

AURFA103

**COMMUNICATE EFFECTIVELY IN AN AUTOMOTIVE
WORKPLACE**

RESOURCE BOOK

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This resource has been developed for the sole purpose to provide information to learning for the acquisition of knowledge and skills related to units of competency for the automotive industry. The resource contains information relating to the knowledge evidence defined in the assessment requirements for a unit of competency in the training package and is by no means all the information for a particular subject matter. Learners are encouraged to seek further information by whatever means are available to them to support their learning.

UNIT DESCRIPTOR

This unit describes the skills and knowledge required to communicate in an automotive workplace. It involves communicating effectively by conveying and receiving information using verbal and non-verbal techniques and correct automotive technical terminology.

The unit applies to those working in the automotive service and repair industry.

NOTES TO USERS

As the competency, AURFA103 Communicate effectively in an automotive workplace; is a foundation skill unit, that is a core unit applicable to the pre-vocational stream and general elective unit for other streams from the AUR training package, there are no prerequisite units which need to be completed, however it is recommended that this is amongst the first competencies delivered in the qualification being undertaken.

Assessment of AUR competencies can take place on-the-job or off-the-job and may involve the use of a simulated work environment in cases where the workplace does not have conditions conducive to meeting assessment requirements.

For a person to achieve competency in this unit, individuals must demonstrate they can meet the assessment requirements of both the knowledge evidence; contained in the resource and the performance evidence; where they can perform the following:

- exchange verbal information regarding work task with colleague
- exchange verbal information regarding work task with supervisor
- request verbal clarification of work task from supervisor
- request information from external customer using the telephone
- request information from external customer using email.

As this Resource Book deals with a common foundation unit within the automotive industry, from traineeships to apprenticeships, it is designed to ensure the generic information and knowledge evidence is included. For this reason, assessment will be tailored by the MIT Assessor to meet the individual needs of each student and workplace, ensuring the integrity of the standards and the assessment requirement are maintained.

INTRODUCTION

Communication takes place constantly all around us, but is it always effective?

The importance of effective workplace communication cannot be understated. The results of ineffective workplace communication can be widespread ranging from the need to repeat a job to endangering life. It may also impact on those not directly involved in the communication process.

Workplace communication is the process of exchanging information, both verbal and non-verbal, within an organization. An organization may consist of employees from many different parts of the society. In order to unite the activities of all employees, communication is crucial. Communicating necessary information to the entire workforce becomes necessary. Effective workplace communication ensures that all the organizational objectives are achieved. How effective communication is at the workplace will have a direct influence on the stress levels and job satisfaction of the workers at all levels.

This competency deals with all aspects of the communication process in order to ensure that workplace communication is effective.

COMMON AUTOMOTIVE TECHNICAL TERMS AND THEIR APPLICATION

As you prepare to work in the automotive repair industry, you will need to learn a whole new vocabulary. Terms such as hygroscopic, asymmetrical, reciprocating motion, and volumetric efficiency are only a few examples of the new vocabulary you will need to master.

Healthcare professionals need to know how each of the body's systems function, the organs that make up the system, and how to diagnose an issue. Automotive technicians need to have the same level of understanding about vehicles. The good news is that automotive names aren't in Latin.

Knowing the correct automotive terminology and concepts will help you fit into your work environment as well as accurately communicate with customers, suppliers and fellow workers. You will also be able to properly complete repair orders, parts requisitions and warranty paperwork as you maintain, diagnose and repair vehicles.

Every trade or profession has its own specialised vocabulary of technical terms (jargon). Technical terms are words or phrases that carry a specific meaning when used within a particular trade.

The automotive trades are one such area. When correctly used technical terms make communication flow more effectively between people working in the same or associated trades. Technical terms are used to quickly and accurately identify such things as:

- Equipment Tools
- Task procedures Parts of machinery
- Work instructions Work documents

When you study a particular trade branch of technology, it is important that you learn to use new words and the proper context for their use. Learning the specialised vocabulary for your trade will have benefits in two areas. It will give you a greater understanding of the subject and will enable you to communicate more effectively with work colleagues within the same area of specialisation.



Specialised vocabularies are very important when communicating within a specific trade, but they can make communication with those outside the trade difficult. The following points may help to make technical communication more effective both inside and outside your specialist area:

1. Limit the number of technical terms you use when communicating outside your occupation. Use words that non-technical people understand.
2. Explain words when they are first used, taking into account the knowledge of the receiver. We can become so used to a term that we forget that others may not know its meaning. Technicians are well known for speaking a language that can be totally incomprehensible to people outside the trade.

