[2]Parts highlighted in yellow are still for discussion at next WG9 meeting.
Parts highlighted in pink are for countercheck/action

Updated 29.08.2012 – with changes

German Vehicle Manufacturers'equipment Specifications Service Unit for AC Systems in Motor Vehicles with Refrigerant R-1234yf	EGEA Specifications Service Unit for MAC Systems For use with Motor Vehicles using Refrigerant R-1234yf	Your comments, if any, please.

3 Legal requirements on the service unit The service unit must comply with the specific national laws and legal provisions and requirements. These can also comprise regulations about the handling of refrigerants and their respective storage bottles. The service unit, including all of its respective equipment and related documentation, must meet the legal regulations, ordinances, prescriptions and directives valid in the respective country at the moment of ordering. The manufacturer must provide documented evidence of the product's compliance with all the legal provisions of the EU valid for this kind of product, as for example • the European Machinery Directive 2006/42/EC • the European Low Voltage Directive 2006/95/EC • the European Directive for Electromagnetic Compatibility EMC 89/336/EEC • the European Pressure Equipment Directive 97/23/EC • Directive 2006/40/EC, dated 17/05/2006, about the emissions from AC systems in motor vehicles and amending Council Directive 70/156/EEC. • For the U.S., the following UL-directives shall be complied with (e.g. UL1604, UL1769, UL1963), valid SAE standards shall be observed (e.g. SAE J639). The manufacturer must also supply the compliance statement, the R-1234yf-related risk assessment, the certificates and the operating instructions according to the relevant legal provisions, such as for example the European Machinery Directive 2006/42/EC, no later than at delivery of the serial service unit. According to the Machinery Directive, the service unit must undergo a prototype licensing by an accredited organisation for certification and standardization and / or GS certification. The service unit must be labelled	**3 Legal requirements on the service unit** The service unit must comply with the specific national laws and legal provisions and requirements. These can also comprise regulations about the handling of refrigerants and their respective storage bottles. The service unit, including all of its respective equipment and related documentation, must meet the legal regulations, ordinances, prescriptions and directives valid in the respective country at the moment of ordering. <u>The manufacturer must provide to the independent and accredited test institute documented evidence of the product's compliance with all the legal provisions of the EU valid for this kind of product.</u> • ~~the European Machinery Directive 2006/42/EC~~ • ~~the European Low Voltage Directive 2006/95/EC~~ • ~~the European Directive for Electromagnetic Compatibility EMC 89/336/EEC~~ • ~~the European Pressure Equipment Directive 97/23/EC~~ • ~~Directive 2006/40/EC, dated 17/05/2006, about~~ ~~the emissions from AC systems in motor vehicles and amending Council Directive 70/156/EEC.~~ • ~~For the U.S., the following UL-directives shall be complied with (e.g. UL1604, UL1769, UL1963), valid SAE standards shall be observed (e.g. SAE J639).~~ The manufacturer must also supply the compliance statement, the R-1234yf-related risk assessment, the certificates and the operating instructions according to the relevant legal provisions~~. such as for example the European Machinery Directive 2006/42/EC, no later than at delivery of the serial service unit. According to the Machinery Directive, the service unit must undergo a prototype licensing by an accredited organisation for certification and standardization and / or GS certification~~. The service unit must be labelled	29.08.12 *Neither Machinery Directive 2006/42/EC nor MID 95/16/EC should apply. The HFO1234YF specification is not included in the MID 95/16/EC scope.* 29.08.12 29.08.12 29.08.12

4 Operating conditions All components of the service unit must be able to resist all environmental and climate influences occurring during operation of the equipment (service unit on), and standstill (service unit off), and must be corrosion-resistant. This also implies mechanical, chemical and thermal stress.	**4 Operating conditions** All components of the service unit must be able to resist all environmental and climate influences occurring during operation of the equipment (service unit on), and standstill (service unit off) within a vehicle repair workshop environment, and must be corrosion-resistant. This also implies mechanical, chemical and thermal stress.	04.04.2012
4.1 Temperatures **Environmental temperatures in the workshop (Service unit operating temperature range)** Minimum environmental temperature: + 10 ºC Maximum environmental temperature: + 50 ºC **Storage temperatures** Minimum environmental temperature: - 25 ºC Maximum environmental temperature: + 50 ºC **Refrigerant temperatures during machine operation** According to ISO 13043 Minimum refrigerant temperature: approx. – 40 ºC Maximum refrigerant temperature: approx. + 105 ºC	**4.1 Temperatures** **Environmental temperatures in the workshop (Service unit operating temperature range)** Minimum environmental temperature: + 5 ºC Maximum environmental temperature: + 45 ºC **Storage temperatures** Minimum environmental temperature: - 10 ºC Maximum environmental temperature: +50 ºC	04.04.2012

4.2 Pressure The service station must be designed for the following absolute pressures: **In case of inactive vehicle AC system on the low side:** Maximum operating pressure: 16.1 bar (standstill pressure at 60 ºC) Minimum operating pressure: 0 bar (after evacuation) **In case of active vehicle AC system on the high side:** Maximum allowed operating pressure: 28 bar Maximum pressure in case of failure: 40 bar (discharge pressure through the safety valve of the vehicle AC system) Minimum allowed pressure: 0 bar (after evacuation)		06.06.2012 • Point was deleted because a max operating pressure can't be defined therefore does not make sense. • Point covered by PED

5 Design concept It must be possible to carry out all work on the AC system in the motor vehicle (extraction, evacuation, filling, measurement of the service pressure or optional flushing) according to practical actual work standards and requirements. The service unit must be designed in such a way that its use does not cause any danger due to explosive areas according to the ordinance on industrial safety (BetrSichV). The service unit must be ready to operate 3 minutes after switch-on. An emergency-off button at the service unit is required by law (machinery directive 2006/42/EC). In case of emergency, valve(s) installed directly on the internal refrigerant bottle must close automatically. A safety locking system must be provided that makes sure the service unit switches to the emergency state if the door panel is opened. It must not be possible to use the service unit if one of the body panels is open. For oil and/or filter replacements, the service unit must switch to maintenance mode automatically. All the individual components of the service unit must be replaceable as spare parts. A high-pressure interruption switch shall also be used to ensure that unnecessary discharge of refrigerant through the overpressure relief valve is prevented in case of increased system pressure in the service unit. The scale (where present) must be protected against vibrations during the transport or replacement of the refrigerant bottles by means of a mechanical locking system.	**5 Safety concept and risk assessment** • At initial power-up the fan shall be operated long enough to perform one air change prior to any other operation. • When the unit is powered, it shall be ensured that there are at least 6 air-exchanges per hour to prevent build-up of concentration of_vapor of the enclosure of the cabinet. • If the air-flow is not detected, then it shall be ensured that the operation of the unit will automatically stop. • Electric devices (e.g fan, switch, etc) shall avoid the generation of sparks if fitted within the cabinet. • <u>The use of refrigerant identifier is optional. Provisions on the gas identifier/analyser to be included (but to be 'legally' counterchecked before next meeting)</u> After switch-on, the service unit should indicate to the operator when the machine is ready and prevent operation during this period. In case of a malfunction <u>valve(s)</u> installed directly on the internal refrigerant bottle must close automatically. If the unit is accessible without the need of tools, then	04.04.2012 + 06.06.2012 29.08.12 29.08.12

