TRISCAN

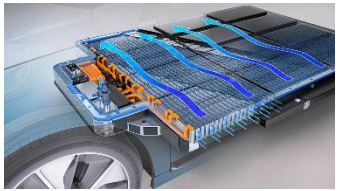
TRISCAN AC Hoses

Pressure sensors

Original Sensata
Technologies products

TRISCAN

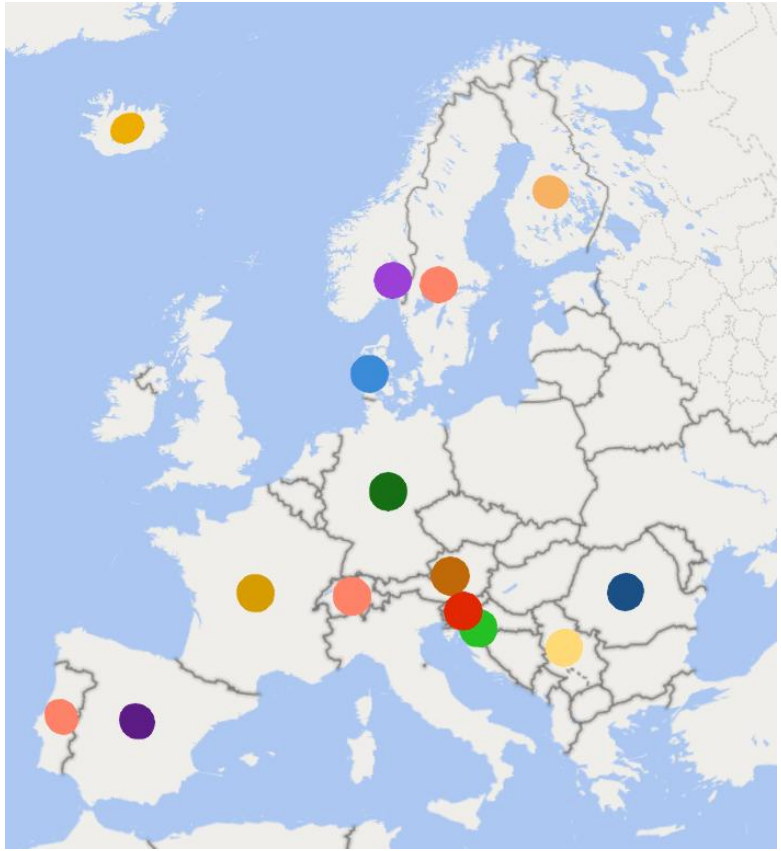
Huge market driven demand



- High mileage cars like light commercial vans
- Good spread on demand in passenger cars
- Vibration from the compressor is causing stress fractures
- Ozone deterioration on external layers of hoses
- Rubber deterioration of the inner layer causing contamination
- Aluminum oxidation from moisture exposure
- Refrigerant lines and connections often break
  - When replacing condenser, compressor, expansion valve and evaporator.
  - As part of a timing belt replacement where parts of the AC system need to be removed to gain access
  - During front end collision damage, crash repairs
- Some hybrid and almost all pure electric vehicles cannot drive without the AC system working due to battery cooling (active cooling).

Business potential

Country	Population	Registered Vehicles	Search quantity
Germany	83.000.000	49.000.000	115.766
France	68.000.000	38.900.000	91.962
Spain	47.400.000	25.000.000	59.101
Austria	9.000.000	5.130.000	26.938
Romania	19.000.000	8.000.000	18.912
Portugal	10.300.000	5.000.000	11.820
Switzerland	8.700.000	5.000.000	11.820
Sweden	10.500.000	5.000.000	11.820
Croatia	3.900.000	2.000.000	10.603
Serbia	6.700.000	2.000.000	10.301
Norway	5.400.000	3.500.000	8.274
Finland	5.500.000	2.800.000	6.619
Denmark	5.800.000	2.780.000	6.572
Slovenia	2.100.000	1.000.000	2.973
Iceland	370.000	260.000	614



- Developing a true to OE range of AC-hoses is an incredibly complex endeavor requiring thousands of product management hours:
  - Approx. 2,500 hours internally (Triscan)
  - Approx. 10,000 hours externally (Manufactorer)

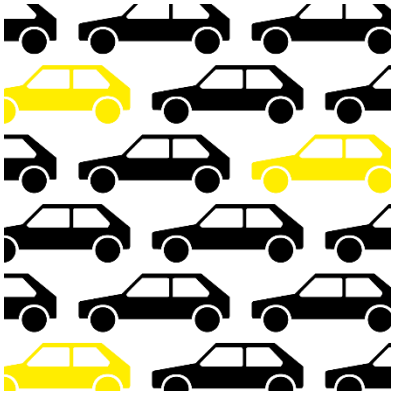
- Tons of data.
- OE samples of each reference.
- This is probably why the current accessible IAM offerings are simply not good enough.