3. Illustrate terms whenever possible. The illustration can be verbal (i.e. by giving an example of how the word is used in context) or visual (by providing a picture or showing the part/affected area) or both.
4. Ask the meaning of any terms that you are not familiar with.
5. Read trade manuals or journals and technical article or document.
6. Use an internet search engine to locate technical articles and video material to research operating principles of components and systems.

Terminology can only be learned within the context of a subject but you can improve and practice ways of improving and using technical words by using the skills mentioned and also by watching, listening and asking questions of those who are specialists in your chosen field.

The objective of technical communication is to transfer information accurately and quickly. It is therefore important to use definite terms and concise expression.

In technical communication, whether you are receiving or conveying information it is important to be specific. In fact, one of the most important means of conveying technical information takes its name from the need to be specific - specifications.

Technology requires specialisation. It also requires an individual to process effective communication skills. People working in the automotive trades must perform their tasks with precision. They must therefore be able to carry out and interpret instructions from current technical manuals. Workers must also be able to communicate up, down and across organisational lines. The whole process of completing a technical task is dependent on the efficient use of technical information and how it is interpreted.

Note: At the end of this resource on page 33, there are a number of pages containing common automotive terms and their meaning.

ACTIVE LISTENING AND QUESTIONING TECHNIQUES

Active listening is an essential skill. We may hear what someone is saying but are we truly understanding what the person is trying to communicate?

The listening process can be difficult to perfect but is one of the most important skills to possess when gathering information from a customer or any other person. The active listener focuses all of their attention on the speaker, including verbal and nonverbal messages.

When appropriate, the active listener encourages the speaker to further communicate details that may have otherwise been left out.



To be a good listener, we need to be aware of barriers that can disrupt the listening process. These barriers can be mental and physical. Mental barriers are thoughts and feelings that interfere with our listening, such as our own assumptions, emotions, and prejudices. To fully absorb what someone is telling us, we need to learn to set these feelings aside.

It takes effort and isn't always easy, but it is important to keep an open mind throughout the listening process. For example, when listening to a customer who is describing their vehicle concern, it is good practice to allow the customer to fully complete what they are saying, even if you believe you have all the information you need.

Keeping an open mind is also an important first step in practising empathy and understanding.

As a listener and active participant, we can encourage the flow of communication by welcoming the speaker, letting them know that we care enough to want to understand the message, and acknowledging the speaker's feelings and concerns.

To accomplish that, give the speaker your undivided attention by focusing on them. This means removing as many distractions as possible. Stop what you are doing, clear your mind of distractions, and look the speaker in the eye.

As the person is speaking, you will also need to provide listening feedback, which indicates to the speaker that you are engaged in what they are saying. Feedback can be nonverbal (e.g., facial expressions, body posture) and verbal.

Nonverbal language, such as nodding while listening and gesturing while speaking, is used to reinforce or add emphasis. If, while speaking, you send a conflicting message, such as looking annoyed while stating that you value the customer's opinion, the person may tend to believe the nonverbal message over the verbal one, even though it is only half of the total message.

For example, a customer has their vehicle, which will not start, towed into your workshop. They tell you that the cause is, a faulty headlight. You may be tempted to roll your eyes at this assertion, but regardless of your personal opinion, you must, as a professional, maintain a sincere and attentive attitude toward the customer.

Nonverbal communication is perceived to be more spontaneous and less conscious; most people tend to believe the nonverbal message more than the actual words expressed. In this case, rolling your eyes would likely override any amount of "correct" words that you might say.

QUESTIONING

Questioning is an important speaking skill that helps keep us out of a lot of trouble. We speak to deliver a message, but many times we need more information, or we need to confirm the details of an agreement. Asking questions to gather more information can provide us with enough information to make good decisions. Or once we come to an agreement with another person, we can use questions to confirm those details. In either of these situations, we have avoided trouble.

In the first case, we gathered enough information to avoid a bad decision. And in the second, we confirmed the expectations that each person had regarding the agreement, helping to avoid disappointment and loss of trust.

To use questions effectively, we need to know how to ask the right questions. We can ask three types of questions:

- Open questions
- Closed questions
- Yes or no questions

Each type of question is beneficial when used appropriately. Good communicators know when and how to use the appropriate type. If you have mastered each of these types of questions, you can keep a conversation going while speaking very little.

These questions can be used in all types of situations, from casual conversations with new acquaintances to detailed conversations with customers. In dealing with customers, we usually start with open questions to gather general information about the issue.