5.1 Equipment design and set-up Mobile use of the service unit must be possible. The impellers must run smoothly and be easy to guide. The front wheels are equipped with a fixing brake. The manufacturer must provide ergonomic holding devices for service hoses and connection cables as well as the service documentation.		04.04.2012
5.2 Control devices and indicators The service unit must include the following control devices and indicators: • Control display to monitor the current service status • Vacuum indication via a manometer or display • Display of service pressures high pressure (HD) or low pressure (ND) via a clearly readable manometer • Display of the contents of the bottle (internal bottle) • Clear control panel with big keys for data entry • Illuminated display with the possibility of issuing charts • Printer with standard paper to print out the most important values (pressures, filling and evacuation quantities, etc.)	**5.2 Control devices and indicators** The service unit must be capable of producing a service report including at least refrigerant and oil quantities (recovered and refilled).	04.04.2012 + 06.06.2012

5.3 Materials The materials used must never be dangerous to health or harmful to humans or the environment during the whole life cycle of the component. The outside part of the service unit must be resistant against operating fluids used in vehicles (for example engine oil, gear oil, brake fluid, compressor lubricating oil, refrigerants, etc.). Service unit components which are not resistant to the above mentioned operating fluids (for example the display or the keyboard) must be placed in such a way that contact with these fluids is impossible during technically correct use of the service unit. During the development and design of the service unit, the manufacturer must take into account the different kinds of conditions and stress in the different work sites due to temperature (worldwide), atmospheric conditions (indoors / outside), absolute pressure (mountain / valley) and other comparable factors. These conditions must compromise neither the operational capacity nor the life cycle of the service unit. The same shall apply for the mechanical stress factors (for example due to transport) that could have an impact on the service unit.		04.04.2012

5.4 **Manufacturing requirements on the internal refrigerant conduits** The joining technique must be of the highest commercial standard quality with regard to assemblies and their components. There must be no defects that could affect the functional capacity of the service unit or its assembly characteristics. This includes, for example, surface defects or inhomogeneities in the material or its compounds as well as incorrect design of the fastenings fittings. The internal solder connections must be free of flux melting or mould release agents as well as residues that could get detached during the operation with the refrigerant R-1234yf or the respective released compressor lubricant, thus causing a contamination or blockage of the refrigeration circuit. All soldering processes are to be designed in such a way that a later influence or impact of corrosive media (as e.g. flux melting agents) is impossible. The surface of the soldering gaps must be at least 60% free of blow holes, with continuous pore lines or worm hole porosities (DIN 8515-1) not being allowed. Inclusions of flux residues must not be in contact with the cross-section of the solder joints or with its surrounding surface. The overlapping depth of the connection fittings must be at least 5 mm.		04.04.2012
5.5 Layout service coupling To guarantee the highest possible flexibility between the service coupling and the service hose, the rigid part of the conduit must be kept as short as possible. Clearances around the vehicle valves must have a minimum radius of 60 mm. An angular hose outlet is acceptable.		04.04.2012

6 Technical specifications basic scope of delivery To guarantee for the smallest possible leakage rate, additional requirements for the joining technique, the measurement and regulation technologies or, where required, process-related changes in the equipment may be necessary. The development and manufacturing processes are subject to strict inspections. During its whole life cycle, the service unit must be protected against external damage from all sorts of liquid substances, i.e. damage through humidity or other operating fluids of the motor vehicle. The basic delivery scope of the service unit must not contain any data about the refrigerant quantities of the OEM vehicles in its database. The refrigerant quantities for the respective vehicle are to be found in the current OEM repair instructions or else can be looked up on the specification plate in the engine compartment. The basic scope of delivery of the service unit must include at least one control and communication interface (hard- and software) for an external gas analysis system.		04.04.2012

6.1 Dimensions / Weight / Volumes Max. length 800 mm Max. width 600 mm Max. height 1500 mm Service hoses length / standard 2500 - 3000 mm Min. wheel size 100 mm Max. weight 120 kg Fresh oil storage bottle 250 – 500 ml Used oil storage bottle 250 – 500 ml UV additive storage bottle 250 – 500 ml Volume internal refrigerant bottle 10 – 26 l		04.04.2012

6.2 Connected loads / protection classes **Version 1** Power supply 230 V / 50 Hz IP Protection class min. IP2x for all the other electrical components Table 2: Connected loads / protection classes 1) If the safety concept results in a different protection class, it will also be accepted. 2)	**Version 2** 1) min. IP4x for engines, min. IP2x for all the other electrical components	04.04.2012
6.3 Interface for gas analysis The service units must provide the following interfaces for the possible connection of external gas analysis equipment (see chapter 7.1): - USB (min. 2.0) - Optional Bluetooth The service unit manufacturer must disclose the necessary control software as well as the respective device drivers for the interfaces, so as to make possible the integration of the external gas analysis equipment.	**6.3 Interface for gas analysis** The service units must provide the following interfaces for the possible connection of external gas analysis equipment (see chapter 7.1): - USB (min. 2.0) - Optional Bluetooth The service unit manufacturer must disclose the necessary control software as well as the respective device drivers for the interfaces, so as to make possible the integration of the optional gas analysis equipment.	06.06.2012 29.08.12 Agreed to remove any reference Including any interface) to a refrigerant identifier in the EGEA specification. This allows equipment manufacturers to create a unit with an embedded RID, but this is a commercial decision. The operating manual will include 'highly recommended' use of an RID, referenced to an SAE/ISO equipment specification and accuracy performance levels.

6.4 Service hoses The service hoses for the refrigerant R-1234yf must be manufactured according to the standard SAE J2888. The hose length must be 2.5 to 3.0 m, the thread connections must be M12 x 1.5 according to the SAE standard and be installed on the outer part.	**6.4 Service hoses** The service hoses and thread connections for the refrigerant R-1234yf must be manufactured according to the standard SAE J2888.	04.04.2012

6.5 Service couplings The service couplings for the high and low side with integrated block valves must meet the standards SAE J2888 and J639 and feature the following characteristics: • The couplings must be designed for a minimum of 5,000 mating cycles. • The internal sealing elements must be designed with the respective necessary resistance. • The clearance volume must be ventilated. This helps to recognize the escape of refrigerant (in case of a defect valve in the vehicle) at an early stage. • The quantity of refrigerant in the clearance volume shall not exceed a maximum of 1.0 g. • If the service couplings are not connected to the vehicle, there shall be no emission or escape of refrigerant if the couplings are opened (turning the knurled head screw to the stop position in clockwise direction). It must not be possible to connect the service couplings to the vehicle under these conditions. • Mechanical disconnection of the couplings must not be possible if the vehicle valves (knurled head screw open) are open. • Maximum diameter = 40 mm (without hose outlet) • The supplier's initial sample inspection report must be provided (see 12.2)	**6.5 Service couplings** The service couplings for the high and low side with integrated block valves must meet the standards SAE J2888 and J639.	04.04.2012

