	71	SA 1127	79
AC-DC	71	SA 1128	79
AC-DC	71	SA 1129	79
AC-DC	71	SA 1130	79
AC-DC	71	SA 1131	79
AC-DC	71	SA 1132	79
AC-DC	71	SA 1133	79
AC-DC	71	SA 1134	79
AC-DC	71	SA 1135	79
AC-DC	71	SA 1136	79
AC-DC	71	SA 1137	79
AC-DC	71	SA 1138	79
AC-DC	71	SA 1139	79
AC-DC	71	SA 1140	79
AC-DC	71	SA 1141	79
AC-DC	71	SA 1142	79
AC-DC	71	SA 1143	79
AC-DC	71	SA 1144	79
AC-DC	71	SA 1145	79
AC-DC	71	SA 1146	79
AC-DC	71	SA 1147	79
AC-DC	71	SA 1148	79
AC-DC	71	SA 1149	79
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### Pressure-Temperature Guide - SI

	Multiple Point - Estimated Liquid (m³) at 10°C			
	40	50	60	70
30	100	100	100	100
31	100	100	100	100
32	100	100	100	100
33	100	100	100	100
34	100	100	100	100
35	100	100	100	100
36	100	100	100	100
37	100	100	100	100
38	100	100	100	100
39	100	100	100	100
40	100	100	100	100
41	100	100	100	100
42	100	100	100	100
43	100	100	100	100
44	100	100	100	100
45	100	100	100	100
46	100	100	100	100
47	100	100	100	100
48	100	100	100	100
49	100	100	100	100
50	100	100	100	100
51	100	100	100	100
52	100	100	100	100
53	100	100	100	100
54	100	100	100	100
55	100	100	100	100
56	100	100	100	100
57	100	100	100	100
58	100	100	100	100
59	100	100	100	100
60	100	100	100	100
61	100	100	100	100
62	100	100	100	100
63	100	100	100	100
64	100	100	100	100
65	100	100	100	100
66	100	100	100	100
67	100	100	100	100
68	100	100	100	100
69	100	100	100	100
70	100	100	100	100
71	100	100	100	100
72	100	100	100	100
73	100	100	100	100
74	100	100	100	100
75	100	100	100	100
76	100	100	100	100
77	100	100	100	100
78	100	100	100	100
79	100	100	100	100
80	100	100	100	100
81	100	100	100	100
82	100	100	100	100
83	100	100	100	100
84	100	100	100	100
85	100	100	100	100
86	100	100	100	100
87	100	100	100	100
88	100	100	100	100
89	100	100	100	100
90	100	100	100	100
91	100	100	100	100
92	100	100	100	100
93	100	100	100	100
94	100	100	100	100
95	100	100	100	100
96	100	100	100	100
97	100	100	100	100
98	100	100	100	100
99	100	100	100	100
100	100	100	100	100

Programs calculated using REFPROP  
Ver 8.0, Std Data Program, NIST 2001

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## Pressure-Temperature Guide – SI

Dew Point – Saturated Vapor (kPa – abs)

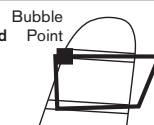
Temp. °C	R422A	Temp. °F
-40	93	-40
-39	98	-38
-38	103	-36
-37	108	-35
-36	113	-33
-35	119	-31
-34	125	-29
-33	131	-27
-32	137	-26
-31	143	-24
-30	150	-22
-29	156	-20
-28	163	-18
-27	171	-17
-26	178	-15
-25	186	-13
-24	194	-11
-23	203	-9
-22	211	-8
-21	220	-6
-20	229	-4
-19	239	-2
-18	248	0
-17	258	1
-16	269	3
-15	280	5
-14	291	7
-13	302	9
-12	314	10
-11	326	12
-10	338	14
-9	351	16
-8	364	18
-7	377	19
-6	391	21
-5	405	23
-4	420	25
-3	435	27
-2	450	28
-1	466	30
0	482	32
1	499	34
2	516	36
3	533	37
4	551	39
5	569	41
6	588	43
7	607	45
8	627	46
9	647	48
10	668	50