- Existing aftermarket ranges are narrow and often not developed from OE samples, but from aftermarket products.

- This fact leads to compounding mistakes on critical to quality dimensions like:

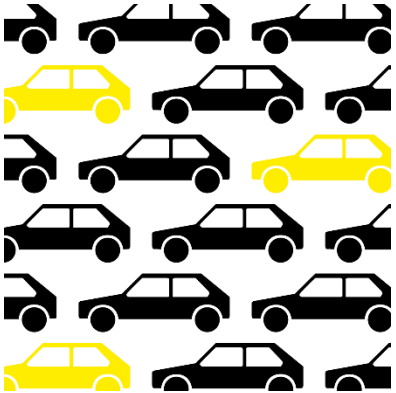
    - Bends
    - Clocking of angles on fittings
    - Poor quality hose
    - Welds
    - QA.

Coverage of the car fleet



	GERMANY		
	Triscan	**VEMO**	**METZGER**
Total VIO	49.080.795	49.080.795	49.080.795
Total VIO covered	23.164.623	11.326.778	4.612.809
Total VIO %	47,20	23,08	9,40
Total linkages	20.914	5.264	2.117
Total unique linkages	5.651	3.078	1.228
Total linked articles	598	190	74

Coverage of the car fleet



	DENMARK		
	Triscan	**VEMO**	**METZGER**
Total VIO	2.843.155	2.843.155	2.843.155
Total VIO covered	1.427.363	292.020	121.283
Total VIO %	50,20	10,27	4,27
Total linkages	20.914	5.264	2.117
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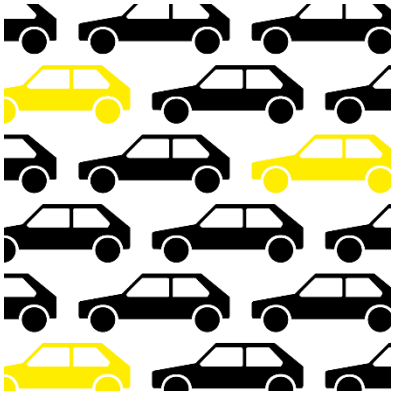

	FRANCE		
	Triscan	**VEMO**	**METZGER**
Total VIO	43.635.589	43.635.589	43.635.589
Total VIO covered	24.500.001	7.694.594	3.870.622
Total VIO %	56,15	17,63	8,87
Total linkages	20.914	5.264	2.117
Total unique linkages	5.651	3.078	1.228
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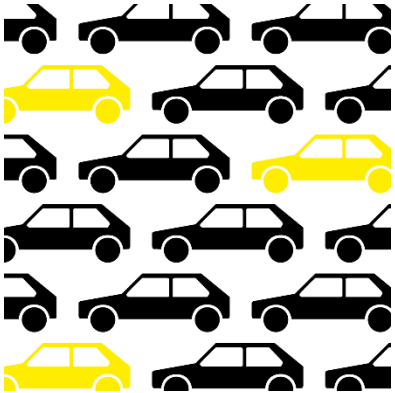
Coverage of the car fleet



	SWEDEN		
	Triscan	**VEMO**	**METZGER**
Total VIO	5.751.316	5.751.316	5.751.316
Total VIO covered	1.933.518	876.053	323.236
Total VIO %	33,62	15,23	5,62
Total linkages	20.914	5.264	2.117
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	FINLAND		
	Triscan	**VEMO**	**METZGER**
Total VIO	2.757.648	2.757.648	2.757.648
Total VIO covered	929.481	470.281	196.808
Total VIO %	33,71	17,05	7,14
Total linkages	20.914	5.264	2.117
Total unique linkages	5.651	3.078	1.228
Total linked articles	598	190	74

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Total linked articles	598	190	74