6.6 Display of process fluids quantities The process fluids quantities in the service unit (refrigerant, fresh refrigeration oil, UV additive and used refrigeration oil) must be displayed before the service unit starts to work.	**6.6 Display of process fluids quantities** The process fluids quantities in the service unit must be displayed before the service unit starts to work.	04.04.2012
6.7 Refill Refilling of an AC system of a motor vehicle which is already filled with refrigerant is not allowed. This must be guaranteed with the help of the control system of the service unit.	**6.7 Refill** Refilling of an AC system of a motor vehicle is not allowed when a positive pressure exists within the vehicle system.	04.04.2012
6.8 Emptying and filling process Before every filling process, evacuation must be performed. After evacuation, a pressure check must be carried out with a maximum of 50 g R-1234yf. The duration of the pressure control must be at least 5 minutes. Afterwards, the refrigerant that was filled in for the pressure check must be extracted again before beginning the actual filling process. Finally, the compressor evacuates the service and internal conduits of the unit automatically. The refrigerant that was extracted from the conduits must be filled into the internal refrigerant storage bottle. The functions must be program-controlled with the possibility of individual manual control. The extraction of refrigerant from the AC system of the motor vehicle, as well as the evacuation, must be possible via the high- as well as the low-side connection. The service unit compressor must feature an aspiration power of at least 20 kg/h.	**6.8 Emptying and filling process** After use, the unit evacuates the service and internal conduits of the unit automatically. The refrigerant that was extracted from the conduits must be returned to the internal refrigerant storage bottle.	04.04.2012

6.9 Precision of the evacuation process **6.9.1 Refrigerant** A minimum of 95% of the refrigerant of the motor vehicle AC system must be recovered in a maximum period of time of 30 minutes; see SAE J2843. The manufacturer of the service unit bears the burden of proof. The evacuated refrigerant quantity shall be displayed with a tolerance of ± 15 g.	**6.9 Precision of the evacuation process** **6.9.1 Refrigerant** The unit shall be capable of recovering a minimum of 95% of the refrigerant present in the test conditions in Annex I. The evacuated refrigerant quantity shall be displayed with a tolerance of ± 15 g (see Annex I for the performance test conditions)	06.06.2012 (copy/paste VDA spec in Annex I for test conditions?) 29.08.12 Adopt the full German OEMs test specifications. We believe that the SAE test method is by far too complex; the German one is a good compromise between test complexity and repeatability. (Annex 1 shows the same test conditions as the VDA specification – chapter 8.3)
6.9.2 Maximum discharge of refrigerant oil Evacuation of the refrigerant shall take place either via the low side or the high side. The quantities of refrigerant oil dragged along from the AC system of the motor vehicle must be as low as possible. Therefore, only gaseous refrigerant may be extracted from the AC system of the vehicle at the beginning of the evacuation process. At the end of the evacuation process, the simultaneously extracted oil shall be automatically drained into a respective storage bottle with a precision of ± 5 g. An adequate outlet shall be available for this step. After the evacuation process, the quantity of the refrigerant oil that was extracted along with the refrigerant must be visible on the display. This measure serves as indicator of how much refrigerant oil has to be refilled into the AC system.	**6.9.2 Maximum discharge of refrigerant oil** At the end of the evacuation process, the simultaneously extracted oil shall be automatically drained into a respective storage bottle with a precision of ± 5 g or 5 ml. After the evacuation process, the quantity of the refrigerant oil that was extracted along with the refrigerant must be visible on the display.	04.04.2012

6.10 Control pressure increase after evacuation process To make sure that the AC system of the motor vehicle was really emptied during the evacuation process, it is necessary to control the pressure increase after the evacuation (secondary steam after evacuation). The pressure shall be measured on the high and low sides (see chapter 8.7).		04.04.2012
6.11 Vacuum test The vacuum test is part of the evacuation and refilling process. The vacuum test is completed when the AC system of the motor vehicle with an inner volume of at least 2 litres reaches an absolute pressure of less than 5 mbar in the vehicle connection after 10 minutes. For automatic program sequences, the vacuum time (factory setting 30 minutes) starts after the above-mentioned vacuum has effectively been reached (see chapter 8.8). Achieving a vacuum of 5 mbar shall be documented in the sample inspection and must be securely complied with in the scope of serial production inspections.	**6.11 Vacuum test** The vacuum pump must be capable of creating a minimum pressure of 5 mbar in 10 minutes when connected to a test cylinder of 2 litres. <u>The vacuum test is performed as follows: 150 mbar maximum vacuum decay for at least 3 minutes, according to SAE J2843. The sensor must operate with an accuracy of +/- 15 mbar.</u> ~~The vacuum test must be capable of detecting a minimum decay of 300 mbar over a max 5 minutes period when compared to ambient atmospheric pressure.~~ This shall be documented in the sample inspection and must be securely complied with in the scope of serial production inspections.	04.04.2012 + 06.06.2012 29.08.12 No compensation for atmospheric pressure variations.
6.12 High side measurement Technical implementation is to be carried out by the manufacturer of the service unit, under consideration of the following aspects: • Measuring range high pressure: 0 to 40 bar • Measuring precision: according to EN 837 quality class 1	**6.12 High/ Low side measurements** The performance and accuracy of the pressure sensors must comply with EN 837, class 1or better; maximum full scale is 60 bar. Analogue Gauges (not mandatory) must comply with EN837, class 1.6 or better.	04.04.2012 + 06.06.2012

6.13 Low side measurement Technical implementation is to be carried out by the manufacturer of the service unit, under consideration of the following aspects: • Measuring range low pressure: 0 to 16 bar • Measuring precision: according to EN 837 quality class 1		04.04.2012
6.14 Filling precision The filling precision for the refrigerant, fresh oil and UV additive must be guaranteed for the whole temperature range (see chapter 4.1). The refrigerant quantities shall be charged through the service couplings in doses with a precision of ± 15 g. The filling precision for fresh oil and UV additive is ± 5 g. at the service coupling.	**6.14 Filling precision** The filling precision for the refrigerant, fresh oil and UV additive must be guaranteed for the whole temperature range (see chapter 4.1). **6.14.1 Refrigerant** The refrigerant quantities shall be charged through the service couplings in doses with a precision of ± 15 g. **6.14.2 Oil & UV additive** If injected automatically by the machine. The filling precision for fresh oil and UV additive is ± 5 g/ 5ml.	04.04.2012 + 06.06.2012

6.15 Supply of fresh refrigerant oil	**6.15 Supply of fresh refrigerant oil and UV dye**	04.04.2012 + 06.06.2012
The storage bottle for fresh oil on the service unit shall be labelled in such a way that it can be clearly distinguished from the storage bottle for used oil. The service unit shall only fill the vehicle AC systems with refrigerant oils that have been released by the OEM. The fresh oil must be supplied into the hermetically sealed fresh oil storage bottle on the service unit directly from closed containers (storage containers). Evacuated used oil shall always be replaced through fresh oil. The quantity of fresh oil to be supplied to the AC system of the vehicle must correspond to the quantity of evacuated used oil. Additional quantities shall only be supplied if indicated in the respective repair instructions. A general supply of fresh oil via the service unit is not allowed for new charging of the vehicle AC system. The supply of this fluid must be optional, i.e. new charging must also be possible without the supply of fresh oil.	If storage bottles for oil are fitted, then they shall all be labeled in such a way that it can be clearly distinguished between oil types and specification and from the storage bottle for used oil. ~~If bottles are exchanged for different vehicle system types, then the machine must be able to prevent any cross-contamination between the different types of oil.~~ Cross contamination between higher and lower conductance oils should be limited and comply with the requirements of SAE J2843. The supply of fresh refrigerant oil shall be achieved in such a way that it is 'moisture free' in the vehicle. If a storage bottle is used, it should be designed in such a way that prevents any contamination from moisture. If the unit is capable of providing automatic oil refilling of the vehicle system, then the unit must always refill the vehicle system with the same quantity of fresh oil corresponding to the quantity of recovered oil. If the UV additive is injected automatically, the following should apply: The UV additive must be stored in a separate, hermetically closed container on the service unit. The filling quantity of the UV additive can be weighed by means of a scale or be dosed with the help of a time-controlled valve. The supply of this fluid must be optional, i.e. a new charging must also be possible without the supply of UV additive.	29.08.12 Add ***and UV dye*** to the title of this section: the same specification should apply to both fresh oil and UV dye (which mostly consists of oil). 29.08.12 29.08.12