Then we use closed questions to find out specific details. We use yes/no questions to further check or confirm the listener's responses or to gain the customer's agreement to authorise a repair or diagnostic procedure.

Open Questions

An open question encourages people to speak freely so we can gather facts, insights, and opinions from them. It's a good way to start a conversation with a new acquaintance or even a customer. Open questions usually begin with the words:

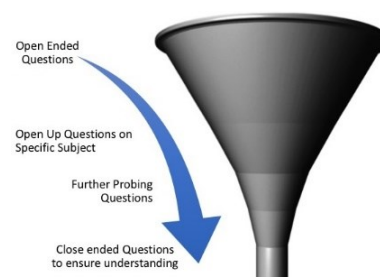
- What
- How
- Why
- Could you tell me...

For example, if you were questioning a customer about their visit to a repair facility, you could ask, "What type of service did you receive from XYZ Automotive?" This question opens the topic up for discussion and allows the customer to give details about their visit.

Closed Questions

If we want to know more information, we can use closed questions to establish facts and details. Closed questions usually begin with the words:

- When



- Where
- Which
- Who
- How many/much...

This type of question requires a specific answer, and there is usually only one answer. For example, you could ask a customer, “How many times have you visited XYZ Automotive?” or, “When did you start going to them?”

These closed questions allow for only one answer without much room for discussion. These questions help you to narrow the topic and guide the discussion in the direction you would like it to go, which is helpful when talking with a customer.

Yes/No Questions

Yes/no questions allow individuals to answer with a simple yes or no. This type of question is useful for checking or confirming a person’s responses. For example, “Would you recommend them?” gets to the point and helps clarify information.

We should generally not start out with yes/no questions because they discourage further explanation or discussion. However, ending with yes/no questions is a good way to get confirmation. For example, after explaining the need for replacing the customer’s water pump and answering the customer’s questions about the job, it would be very appropriate to ask, “Can we go ahead and replace that leaky water pump for you?”

VERBAL COMMUNICATION TECHNIQUES

Speaking is often referred to as an art. That is because there are so many facets to effectively communicate and/or gather information. Whether you are asking a customer about a vehicle or your boss for a raise, knowing how to “artfully speak” will benefit you.

Speaking is a three-step process:

- Think about the message.
- Accurately present the message.
- Check whether the message is correctly understood.



If it’s not understood, we have to respond by rethinking and representing the message and rechecking with our listener. This process continues until we are satisfied that the listener correctly understands our message. Think before you speak is easier said than done, but it’s not impossible. In some situations, we have time to think and plan beforehand. Others require us to think on our feet.

Thinking on your feet simply means you may be called upon to answer or handle a difficult situation quickly. Having to get things right in a fast-paced setting can result in rash decisions, but there are a few tactics you can use to make these situations easier:

1. Relax. It is not easy to do in an urgent situation, but attempting to remain calm is extremely beneficial, keeping your mind clear and helping you to embody the confidence needed in such a situation.
2. Listen. If the situation requires you to answer a tough question, make sure you fully understand the question before answering. You can always ask the questioner to repeat or, better yet, rephrase the question. This gives you more time to think about your answer and also another chance to read into the intent of the question. Remember that if someone is asking a question of you, then they are showing interest. Interest is a good thing!
3. Pause. Silence is golden, when used properly. Most people are uncomfortable with silence, but it is perfectly acceptable to take slight pauses before speaking to organise your thoughts. This will also give you the advantage of controlling the pace of the conversation. If a situation that you have been put in charge of is slipping out of control, regain control with slight pauses and thoughtful answers.

It may be beneficial to say something like, “Let me think about that for a second.” Or you may take a few seconds to restate your understanding of the problem and the person’s question. Doing so can help the other person understand that you are devoting effort to the question while giving you a bit of time to decide on an answer.

Before speaking, take a moment to consider that your tone of voice reveals a lot about your feelings and adds significant meaning to your message. The tone of voice includes how high or low the pitch of our voice is, how fast or slow we speak, how soft or loud, and most importantly, what our voice characteristics or emotional indications are.

Even if you disagree with what is being asserted, try to first use empathising statements, such as “I understand” or “I can imagine how frustrating that would be,” before offering a solution. For example, a regular customer had brought their vehicle in last week for a malfunction indicator lamp (MIL). The vehicle was fixed, and the codes were erased. Now, the same customer is back with the MIL on again and furious that they had to return. Regardless if the MIL is on for the same cause or not, you still have an upset customer to deal with.