	GREAT BRITAIN		
	Triscan	**VEMO**	**METZGER**
Total VIO	37.660.861	37.660.861	37.660.861
Total VIO covered	15.652.284	5.484.501	2.083.417
Total VIO %	41,56	14,56	5,53
Total linkages	20.914	5.264	2.117
Total unique linkages	5.651	3.078	1.228
Total linked articles	598	190	74

	NORWAY		
	Triscan	**VEMO**	**METZGER**
Total VIO	3.054.404	3.054.404	3.054.404
Total VIO covered	990.555	424.913	127.627
Total VIO %	32,43	13,91	4,18
Total linkages	20.914	5.264	2.117
Total unique linkages	5.651	3.078	1.228
Total linked articles	598	190	74

	POLAND		
	Triscan	**VEMO**	**METZGER**
Total VIO	18.059.892	18.059.892	18.059.892
Total VIO covered	6.066.617	3.835.364	2.565.576
Total VIO %	33,59	21,24	14,21
Total linkages	20.914	5.264	2.117
Total unique linkages	5.651	3.078	1.228
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Poor data quality on current offerings

- Incorrect or missing crossing to OE
- Incorrect/missing links
- Lack of criteria/delimitations
- Improper consolidation

Improper consolidation

i	20	5Q0 820 743 C	Refrigerant line (A/C compressor > cut-off point)	1	PR:T9B,TK8, TL1,TM5,TP1+ KK1
i	(20)	5Q0 816 743 E	Refrigerant line (A/C compressor > cut-off point)	1	PR:T3Q,TA8, TI6,TP6,TT6+ KK3

KK1 R-134A Refrigerant

KK3 R-1234YF Refrigerant

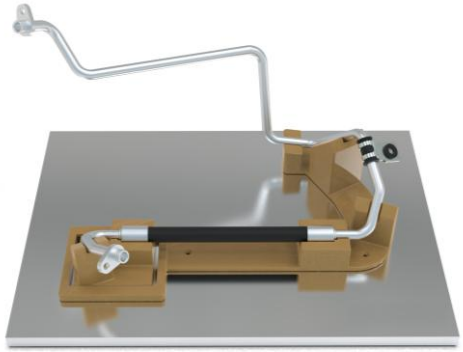
The TRISCAN program

- Based on extensive market data – the most searched OE numbers for AC hoses that are in demand at workshop level across Europe.
- A unique chance to win sales from OE-dealers that until now has been lost because no supplier has been able to cover the demand.
- Exceptional in range, product quality and data accuracy.
- 650+ references – 300+ first to market references.
- Pressure sensor is always included (on AC-hoses where a pressure sensor is fitted).

Shipping – box size recommendations

Cardboard box #	Size - W x H x D (mm)
1	XXX * XXX * XXX
2	XXX * XXX * XXX
3	XXX * XXX * XXX
4	XXX * XXX * XXX
…	

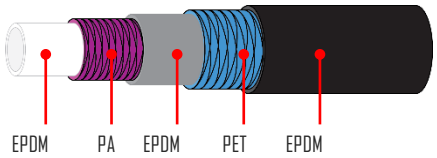
Product quality



OE SPEC

- Every item is developed based on 3D scanned OE samples.
- True to OE in terms of hoses, pipes, fittings, brackets, angles and bends.
- Assembled using fixtures.
- In-house production of all components and hose.
- All pipe fittings are brazed by robot.
- Leakage testing of each individual pipe and fitting.
- Leakage testing of assembled hose with nitrogen.
- Produced by one of the largest OE manufacturers of A/C hoses in the world.

Product Quality - Hose



EPDM: **E**thylen **P**ropylen **D**ien **M**onomer

PA: **P**oly**A**mide

PET: **P**oly**E**thylene **T**erephthalate

- Single Braided Barrier Hose
- Temperature range: -40 C-135 C
- Working pressure: 35 bar
- Bursting pressure: 172 bar
- Compatible with: R12 / R134A / R1234YF
- Low permeability (leakage)
- Fulfills: SAE J 2064/3062 Type C
- Accreditations:
  - CNAS laboratory
  - GEELY
  - SGMW (SAIC / GM / Wulling)
  - General Motors GP10

Product quality – Hose testing

Including, among other things.:

- Volumetric expansion
- Pulse test (300,000 cycles)
- Burst test
- Vibration test
- Tensile test
- Aging test
- Permeability testing <5 gram pr. meter of hose pr year

Burst test

Pulse test

Tensile test

Aging test

Data quality

- There are 3 generic article codes in the Tecdoc structure that are associated with AC-hoses and they are often used incorrectly in Tecdoc.