6.16 Supply of UV additive The supply quantity of the UV additive via the service unit is to be entered manually. Only leak detection agents that were released by the respective OEM are allowed. The UV additive must be stored in a separate, hermetically closed container on the service unit. The filling quantity of the UV additive can be weighed by means of a scale or be dosed with the help of a time-controlled valve. The UV additive must be supplied into the hermetically sealed UV additive storage bottle on the service unit directly from closed containers (storage containers). The supply of the UV additive must not be coupled to the oil supply. The supply shall be requested by means of a separate menu item and must be confirmed. The supplied UV additive quantity will be added to the charged quantity of fresh oil. A general supply of UV additive via the service unit is not allowed for new charging of the AC system of the vehicle. The supply of this fluid must be optional, i.e. a new charging must also be possible without the supply of UV additive.	~~**6.16 Supply of UV additive**~~ ~~If the UV additive is injected automatically, the following should apply:~~ ~~The UV additive must be stored in a separate, hermetically closed container on the service unit.~~ ~~The filling quantity of the UV additive can be weighed by means of a scale or be dosed with the help of a time-controlled valve.~~ ~~The supply of this fluid must be optional, i.e. a new charging must also be possible without the supply of UV additive.~~	06.06.2012

6.17 Evacuation fill hoses and internal conduits After the refilling process and the pressure test, the service unit must automatically evacuate its internal conduits and pass the refrigerant into an internal storage bottle. The connection of the service couplings to the vehicle must be without pressure, i.e. there must be no overpressure in the service couplings. If the service unit could not be switched off in a regular way due to a voltage breakdown or other reasons and the selected procedure could not be completed correctly, the service unit must automatically switch into its basic state (e.g. non pressurized fill hoses) during restart.	**6.17 Evacuation of service hoses ~~fill hoses and internal conduits~~** After the refilling process, the service unit must automatically evacuate its internal conduits and pass the refrigerant into an internal storage bottle. The connection of the service couplings to the vehicle must be <u>de-pressurised,</u> i.e. there must be no overpressure in the service couplings. <u>The service hoses shall be empty (below atmospheric pressure) at the end of each service operation and before any new service starts.</u> If the service unit could not be switched off in a regular way due to a voltage breakdown or other reasons and the selected procedure could not be completed correctly, the service unit must automatically switch into its basic state (e.g. non pressurized fill hoses) during restart.	06.06.12 29.08.12 29.08.12
6.18 Critical limit for refrigerant loss during drainage of non-condensable gases The limits for loss of refrigerant during drainage of non-condensable gases must be kept at a technical minimum and must be documented. The loss of refrigerant during complete removal of non-condensable gases must not exceed the value of 10 g.	**6.18 Critical limit for refrigerant loss during drainage of non-condensable gases** <u>The loss of refrigerant during removal of non-condensable gases must not exceed the value of 20 g.</u> <u>The unit shall prevent any unnecessary induction of air into the internal bottle.</u>	06.06.2012 To check SPX Patent on system for NCG. – AC to check and verify 29.08.12

6.19 Refrigerant purity The following indications on refrigerant purity are subject to pending examinations. The values may still have to be adjusted. The refrigerant recovered in the internal refrigerant storage bottle must reach a purity of at least 98%: • Water content: < 50 ppm • non-condensable gases: < 150 ppm • Oils / lubricants: < 500 ppm • High boiler: < 500 ppm The service unit must be equipped with easily exchangeable fine filters to separate humidity, acids and solid particles bigger than 15 µm. Proof must be provided pursuant to SAE J2099.	**6.19 Refrigerant purity** The following indications on refrigerant purity are subject to pending examinations. The values may still have to be adjusted. The refrigerant recovered in the internal refrigerant storage bottle must reach a purity of at least 98%: • Moisture: < 50 ppm by weight • non-condensable gases (air): < 1.5% by volume • High boiling residues: < 500 ppm by weight The service unit must be equipped with filters to separate moisture, acids and solid particles bigger than 15 µm. Proof must be provided pursuant to SAE J2099 and J2843	29.08.12 *The testing of these values needs to be checked to establish if the test centres could actually make the tests required.* 29.08.12

6.20 Filter inserts The service unit must contain an internal dehumidifier filter that must be replaced when saturated. Its acid capacity must be at least 5% of the weight of the dry dehumidifier package. The service unit must be able to recognize when the capacity of the dehumidifier has reached its maximum allowed limit and when replacement of the dehumidifier filter is necessary. This includes a reliable way to indicate the humidity level, optionally also with a stored algorithm that is based on the quantity of recovered refrigerant. The user must be clearly warned before the maximum saturation level is reached that the filter must be replaced. The warnings must appear in the menu display and on the paper print-outs. The warnings must make perfectly clear that the service unit is using a filter that will soon reach the end of its operative life cycle. The manufacturer must install an interruption in the service unit that triggers when the filter reaches its maximum saturation limit. The manufacturer must also integrate an identification system that sets the service unit back to its regular work status once the new filter is inserted. The dehumidifier package must be available worldwide as a separate filter set (including all seals) with a detailed description. The distribution and sale of the filter sets must be coordinated with the respective OEM. The user must be able to carry out the filter exchange on his own.	**6.20 Filter inserts** The service unit must contain an internal dehumidifier filter that must be replaced when saturated. Its acid capacity must be at least 5% of the weight of the dry dehumidifier package. The service unit must be able to recognize when the capacity of the dehumidifier has reached its maximum allowed limit and when replacement of the dehumidifier filter is necessary. This includes a reliable way to indicate the humidity level, optionally also with a stored algorithm that is based on the quantity of recovered refrigerant. The user must be clearly warned before the maximum saturation level is reached that the filter must be replaced. The warnings must appear in the menu display and on the paper print-outs. The warnings must make perfectly clear that the service unit is using a filter that will soon reach the end of its operational life cycle. <u>The manufacturer must install an interruption in the service unit that triggers when the filter reaches its maximum saturation limit. The dehumidifier package must be available as a separate filter set (including all seals) with a detailed description.</u>	29.08.12 *Needed to ensure EGEA specification conformity. Could be switched off through an engineer password, but this would invalidate warranty and specification conformity.*