Bubble Point – Saturated Liquid (kPa – abs)

Temp. °C	R422A	Temp. °F
10	740	50
11	762	52
12	784	54
13	808	55
14	831	57
15	856	59
16	880	61
17	906	63
18	931	64
19	958	66
20	985	68
21	1.012	70
22	1.040	72
23	1.069	73
24	1.098	75
25	1.128	77
26	1.158	79
27	1.189	81
28	1.221	82
29	1.253	84
30	1.286	86
31	1.320	88
32	1.354	90
33	1.389	91
34	1.424	93
35	1.460	95
36	1.497	97
37	1.535	99
38	1.573	100
39	1.612	102
40	1.651	104
41	1.692	106
42	1.733	108
43	1.775	109
44	1.817	111
45	1.860	113
46	1.905	115
47	1.949	117
48	1.995	118
49	2.042	120
50	2.089	122
51	2.137	124
52	2.186	126
53	2.236	127
54	2.286	129
55	2.338	131
56	2.390	133
57	2.444	135
58	2.498	136
59	2.553	138
60	2.609	140
61	2.666	142
62	2.724	144
63	2.783	145
64	2.843	147
65	2.904	149

**Subcooling – Saturated Liquid Pressures**

Typical  
PH Diagram  
Superheat–  
Reference Point



**Superheat – Saturated Vapor Pressures**

Typical  
PH Diagram  
Subcooling–  
Reference Point



\* Properties calculated using REFPROP  
Ver 8.0, Std Ref Data Program, NIST 2007.

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Pressure-Temperature Guide – SI

Saturated Conditions – Pressure (kPa)

Temp. °C	R22	R134a	R404A	R410A	R507	Temp. °F
-40	105	51	135	176	139	-40
-39	110	54	141	184	145	-38
-38	115	57	148	192	152	-36
-37	121	60	155	201	158	-35
-36	126	63	161	210	165	-33
-35	132	66	169	219	173	-31
-34	138	70	176	229	180	-29
-33	144	73	183	238	188	-27
-32	151	77	191	249	196	-26
-31	157	80	199	259	204	-24
-30	164	84	208	270	213	-22
-29	171	88	216	282	222	-20
-28	178	93	225	293	231	-18
-27	186	97	235	305	240	-17
-26	193	102	244	318	250	-15
-25	201	106	254	331	260	-13
-24	210	111	264	344	270	-11
-23	218	116	274	357	281	-9
-22	227	122	285	371	292	-8
-21	236	127	296	386	303	-6
-20	245	133	307	401	315	-4
-19	255	139	319	416	326	-2
-18	265	145	331	432	339	0
-17	275	151	343	448	351	1
-16	285	157	356	465	364	3
-15	296	164	369	482	337	5
-14	307	171	382	499	391	7
-13	319	178	396	517	405	9
-12	330	185	410	536	420	10
-11	342	193	424	555	434	12
-10	355	201	439	575	450	14
-9	367	209	454	595	465	16
-8	381	217	470	615	481	18
-7	394	225	486	637	498	19
-6	408	234	503	658	514	21
-5	422	243	519	681	532	23
-4	436	253	537	703	549	25
-3	451	262	554	727	567	27
-2	466	272	573	751	586	28
-1	482	282	591	775	605	30
0	498	293	610	801	624	32
1	514	304	630	827	644	34
2	531	315	650	853	665	36
3	548	326	670	880	686	37
4	566	338	691	908	707	39
5	584	350	712	936	729	41
6	603	362	734	965	751	43
7	622	375	757	995	774	45
8	641	388	780	1.025	798	46
9	661	401	803	1.057	822	48
10	681	415	827	1.088	846	50
11	702	429	852	1.121	871	52
12	723	443	877	1.154	897	54
13	745	458	902	1.188	923	55
14	767	473	928	1.223	949	57

Saturated Conditions – Pressure (kPa)