  2094 – High Pressure Line, air conditioning
  2095 – Low Pressure Line, air conditioning
  2096 – High-/Low Pressure Line, air conditioning

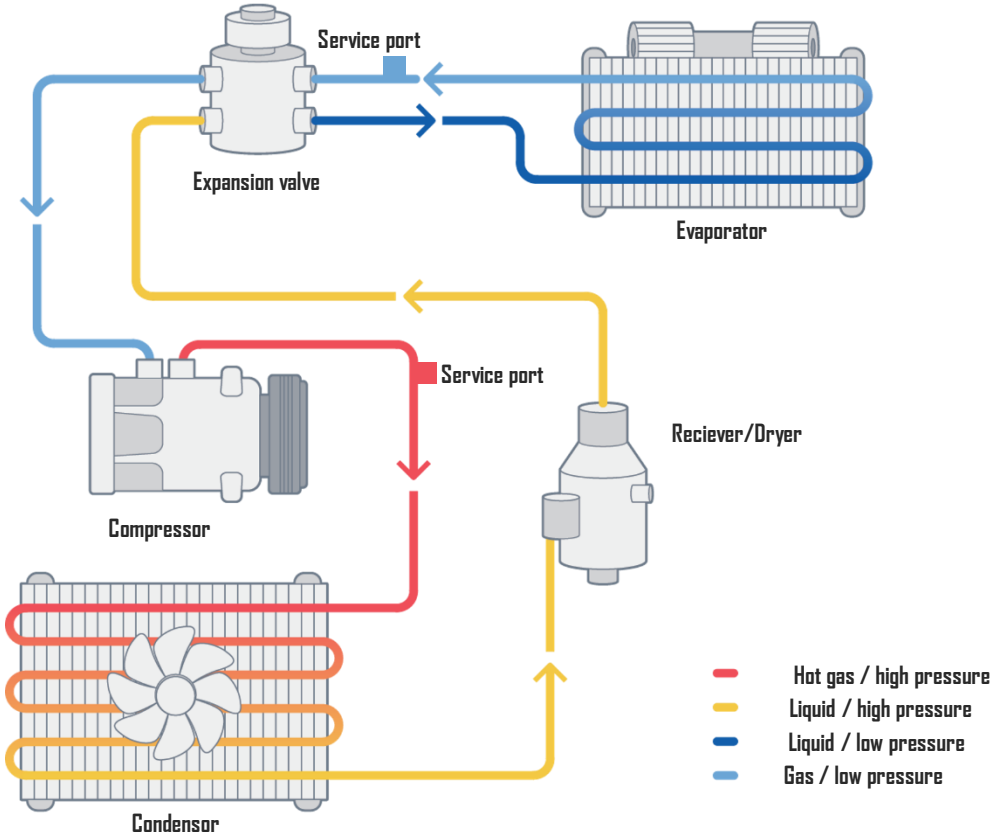
- Misclassification of high- or low-pressure side, or association of all three GA codes to the same article number often leads to the mechanic not finding the desired hose.

- Triscan AC-hoses are exclusively associated with the GA code 2096 for ease of use:

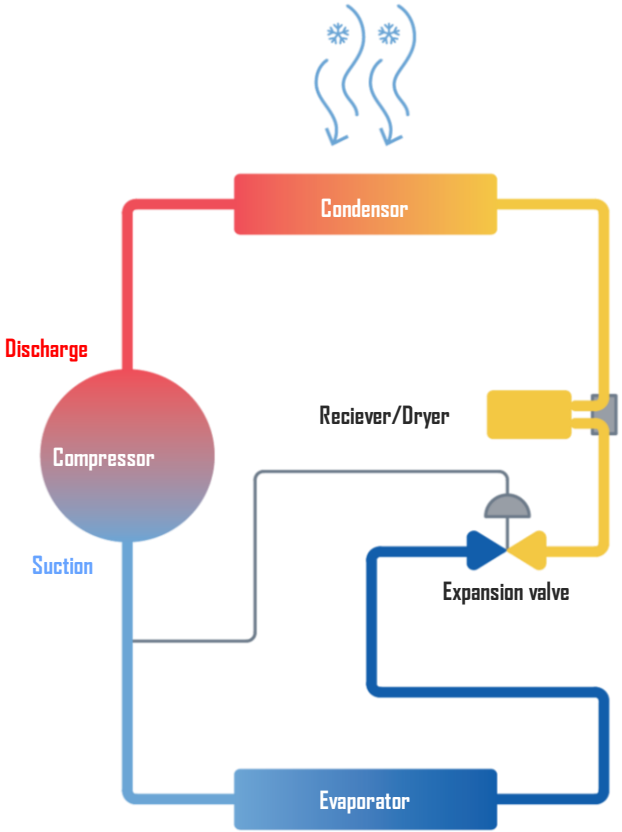
  Eliminating the risk of the mechanic clicking only 2094 or 2095 and not seeing all the part numbers available for the vehicle.