Most times, people who are angry will respond well to a statement like, “I can imagine how frustrating it is for you to have to return.” When you say this, remember to keep a calm and steady tone of voice. Ultimately, the goal is to de-escalate the customer’s anger. Try not to argue with the customer but rather support the customer and offer a solution that will work for both of you.

In the same situation, you could say, “I can imagine how frustrating that is for you. Let’s bring it in and see if it is the same problem as before or something different. If it is the same problem, our 1-year warranty will cover it. Can I get you a cup of coffee in our waiting room while we look into it?”

So, when encountering an upset customer, the goal is to de-escalate the anger, guide the situation back to rational communication, and come to an agreement about how the problem will be resolved. Always empathise, de-escalate, do not argue, and focus the discussion on finding a mutually agreeable solution, if possible.

After thinking about what we want to say, and how to say it, we can then use the second step of the process by presenting a message using verbal and nonverbal language. Remember that when we say verbal language, we mean the actual words that are being spoken. Nonverbal language includes how we speak those words, our tone of voice, body language, and appearance, and takes into consideration the environment.

Imagine you are with a friend in a quiet café, drinking coffee, and they are telling you how much they value your opinion. Now imagine that they are clenching their fists, scowling, and screaming those same words to you. It would change the message a little, wouldn’t it?

The last step of the communication process is to make sure our message is correctly understood by the listener. Look to see that the listener is making eye contact with you. If you perceive a lack of understanding or confusion, be prepared to repeat yourself while trying to explain it in another way or by using an example.

Make sure you suppress any outward irritation you may feel at needing to do so. In stressful situations, the parties involved are often not as open-minded as in calmer moments and are therefore not as receptive to your words. This can also end with misunderstandings and expectations that go unmet. So, take the extra step and ask clarifying questions or summarise the message.

ONE-ON-ONE COMMUNICATION

Face-to-face conversation is the most common form of one-to-one communication. Conversation consists of talk about various matters of common interest to both parties. Conversations, unlike many other types of communication are usually not planned or rehearsed beforehand. There are a few elements you should be aware of if you want to be an interesting person to talk with.

Accuracy: It is important that when you are conversing that you send and receive accurate messages. Choose words you are sure your receiver will understand. Your word choices should largely depend on who your listener is. You should also consider your listener's age and experience when communicating. For example, you should not use technical words to describe a vehicle engine to someone who's not familiar with the terms. Finally, pay close attention to the feedback you receive to make sure the listener understands you.

Be Courteous: Good conversation involves taking turns. Each person should take turns speaking and then listening. You must be willing to "yield the floor" regularly when conversing. Avoid interrupting to express an idea of your own while the other person is speaking.

Converse on a Variety of Topics: Conversation deals with topics of interest to both people involved. In order to develop stimulating conversations, you should try to develop a variety of interests. When you switch to a new topic of conversation, be sure to relate the new topic to the previous one. This allows the conversation to flow smoothly.

Enjoy the Conversation: Good conversation is an art you can develop. During periods when you are the speaker, speak dynamically and enthusiastically. No one wants to converse with someone who's conversation is flat, full monotone with a deadpan face and no gestures of any kind. Make sure you develop your conversation with enthusiasm for your topic. It should show in your voice and body movements.

GROUP AND TEAM INTERACTIONS

Being part of a team can make working an enjoyable experience or a horrible one, depending on the team. In large, the ability of each team member to communicate effectively will determine the success of the team.

A high-performing team can accomplish much. As the saying goes, the sum is greater than its parts. We can achieve much more when we work effectively together. Being part of a team allows us to:

- Learn new things from other team members.
- Share ideas, knowledge, and resources.
- Complement each other's strengths and weaknesses.
- Feel a sense of belonging.

Poorly functioning teams spend a lot of time and energy bickering and blaming, and not enough time and energy being productive. Transitioning from a poorly functioning team to a high-performing team requires commitment to the team along with self-discipline.

When all team members are committed to a set of common goals, they can contribute in positive ways to the success of the team. Developing such a team requires good leadership skills as well as good followership skills.

Good leadership skills involve setting a clear vision of the goals, empowering each team member to contribute their best efforts, and recognising each team member's strengths and weaknesses. Good leadership also provides training or mentoring to address any weaknesses in the team. Followership is just as important as leadership. Not much would get done if everyone were a leader. Good following skills involve being fully engaged in the team and its goals, stepping in and performing the work that needs to be done, participating fully in all decision making, and giving honest feedback.