6.21 Leakage rate The leakage rate (in off mode) of the service unit shall be reduced to a minimum and must not exceed 80 g/ year. The manufacturer must provide proof of and document the leak tightness of the service unit.	**6.21 Leakage rate** The leakage rate (in 'off' mode) of the service unit shall be minimised and must not exceed 80 g/year. The manufacturer must provide documentary proof of the leak tightness of the service unit.	29.08.12 *Investigate the verification procedure contained in the VDA specification – action: NP*
6.22 Operating hours counter The service unit shall be equipped with an internal counter to keep a record of the operating hours.	~~**6.22 Operating hours counter**~~ ~~The service unit shall be equipped with an internal counter to keep a record of the operating hours.~~	29.08.12
7 Technical requirements optional scope of delivery (equipment version specific) **7.1 Gas analysis** The gas analysis is controlled through the service unit and must be carried out before the evacuation process. The process must guarantee that no contaminated refrigerant get into the internal refrigerant storage bottle of the service unit. If the refrigerant R-1234yf in the motor vehicle is contaminated (more than 5%), the evacuation process in the service unit must not be started. Indication on refrigerant purity depend on pending examinations and still need to be determined (see chap. 6.19). Co-applicable documents: Requirements specifications for the vehicle refrigerant analytical apparatus with refrigerant R1234yf	~~**7 Technical requirements optional scope of delivery (equipment version specific)**~~ ~~**7.1 Gas analysis**~~ ~~The gas analysis is controlled through the service unit and must be carried out before the evacuation process. The process must guarantee that no contaminated refrigerant get into the internal refrigerant storage bottle of the service unit. If the refrigerant R-1234yf in the motor vehicle is contaminated (more than ??%), the evacuation process in the service unit must not be started.~~ ~~Indication on refrigerant purity depend on pending examinations and still need to be determined (see chap. 6.19).~~ ~~Co-applicable documents:~~ ~~Requirements specifications for the vehicle refrigerant analytical apparatus with refrigerant R1234yf~~	29.08.12 *Now not applicable – refrigerant identifier is no longer included in the specification.*

7.2 Flushing function The flushing function of the AC system of the motor vehicle is performed by the service unit. The flushing direction is opposite to the normal flow direction of the refrigerant circuit. Each flushing process must be preceded by a pressure control with a maximum of 50 g R-1234yf. The duration of this pressure control is 5 minutes. Universal adapters for AC lines are not allowed. The exact process as well as the technical requirements for the flushing must be described in detail by the individual car manufacturer. **Hardware necessary for flushing:** • Special adapters cleared by the vehicle manufacturer (e.g. for building the flushing circuit) • Flushing device (pressure vessel with riser, inner volume approx. 3 litres, easily replaceable filter element, safety valve) as an additional volume for increasing flow speed at the refrigerant exit from the vehicle circuit (flushing in of the refrigerant right into the pressure vessel, extraction of the refrigerant from the pressure vessel through a riser and the filter element (the riser prevents the pressure vessel from cooling too much during extraction and ice from forming, The filter element keeps coarse dirt away from the service station.) • Climate station with flushing software **Required software of the climate service station for flushing (program course)** • Evacuation of the flushing circuit (vacuum inspection) • Pressure test of the flushing circuit (with 50 g refrigerant),	~~**7.2 Flushing function**~~ ~~The flushing function of the AC system of the motor vehicle is performed by the service unit. The flushing direction is opposite to the normal flow direction of the refrigerant circuit. Each flushing process must be preceded by a pressure control with a maximum of ?? g R-1234yf. The duration of this pressure control is 5 minutes. Universal adapters for AC lines are not allowed. The exact process as well as the technical requirements for the flushing must be described in detail by the individual car manufacturer.~~ ~~**Hardware necessary for flushing:**~~ • ~~Special adapters cleared by the vehicle manufacturer (e.g. for building the flushing circuit)~~ • ~~Flushing device (pressure vessel with riser, inner volume approx. 3 litres, easily replaceable filter element, safety valve) as an additional volume for increasing flow speed at the refrigerant exit from the vehicle circuit (flushing in of the refrigerant right into the pressure vessel, extraction of the refrigerant from the pressure vessel through a riser and the filter element (the riser prevents the pressure vessel from cooling too much during extraction and ice from forming, The filter element keeps coarse dirt away from the service station.)~~ • ~~Climate station with flushing software~~ ~~**Required software of the climate service station for flushing (program course)**~~ • ~~Evacuation of the flushing circuit (vacuum inspection)~~ • ~~Pressure test of the flushing circuit (with ?? g refrigerant),~~	29.08.12

7.3 Refrigerant quantities database The database of the service unit contains the quantities of refrigerant according to the indications of the OEM repair instructions.	**7.3 Refrigerant quantities database** ~~The database of the service unit contains the quantities of refrigerant according to the indications of the OEM repair instructions~~ The operating manual should include guidance to use the vehicle specific data for the refrigerant and oil requirements.	***Question to the EGEA secretariat:*** ***Why not develop a common EGEA database, which may include vehicle's A/C data, technical data sheet, drawings, etc.?*** *Licensing and contributing terms to be defined, of course* **Response by next meeting from EGEA secretariat.** **End of meeting discussions: 29th August 2012**
8 Test specifications In the following, the test specifications to be fulfilled that must be certified by an independent and accredited test institute are described. The test results are part of the mandatory operating documentation (see chapter 10.3).	**8 Test specifications** In the following, the test specifications to be fulfilled that must be certified by an independent and accredited test institute are described. The test results are part of the mandatory operating documentation (see chapter 10.3).	Important: the test institutes should be more than one.

8.1 Pressure tests All service unit components that contain or convey refrigerant must undergo a pressure test with a test pressure that corresponds to 1.43 times the maximum allowed operating pressure (see chapter 4.2). The manufacturer must carry out and document a pressure test for each delivered service unit as part of the acceptance inspection. The pressure test documents and the positive test result certification must be enclosed in the delivery of the service unit. If a differentiated test is not possible for reasons of design (e.g. discharge through a safety valve), it will be necessary to carry out and certify at least two differentiated pressure tests according to the following requirements: • Test medium: Nitrogen • Holding period: 3 minutes • Test criterion: There must be no measurable pressure loss. "Service hose area" (high side and low side): The pressure for this test must be 1.43 times the maximum pressure of 40 bar, i.e. 52 bar. "Area internal refrigerant storage bottle": The pressure for this test will be 20 bar.	**8.1 Pressure tests** All service unit components that contain or convey refrigerant must undergo a pressure test with a test pressure that corresponds to 1.43 times the maximum allowed operating pressure (see chapter 4.2). The manufacturer must carry out and document a pressure test for each delivered service unit as part of the acceptance inspection. The pressure test documents and the positive test result certification must be enclosed in the delivery of the service unit. If a differentiated test is not possible for reasons of design (e.g. discharge through a safety valve), it will be necessary to carry out and certify at least two differentiated pressure tests according to the following requirements: • Test medium: Nitrogen • Holding period: 3 minutes • Test criterion: There must be no measurable pressure loss. "Service hose area" (high side and low side): The pressure for this test must be 1.43 times the maximum pressure of 40 bar, i.e. 57.2 bar. "Area internal refrigerant storage bottle": The pressure for this test will be 20 bar.	This paragraph should be removed: in § 6.21 there is already a requirement to limit the leak to 80 g/yr. Each manufacturer will have to demonstrate to the test institute how this target is reached, but everyone is free to choose its own method. As far as the pressure tests: there is no need to list them here; the pressure tests are already covered by the PED.

8.2 Leakage test The manufacturer must carry out and document a leakage test for each delivered service unit as part of the acceptance inspection. The leakage test documents and the positive test result certification must be enclosed in the delivery of the service unit. • Test medium: Helium / purity min. 4.6 • Test pressure: 10 bar • Test duration: > 2 minutes • Measuring device: Helium leakage detector • Test criterion: no measurable leakage	**8.2 Leakage test** The manufacturer must carry out and document a leakage test for each delivered service unit as part of the acceptance inspection. The leakage test documents and the positive test result certification must be enclosed in the delivery of the service unit. • Test medium: Helium / purity min. 4.6 • Test pressure: 10 bar • Test duration: > 2 minutes • Measuring device: Helium leakage detector • Test criterion: no measurable leakage	This paragraph should be removed: in § 6.21 there is already a requirement to limit the leak to 80 g/yr. Each manufacturer will have to demonstrate to the test institute how this target is reached, but everyone is free to choose its own method. As far as the pressure tests: there is no need to list them here; the pressure tests are already covered by the PED.