Temp. °C	R22	R134a	R404A	R410A	R507	Temp. °F
15	789	488	955	1.258	977	59
16	812	504	982	1.295	1. 005	61
17	836	521	1.010	1.332	1.033	63
18	860	537	1.039	1.370	1.062	64
19	885	554	1.068	1.408	1.092	66
20	910	572	1.097	1.448	1.122	68
21	936	590	1.127	1.448	1.153	70
22	962	608	1.158	1.529	1.184	72
23	989	627	1.190	1.571	1.216	73
24	1.016	646	1.222	1.614	1.249	75
25	1.044	665	1.255	1.657	1.283	77
26	1.072	685	1.288	1.702	1.317	79
27	1.101	706	1.322	1.748	1.352	81
28	1.131	727	1.357	1.794	1.387	82
29	1.161	748	1.392	1.841	1.423	84
30	1.192	770	1.428	1.889	1.460	86
31	1.223	793	1.465	1.939	1.498	88
32	1.255	815	1.503	1.989	1.536	90
33	1.288	839	1.541	2.040	1.575	91
34	1.321	863	1.580	2.092	1.615	93
35	1.355	887	1.620	2.145	1.655	95
36	1.389	912	1.660	2.199	1.697	97
37	1.424	937	1.701	2.254	1.739	99
38	1.460	963	1.743	2.310	1.782	100
39	1.497	990	1.786	2.367	1.825	102
40	1.534	1.017	1.829	2.426	1.870	104
41	1.571	1.044	1.874	2.485	1.915	106
42	1.610	1.072	1.919	2.545	1.961	108
43	1.649	1.101	1.965	2.607	2.008	109
44	1.689	1.130	2.012	2.670	2.056	111
45	1.729	1.160	2.059	2.734	2.104	113
46	1.770	1.190	2.108	2.799	2.154	115
47	1.812	1.221	2.157	2.865	2.204	117
48	1.855	1.253	2.207	2.932	2.256	118
49	1.899	1.285	2.259	3.001	2.308	120
50	1.943	1.318	2.311	3.071	2.361	122
51	1.988	1.351	2.364	3.142	2.415	124
52	2.033	1.385	2.418	3.214	2.471	126
53	2.080	1.420	2.472	3.288	2.527	127
54	2.127	1.456	2.528	3.363	2.584	129
55	2.175	1.492	2.585	3.439	2.642	131
56	2.224	1.528	2.643	3.517	2.701	133
57	2.274	1.566	2.702	3.596	2.761	135
58	2.324	1.604	2.762	3.676	2.823	136
59	2.375	1.642	2.823	3.758	2.885	138
60	2.428	1.682	2.885	3.842	2.949	140
61	2.481	1.722	2.948	3.927	3.013	142
62	2.534	1.763	3.012	4.013	3.079	144
63	2.589	1.804	3.078	4.101	3.147	145
64	2.645	1.847	3.145	4.191	3.215	147
65	2.701	1.890	3.213	4.282	3.285	149

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## Temperature units

Temperature in °C	Temperature in °F
100 °C	212 °F
96 °C	205 °F
90 °C	194 °F
80 °C	176 °F
70 °C	158 °F
60 °C	140 °F
55 °C	122 °F
40 °C	104 °F
30 °C	86 °F
27 °C	80 °F
24 °C	76 °F
22 °C	72 °F
21 °C	69 °F
18 °C	64 °F
15 °C	59 °F
12 °C	53 °F
7 °C	45 °F
0 °C	32 °F
-6 °C	21 °F
-14 °C	6 °F
-30 °C	-24 °F
-37 °C	-35 °F
-51 °C	-60 °F
-57 °C	-70 °F
-68 °C	-90 °F

## CONVERSION- TABLES

## Printing units and conversion factors

	Torr	mbar	bar	Pa	atm
1 Torr =	1	1,33	$1,33 \times 10^{-3}$	133	$1,32 \times 10^{-3}$
1 mbar =	0,750	1	$10^{-3}$	$10^2$	$0,987 \times 10^{-3}$
1 bar =	750	$10^{-3}$	1	$10^5$	0,987
1 Pa =	$7,5 \times 10^{-3}$	$10^{-2}$	$10^{-5}$	1	$0,987 \times 10^{-6}$
1 atm =	760	1013	1,013	$1,01325 \times 10^5$	1



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# TERMS AND CONDITIONS OF DELIVERY AND PAYMENT

## I. General – scope of application

1. These terms and conditions apply to all existing and future business relations. Deviating, conflicting or supplementary general terms and conditions, even where known, shall not form part of this agreement unless the validity of such has been expressly agreed. For the purposes of these terms and conditions, customers are natural or legal persons or private companies with legal capacity with whom business relations have been entered into and who exercise trade through commercial or self-employed activities.