  Avoiding customers allocating menu tree options.

AC System Design



AC Pressure sensor



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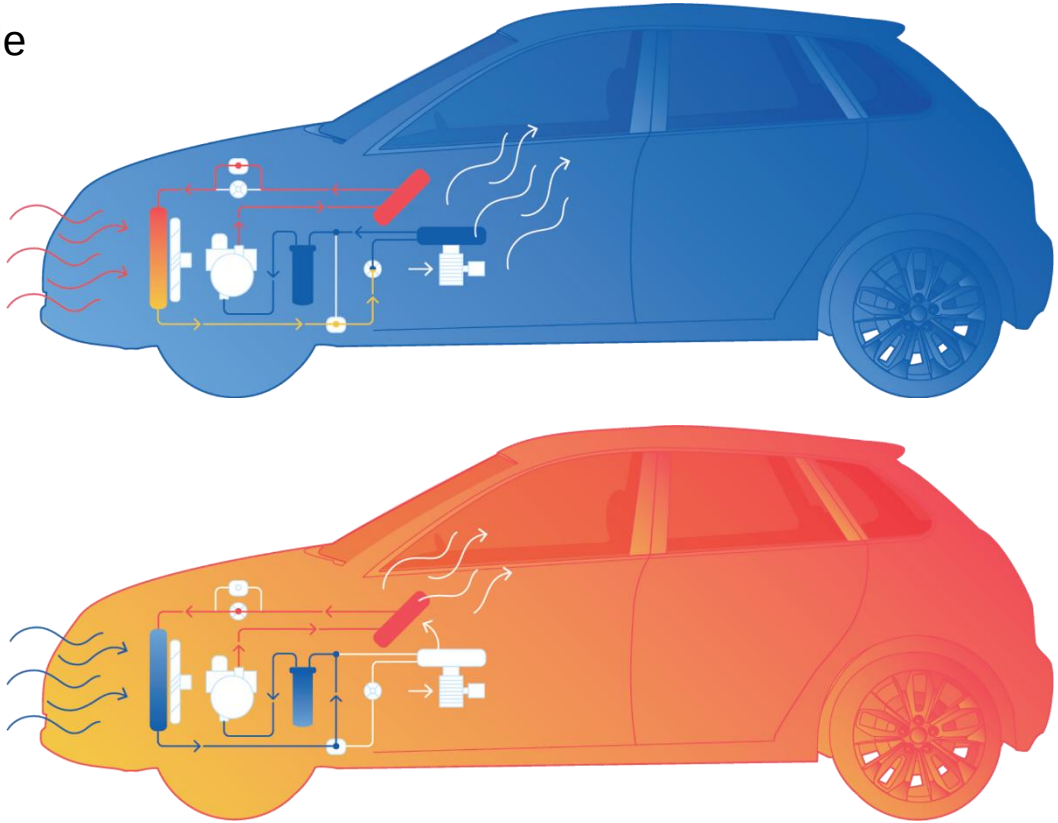
AC System Design – EV’s

- Heat pump principle
- Cooling of battery



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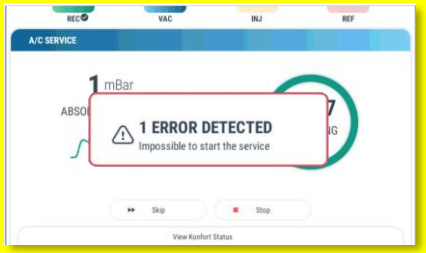
Environment and costs of ownership



- A leaking system is an environmental burden due to leaking refrigerant.
- Filling stations check for leaks and filling cannot be started if leaks are found.
- Avoid complaints on compressor replacement due to lack of flushing.