8.3 Filling precision / precision of evacuation **8.3.1 Refrigerant** The filling precision is defined for the following scenario. Framework conditions and technical specifications: • Constant temperature of the test room (test at 15 ºC / test at 25 ºC / test at 35 ºC / test at 45 ºC) • The service unit, the test storage bottle or the test setup (the refrigeration circuit of the motor vehicle is currently not regulated in detail) must be conditioned to the respective room temperature. • Calibrated scale (to weigh the test storage bottle or the test setup) with a measuring tolerance of ± 1 g. • Measuring cycles must be carried out for the following filling quantities -> 300 g / 500 g / 750 g and 950 g. For each temperature level and filling quantity three measurements must be carried out. The test vessel is heated to ambience temperature between the tests by an external heat source! For documentation of the measurement results, a template with the following data must be created: • Name and exact denomination of the tested equipment • Date of the measurement • Indication of the temperature measuring range and the filling quantities (see above) • Consecutively numbered list of the measured ACTUAL values and the resulting deviations per measurement	**8.3 Filling precision / precision of evacuation** **8.3.1 Refrigerant** The filling precision is defined for the following scenario. Framework conditions and technical specifications: • Constant temperature of the test room (test at 15 ºC / test at 25 ºC / test at 35 ºC / test at 45 ºC) • The service unit, the test storage bottle or the test setup (the refrigeration circuit of the motor vehicle is currently not regulated in detail) must be conditioned to the respective room temperature. • Calibrated scale (to weigh the test storage bottle or the test setup) with a measuring tolerance of ± 1 g. • Measuring cycles must be carried out for the following filling quantities -> 300 g / 500 g / 750 g and 950 g. For each temperature level and filling quantity three measurements must be carried out. The test vessel is heated to ambience temperature between the tests by an external heat source! For documentation of the measurement results, a template with the following data is shown as Appendix 1: • Name and exact model reference of the tested equipment • Date of the measurement • Indication of the temperature measuring range and the filling quantities (see above) • Consecutively numbered list of the measured ACTUAL values and the resulting deviations per measurement	

8.3.2 Refrigerant oil The service unit manufacturer must inform the OEM about how the filling precision of the refrigerant oil into the AC system of the vehicle (hardware and software) is technically guaranteed.	**8.3.2 Refrigerant oil** ~~The 1234yf equipment manufacturer must be able to show to the independent test facility that the filling precision of the refrigerant oil into the AC system of the vehicle (hardware and software) is technically guaranteed.~~	
8.3.2 Refrigerant oil The service unit manufacturer must inform the OEM about how the filling precision of the UV additive into the AC system of the vehicle (hardware and software) is technically guaranteed.	**8.3.3 UV additive** ~~The 1234yf equipment manufacturer must be able to show to the independent test facility that the filling precision of the UV additive into the AC system of the vehicle (hardware and software) is technically guaranteed.~~	
8.4 Gas analysis The OEM will determine the quantitative and qualitative analyses concerning gas purity of the evacuated and/or injected refrigerant as standard in future specifications. At the current development stage, the Working Group “Service” is gladly willing to receive and support respective gas analysis concepts.	**8.4 Gas analysis** ~~The independent test facility will determine the quantitative and qualitative analyses concerning gas purity of the evacuated and/or injected refrigerant~~.	

8.5 Analysis critical limits for non-condensable gases To prevent an excessive loss of R-1234yf due to the relaxation of non-condensable gases during operation, the respective R-1234yf losses must be inspected: Safety regulations for the handling of the refrigerant R-1234yf: • The user must follow the general safety regulations for the handling of the refrigerant R-1234yf! • He must wear adequate protective clothing (goggles and protective gloves, etc.). Framework conditions and technical specifications to determine the critical limits: • Constant temperature of the test room (between 18 ºC and 25 ºC) • The service unit, the test storage bottle or the test setup (the refrigeration circuit of the motor vehicle is currently not regulated in detail) must be conditioned to the respective room temperature. • Calibrated scale (to weigh the test storage bottle or the test setup) with a measuring tolerance of ± 2 g. The test is carried out with a 2.2 litre test bottle. <u>Note on security:</u> During the connection or disconnection of the high side service coupling, the valve of the test storage bottle must always point upwards. The test storage bottle must be fixed in this position with an adequate fixing support. Attention: The user must follow the general safety regulations for the handling of the refrigerant	**8.5 Analysis critical limits for non-condensable gases** Rifarsi alla SAE J2843 del feb 2012, par. 4.4 ~~To prevent an excessive loss of R-1234yf due to the relaxation of non-condensable gases during operation, the respective R-1234yf losses must be inspected:~~ ~~Safety regulations for the handling of the refrigerant R-1234yf:~~ • ~~The user must follow the general safety regulations for the handling of the refrigerant R-1234yf.~~ • ~~He must wear adequate protective clothing (goggles and protective gloves, etc.).~~ ~~Framework conditions and technical specifications to determine the critical limits:~~ • ~~Constant temperature of the test room (between 18 ºC and 25 ºC)~~ • ~~The service unit, the test storage bottle or the test setup (the refrigeration circuit of the motor vehicle is currently not regulated in detail) must be conditioned to the respective room temperature.~~ • ~~Calibrated scale (to weigh the test storage bottle or the test setup) with a measuring tolerance of ± 2 g.~~ ~~The test is carried out with a 2.2 litre test bottle.~~ ~~Note on security:~~ ~~During the connection or disconnection of the high side service coupling, the valve of the test storage bottle must always point upwards. The test storage bottle must be fixed in this position with an adequate fixing support.~~ ~~Attention: The user must follow the general safety~~	

8.6 Maximum refrigerant oil discharge during evacuation To keep the loss of refrigerant oil from the AC refrigeration circuit of the motor vehicle as low as possible during the evacuation process, the service unit must extract gaseous refrigerant exclusively from the vehicle for 2 minutes in the first step of the evacuation process (for example by reducing the evacuation speed).	**8.6 Maximum refrigerant oil discharge during evacuation** To keep the loss of refrigerant oil from the AC refrigeration circuit of the motor vehicle as low as possible during the evacuation process, the service unit must extract gaseous refrigerant exclusively from the vehicle for 2 minutes in the first step of the evacuation process (for example by reducing the evacuation speed).	
8.7 Control pressure increase after evacuation Determination of a defined and practice-oriented pressure gradient dP/dt. If necessary, the service unit manufacturer must provide a demonstration as part of the design review.	**8.7 Control pressure increase after evacuation** ~~Determination of a defined and practice-oriented pressure gradient dP/dt. If necessary, the service unit manufacturer must provide a demonstration as part of the design review.~~	There is already a statement that requires that the station recovers > 95% of the refrigerant. There is no need to further specify the dP/dt algorithm: each manufacturer can use its own method. The only important figure is: > 95% recovered refrigerant
8.8 Vacuum test Determination of set-up possibilities / manipulation possibilities regarding the vacuum time. If necessary, the service unit manufacturer must provide a demonstration as part of the design review.	**8.8 Vacuum test** Determination of set-up possibilities / manipulation possibilities regarding the vacuum time. If necessary, the service unit manufacturer must provide a demonstration as part of the design review.	
9 Terms of service and supply The manufacturer must be able to guarantee the technical service in all countries were his equipment is delivered. The manufacturer must submit a list with the countries where he is able to provide the technical service to the OEM. The specific versions of the service units for the different countries must be available in series to be delivered on time and in sufficient quantities.	**9 Terms of service and supply** ~~The manufacturer must be able to guarantee the technical service in all countries were his equipment is delivered.~~	