## II. Conclusion of contract

1. Our offers are subject to change and are without obligation. Where appropriate, we reserve the right to undertake technical alterations and alterations to shape, colour and/or weight.
2. We are entitled to accept the contractual offer stated in an order within 2 weeks of receipt. Written notification of acceptance will be provided by ourselves to the customer by way of confirmation of order. The content and scope of our delivery and performance are determined exclusively on the basis of our written confirmation of order.
3. Conclusion of contract is subject to the proviso that we ourselves are supplied correctly and in good time by our own suppliers. This applies only in cases of failure to supply not occasioned by ourselves, in particular, where a congruent covering transaction has been concluded with our suppliers. Customers will be immediately notified of any non-availability of performance.
4. Insofar as the customer has ordered goods via electronic medium, the order text will be stored by us and, on request, will be sent to the customer by email together with these terms and conditions.
5. Technical consultancy is not a subject matter of the agreement and is only binding in written form. This does not release the customer from the obligation to use our products in the appropriate and proper manner.

## III. Prices and payment (remuneration)

1. Prices offered are without obligation and are ex works from our central warehouse in Mönchengladbach. Prices are exclusive of VAT at the statutory applicable rate. We are entitled to require an advance payment from the customer of up to 50% of the total order prior to initiating delivery. In cases where the customer is not prepared or is unable to pay such an advance payment, even after a reasonable period of time has been established, we will be entitled to withdraw from the contract and claim for damages. Damages will amount to 20% of the order value without prejudice to the possibility of claiming higher actual damages. Provision of evidence of lesser damages shall be incumbent on the purchaser.

2. Insofar as no other agreement has been concluded, the customer is obliged to pay the due price within thirty days of receipt of goods. On expiration of this period, the customer shall be in default of payment. For the period of default, the customer will be required to pay a rate of interest of 8 % above the base interest rate on the overdue account. We reserve the right provide evidence of greater losses due to default and assert any claim for such losses.
3. Any right of offset shall only exist where the counterclaims are judicially non-appealable or have been recognised by ourselves. Any right of retention may only be exercised where the counterclaim is based on the same contractual relationship.

## IV. Passing of risk and acceptance of goods

1. The risk of accidental loss or accidental deterioration of the goods passes to the purchaser upon delivery - and in the case of sales shipment upon supply of the goods to the forwarding agent, carrier or other persons/organisation tasked with transporting the consignment.
2. The passing of risk shall not be prejudiced where the purchaser delays in acceptance.
3. Insofar as not otherwise specified by the purchaser, the method of shipment shall be decided by ourselves. We accept no responsibility to offer the cheapest form of shipment. Any claims for damage against the carrier are to be lodged by the purchaser itself. Insurance of the goods will only be undertaken at the request of the purchaser.
4. All deliveries are ex. works Mönchengladbach, Germany, unless otherwise agreed upon.

## V. Retention of title

1. The goods shall remain our property until the purchaser has settled all outstanding accounts due to us from the ongoing business relationship. The purchaser is obliged to handle the goods with due care and attention.
2. The customer is entitled to resell the reserved goods (goods subject to retention of title) within the normal course of business: The customer hereby assigns to us all accounts receivable to the value of the invoice amount accruing to it from such resale to third parties. We hereby accept the assignment. Following assignment, the customer remains entitled to collect the outstanding account. We reserve the right to undertake collection of the outstanding account ourselves in the event that the customer fails to fulfil its payment obligations or defaults on payment.
3. The customer is obliged to notify us immediately in the event of third party action relating to the goods, for example, levy of execution (seizure) or damage or destruction of the goods. The customer shall also notify us immediately of any change in possession of the goods or



# TERMS AND CONDITIONS OF DELIVERY AND PAYMENT

of a change to its place of domicile.

4. In the event of conduct on the part of the customer that is contrary to the terms of the contract, particularly default in payment or violation of an obligation stated under 3. above, we shall be entitled to withdraw from the contract and reclaim the goods.

## VI. Warranty

1. The customer is obliged to notify us of any manifest defects immediately and, in any event, not later than 10 days from receipt of the goods; failure to do so shall preclude the assertion of any claim under warranty. Timely dispatch shall be sufficient for observance of the period of notice. The customer bears the full burden of proof relating to all prerequisites of a claim, particularly regarding the defect itself, the time of determination of the defect and prompt complaint of the defect. The customer is obliged to provide written notification of manifest defects within a period of ten days from the time of determination that the goods are not in conformance with the contract. Receipt of such notification by us shall be decisive with respect to compliance with the period of notice. Should the customer fail to provide notification, the warranty rights will lapse two months following establishment of the defect by the customer. This shall not apply in the event of malice on our part. The burden of proof regarding the time of determination of the defect lies with the customer.
2. Insofar as the customer opts to withdraw from the contract due to legal deficiencies in title or defective quality and following subsequent failure to discharge performance, he shall not be entitled to any additional claim for compensation as a result of the fault. Where the customer chooses compensation following subsequent failure to discharge performance, the goods shall remain with the manufacturer insofar as this is reasonable. Compensation shall be limited to the difference between the purchase price and the value of the defective item. This shall not apply where the breach of contract resulted from malicious action occasioned by ourselves.
3. For customers, the warranty period is two years following delivery of the goods.
4. The nature of the goods is hereby agreed to be that contained in the manufacturer's product description. Public statements, commendations or advertising by the manufacturer do not amount to descriptions of the nature of the goods in accordance with the contract.
5. In the legal sense, the purchaser does not receive a guarantee offered by ourselves. Manufacturer's guarantees shall remain without prejudice.
6. Slight deviations from the agreed characteristics, slight diminution of usability, normal wear and tear, damage occurring subsequent to the passing of risk due to incorrect or negligent handling, excessive use or unsuitable

use of resources that are the result of specific influences not provided for under the contract shall not give rise to complaints of defects. No claims for defects may be asserted for improper modifications or repairs carried out by the customer or third parties, or any consequences resulting thereof.

7. Goods for warranty, need to be delivered to our warehouse Mönchengladbach, Germany free of charge.

## VII. Limitation of liability

1. Liability on our part for violations of obligations due to ordinary negligence shall be limited to average losses/damage which, in terms of the type of goods in question, are foreseeable, direct, and typical for such contracts. This also applies for violations of obligations due to ordinary negligence on the part of our legal representatives or vicarious agents. We accept no liability against the customer for violation of non-substantial contractual obligations due to slight negligence.
2. We accept no liability for losses/damage not occurring to the goods themselves. In particular, we shall not be liable for any loss of profit or other loss of assets on the part of the customer.

## VII. Repairs

1. Insofar as a quotation is desired prior to carrying out repairs, this must be expressly requested.

## XI. Other provisions

1. The law of the Federal Republic of Germany shall apply. Application of the provisions of the United Nations Convention on Contracts for the International Sale of Goods is precluded.
2. Wheresoever the purchaser is a business, a legal entity under public law or a separate estate under public law, the exclusive place of fulfilment for all disputes arising from this contract is Mönchengladbach. This also applies where the customer has no general legal venue in Germany or where the domicile or ordinary place or residence are unknown at the time when proceedings for legal action are filed.
3. Should any individual provision of the contract with the customer, including these general business conditions, be or become wholly or partially inoperative, this shall not prejudice the validity of all remaining provisions. The wholly or partially inoperative provision is to be replaced by an alternative provision, whose economic outcome most closely meets that of the inoperative provision.

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