9.1 Delivery conditions **9.1.1 Connection technique** Each part of a connecting element that is in contact with the refrigerant must undergo an internal cleaning process together with its respective conduit or component. All the connections must be manufactured to be safe to operate, undergo a 100% pressure control and be clean. The internal solder connections must be free of flux melting agents or residues. Connecting elements made in steel must be protected against corrosion on their inner side by means of a temporary anti-corrosion agent (e.g. refrigerant oil or other adequate agents authorized by the customer). Elements of the connection technique must be delivered pre-finished on the refrigerant conduits, according to the released drawings and initial samples. After the respective leakage test and drying process, their connecting parts must be supplied with easily dismountable dust-tight and captive closure caps. Similarly, the counterparts delivered on the respective components must be pre-finished and according to the released drawings and initial samples. These must also be equipped with dust-tight and captive closure caps.	**9.1 Delivery conditions** **9.1.1 Connection technique** ~~Each part of a connecting element that is in contact with the refrigerant must undergo an internal cleaning process together with its respective conduit or component. All the connections must be manufactured to be safe to operate, undergo a 100% pressure control and be clean. The internal solder connections must be free of flux melting agents or residues. Connecting elements made in steel must be protected against corrosion on their inner side by means of a temporary anti-corrosion agent (e.g. refrigerant oil or other adequate agents authorized by the customer).~~ ~~Elements of the connection technique must be delivered pre-finished on the refrigerant conduits, according to the released drawings and initial samples. After the respective leakage test and drying process, their connecting parts must be supplied with easily dismountable dust-tight and captive closure caps. Similarly, the counterparts delivered on the respective components must be pre-finished and according to the released drawings and initial samples. These must also be equipped with dust-tight and captive closure caps.~~	

9.1.2 Service unit scope of delivery • Service unit (model in the language of the respective country) • Service hoses for high side / low side according to chapter 6.4 • Service couplings for high side and low side service connection according to chapter 6.5 • Hermetically closed storage bottles for fresh oil, used oil and UV additive • Humidity sensor or indicator for the internal refrigerant bottle in case there is no notification on the display • Goggles and protective gloves according to UVV • Operating instructions according to chapter 10.4 • Quick instruction guide on the service unit • Acceptance protocol • Corresponding reports and certificates according to chapter 10 • Maintenance plan (including calibration) • Integrated printer with standard print paper and respective paper supply • Protective cover for the service unit • Bottle adapter including seal for filling the service unit	**9.1.2 Service unit scope of delivery** • ~~Service unit (model in the language of the respective country)~~ • ~~Service hoses for high side / low side according to chapter 6.4~~ • ~~Service couplings for high side and low side service connection according to chapter 6.5~~ • ~~Hermetically closed storage bottles for fresh oil, used oil and UV additive~~ • ~~Humidity sensor or indicator for the internal refrigerant bottle in case there is no notification on the display~~ • ~~Goggles and protective gloves according to UVV~~ • ~~Operating instructions according to chapter 10.4~~ • ~~Quick instruction guide on the service unit~~ • ~~Acceptance protocol~~ • ~~Corresponding reports and certificates according to chapter 10~~ • ~~Maintenance plan (including calibration)~~ • ~~Integrated printer with standard print paper and respective paper supply~~ • ~~Protective cover for the service unit~~ • ~~Bottle adapter including seal for filling the service uni~~t	

9.2 Labelling Due to the respective labelling according to SAE J2851 / SAE J2843, the service unit is optically easy to distinguish from a service unit for the refrigerant R134a. The manufacturer must attach the European CE mark to the service unit as well as a prototype test mark and / or GS mark. Safety regulations or other instructions for the safe handling must be clearly visible on the service unit: "Attention – Only qualified staff may operate this service unit." The manufacturer also must be aware of his labelling obligation for possible hazardous substances.	**9.2 Labelling** ~~Due to the respective labelling according to SAE J2851 / SAE J2843, the service unit is optically easy to distinguish from a service unit for the refrigerant R134a. The manufacturer must attach the European CE mark to the service unit as well as the independent test facility test report reference. Safety regulations or other instructions for the safe handling must be clearly visible on the service unit:~~ ~~"Attention – Only qualified staff may operate this service unit."~~ ~~The manufacturer also must~~ also comply with ~~the labelling obligations for possible hazardous substances~~.	An EGEA label has to be defined and specified
9.3 Initial commissioning and instructions The manufacturer must make sure that initial commissioning with the respective briefing of the service personnel is carried out (at the end customer).	**9.3 Initial commissioning and instructions** ~~The manufacturer must make sure that initial commissioning with the appropriate training of the service personnel is carried out, either directly by the equipment manufacturer's own competent service personnel, or suitably trained and competent personnel of their importers or distributors.~~	
9.4 Maintenance by the end customer The end customer must assure maintenance of the following components, after the respective authorization of the service unit manufacturer / supplier: • Oil exchange on vacuum pump • Exchange of the filter set • Calibration of the scales	**9.4 Maintenance by the end customer** The end customer must be able to maintain themselves the following components, after the respective authorization of the service unit manufacturer / supplier: • Oil exchange on vacuum pump • Exchange of the filter set • ~~Calibration of the refrigerant scale~~	

9.5 Servicing of the unit The manufacturer or his/her sales or service partners must provide the respective technical service. The manufacturer shall always be the direct contact for the OEM end customer concerning the technical service. The manufacturer must guarantee a service availability (e.g. by means of a hotline and feedback to the user) of 24 h worldwide. If necessary, the technical customer service must be able to be on-site within 48 hours.	**9.5 Servicing of the unit** ~~The equipment manufacturer's own competent service personnel, or suitably trained and competent personnel of their importers or distributors, shall provide the respective technical service.~~	

9.6 Spare parts All the individual components in the service unit that are listed below must be replaceable individually, and the supply quality must comply with general norms, standards and additional requirements, as well as those defined in these Specifications. • Service hose high side and low side • Service coupling high side and low side • Manometer high side and low side • Seal set (service kit) for the high side and low side service couplings • R-1234yf refrigerant storage vessel (internal refrigerant bottle) • Scale for refrigerant • Scale for fresh / used oil • Scale for UV additive • Vacuum pump • Storage vessel for fresh oil / used oil and UV additive • Pressure sensors and valves • Overpressure valve • Data entry unit (membrane keyboard) • Control unit • Printer • Service unit cover • Interface for the gas analysis • Bottle adapter including seal for filling the service unit Availability of the spare parts is guaranteed worldwide within 24 hours. If necessary, the delivery of a spare unit is guaranteed worldwide within 48 hours.	**9.6 Spare parts** ~~All the individual components in the service unit that are listed below must be replaceable individually, and the supply quality must comply with general norms, standards and additional requirements, as well as those defined in these Specifications.~~ • ~~Service hose high side and low side~~ • ~~Service coupling high side and low side~~ • ~~Manometer high side and low side~~ • ~~Seal set (service kit) for the high side and low side service couplings~~ • ~~R-1234yf refrigerant storage vessel (internal refrigerant bottle)~~ • ~~Scale for refrigerant~~ • ~~Scale for fresh / used oil~~ • ~~Scale for UV additive~~ • ~~Vacuum pump~~ • ~~Storage vessel for fresh oil / used oil and UV additive~~ • ~~Pressure sensors and valves~~ • ~~Overpressure valve~~ • ~~Data entry unit (membrane keyboard)~~ • ~~Control unit~~ • ~~Printer~~ • ~~Service unit cover~~ • ~~Interface for the gas analysis~~ • ~~Bottle adapter including seal for filling the service unit~~ ~~Availability of the spare parts is guaranteed within 24 hours for any EU Member State in which the equipment is sold.~~	

9.7 Accessories • Oil set for vacuum pump • Filter set (dryer) • Printer paper	**9.7 Accessories** • Oil set for vacuum pump • Filter set (dryer) • Printer paper	
10 General service documentation **10.1 Compliance statement** The manufacturer must provide proof of the compliance of the product with all the Community legislation or regulations applicable to this product, such as • the European Machinery Directive 2006/42/EC • the European Low Voltage Directive 73/23/EEC • the European Directive for Electromagnetic Compatibility EMC 89/336/EEC • the European Pressure Equipment Directive 97/23/EC.	**10 General service documentation** **10.1 Compliance statement** ~~The manufacturer must provide proof of the compliance of the product with all the Community legislation or regulations applicable to this product, such as~~ • ~~the European Machinery Directive 2006/42/EC~~ • ~~the European Low Voltage Directive 73/23/EEC~~ • ~~the European Directive for Electromagnetic Compatibility EMC 89/336/EEC~~ • ~~the European Pressure Equipment Directive 97/23/EC.~~	
10.2 Risk assessment The manufacturer must provide a risk assessment about the use of the refrigerant R-1234yf at the latest at the time of delivery.	**10.2 Risk assessment** ~~The manufacturer must provide a risk assessment about the use of the refrigerant R-1234yf at the latest at the time of delivery~~.	
10.3 Test results The individual records or test results of the tests and controls described in chapter 8 must be certified by an independent and accredited testing institute. To this end, the manufacturer must provide the respective plausibility checks and documentary proof in form of calculations, material certifications and measurement protocols.	**10.3 Test results** The individual records or test results of the tests and controls described in chapter 8 must be certified by an independent and accredited testing facility. To this end, the manufacturer must provide the respective plausibility checks and documentary proof in form of calculations, material certifications and measurement protocols.	

10.4 Operating instructions **10.4.1 Format of the documentation** The scope of delivery of the service unit must include the operating instructions according to SAE J2843 and J2851 following the standard EN 62079 (preparation of operating instructions; structure, contents and presentation). The operating instructions must be supplied in a resistant paper edition as well as in electronic form (CD, DVD). Furthermore, the manufacturer must provide a quick service guide on the unit itself, in the area of the control elements. The operating instructions must be delivered in the following languages: - German - English - Spanish - French - Italian - Portuguese Depending on the delivery country of the respective OEM, further languages will be necessary.	**10.4 Operating instructions** **10.4.1 Format of the documentation** The scope of delivery of the service unit must include the operating instructions according to SAE J2843 and J2851 following the standard EN 62079 (preparation of operating instructions; structure, contents and presentation). The operating instructions must be supplied in a resistant paper edition as well as in electronic form (CD, DVD). Furthermore, the manufacturer must provide a quick service guide on the unit itself, in the area of the control elements. The operating instructions must be delivered in the following languages: - German - English - Spanish - French - Italian - Portuguese	

10.4.2 Contents Beyond the legal requirements, the operating instructions must also describe the necessary behaviour in case of failures, the maintenance scope / intervals, troubleshooting help, service stations (worldwide), repair process / warranty conditions, spare parts procurement (pictures, denomination, order numbers), test records (legal inspections, maintenance proof), waste disposal of old equipment according to chapter 11, as well as information about the respective safety requirements. If the service unit is not equipped with a device for the identification of the refrigerant, the operating instructions must indicate that there is a risk of contamination of the unit and the existent recycled refrigerant contained in the storage bottle of the unit. The manufacturer must insist and remind strongly that only and exclusively the refrigerant R-1234yf (2,3,3,3-Tetrafluoropropene / C3H2F4) must be used.	**10.4.2 Contents** Beyond the legal requirements, the operating instructions must also describe the necessary procedure in case of failures, the maintenance scope / intervals, troubleshooting help, repair process / warranty conditions, spare parts procurement (pictures, denomination, order numbers), test records (legal inspections, maintenance proof), waste disposal of old equipment according to chapter 11, as well as information about the respective safety requirements. If the service unit is not equipped with a device for the identification of the refrigerant, the operating instructions must indicate that there is a risk of contamination of the unit and the existent recycled refrigerant contained in the storage bottle of the unit. The manufacturer must insist and remind strongly that only and exclusively the refrigerant R-1234yf (2,3,3,3-Tetrafluoropropene / C3H2F4) must be used and that a refrigerant identifier is highly recommended	
10.4.3 Instructions for initial commissioning The instructions for initial commissioning must be easy to understand worldwide, including all the necessary warnings. The instructions must be complete and clear, and illustrations must be included where required. The instructions must be provided in the languages listed in chapter 10.4.1.	**10.4.3 Instructions for initial commissioning** The instructions for initial commissioning must be easy to understand, including all the necessary warnings. The instructions must be complete and clear, and illustrations must be included where required. The instructions must be provided in the languages listed in chapter 10.4.1.	
10.5 Manufacturer's declaration The OEM must be provided with a manufacturer's declaration according to chapter 12.1 for approval of the series device.	**10.5 Manufacturer's declaration** The customer ~~OEM~~ must be provided with a manufacturer's declaration according to chapter 12.1 for approval of the series device.	Chapter 12.1 need to be updated according to the EGEA requirements

11 Take-back obligation / waste disposal concept / recycling The manufacturer shall take back used equipment free of charge. The manufacturer, furthermore, guarantees correct waste disposal or technically correct recycling. The service unit must be marked with the respective instructions about disposal and recycling of used equipment, which shall also be included in the operating instructions. This is also valid for the waste disposal and recycling instructions for: • Filter inserts • Cleaning fluids • Oils • All the other operating fluids	**11 Take-back obligation / waste disposal concept / recycling** ~~The manufacturer shall take back used equipment free of charge. The manufacturer, furthermore, guarantees correct waste disposal or technically correct recycling. The service unit must be marked with the respective instructions about disposal and recycling of used equipment, which shall also be included in the operating instructions.~~ ~~This is also valid for the waste disposal and recycling instructions for:~~ • ~~Filter inserts~~ • ~~Cleaning fluids~~ • ~~Oils~~ • ~~All the other operating fluids~~	
12 Attachment **(See specification)**	**12 Attachment** **(See specification)**	

EGEA Best practice:

- **Safety recommendation for the working environment**: this equipment is designed to be used in a working environment where there is a minimum of one air exchange per hour
- **Recommendation to use refrigerant identifier**
- **Recommendation on emptying and filling process**

- **Recommendation for the Supply of UV additive:** The UV additive must be supplied into the hermetically sealed UV additive storage bottle on the service unit directly from closed containers (storage containers).