We need to be committed to the team and team goals to make teamwork successful. Group and team interactions are most effective when each team member has a defined role and responsibilities that go with that role. Each member is then able to rely on the others to do their part. Think of a team as a chain; one broken link can break the whole chain. A good team player is someone who commits to being a part of that team and contributes to its success by fulfilling their role.

COLLABORATIVE AND INCLUSIVE TECHNIQUES FOR INTERACTING WITH OTHERS

Collaboration is the process of two or more people, entities or organisations working together to complete a task or achieve a goal. Collaboration is similar to cooperation. Most collaboration requires leadership, although the form of leadership can be social within an organised or equal group. Teams that work collaboratively tend to learn through discussion, clarification of ideas and reach agreement, they often access greater resources when there are pooled together.

Structured methods of collaboration encourage reflective behaviour and communication. Such methods aim to increase the success of teams as they engage in collaborative problem-solving. Collaboration is present in opposing goals exhibiting the notion of confrontational collaboration, though this is not a common use of the term. In its applied sense, collaboration is a purposeful relationship in which all parties strategically choose to cooperate in order to accomplish a shared outcome.

Inclusive techniques aim to avoid offense and fulfill the ideals of social equality by avoiding expressions that imply ideas that are sexist, racist, or otherwise biased, prejudiced, or denigrating to any particular group of people (and sometimes animals). Use of inclusive techniques might be considered a form of political correctness; often the term "political correctness" is used to refer to this practice, either as a neutral description by supporters in general or with negative connotations among its opponents.

Its supporters argue that language is often used to spread prejudice and that creating intention around using inclusive language can help create more productive, safe, and rewarding organisations and societies.

TECHNIQUES APPROPRIATE TO DIFFERING AGES, CULTURAL BACKGROUNDS AND SPECIAL NEEDS

DIFFERING AGES

Now that Generation Z has entered the workforce, colleagues at a single employer may range from those who came of and age faxing, to ones who posted their formal pictures to Instagram. We may have five unique generations in the workplace. You could be working with someone 50 or 60 years older or younger than you.

Members of Generation Z, defined by those born after 1997, are working alongside a small number of members of the Silent Generation, or those born before 1945; the Baby Boomers, those born between 1946 and 1964, a group expected to work as long as they can; Generation Xers, born between 1965 and 1980; and the Millennials (sometimes labelled Generation Y), who were born between 1981 and 1996 and currently make up the workforce's largest segment. How different are they? One co-worker may remember when the colour TV came out; the other one may only have known Netflix.

This matters, because the technology that's popular as we grow up tends to shape our communication styles for life. There is no one perfect way to communicate across generations. They all have different norms. These communication differences are really causing a lot of problems right now because they are so pronounced. But there are ways to communicate better with colleagues of any age. Here are some tips:

Establish protocol - Onboarding is critical for setting communication expectations. Generation Z grew up tethered to devices and constantly communicating, while Boomers may be used to signing off at 5 p.m. That's why when employees of any age are hired, they should learn their workplace's style: Is texting the boss or a client appropriate? If you send email on the weekends, can you expect a response or is it acceptable to respond on Monday morning?

Think about the individual - Once you have the workplace culture figured out, take the time to learn how each person works the best and most effectively, regardless of their age. The new Gen Z guy may not like group chats or that the person with a bit of grey hair may not be a fan of lengthy in-person meetings. Simply asking colleagues: What is the best way to communicate with you? Once you learn this, tailor your communication to the person, more than the generation.

Be authentic - Remember that the basic rules of communication still apply in a digital age. Listen more and think before you speak. Use a clear, plain language, appropriate age tone and avoid using slang or jargon. Respect the rules of genuine relationships that are time-tested and always reliable. Utilize empathy, demonstrate appreciation, respect their time and other commitments, and identify easy connectors, such as shared interests.

CULTURAL BACKGROUNDS

Working in an environment with people of different backgrounds, races and nationalities can be a rewarding and fulfilling professional experience. You can expand your horizons by learning different communication skills and approaches while interacting with people from around the world. However, working in a multicultural workplace does require a certain amount of tact, diplomacy and a willingness to learn, adapt and compromise.

Patience and Understanding - Working with colleagues in a multicultural environment requires a certain level of patience. People from different backgrounds often have different ways of approaching tasks and human interactions. These are neither right or wrong, only different. Having

the patience to take the time to fully understand where colleagues are coming from in different workplace scenarios can help you all work together more efficiently and effectively.

Respectful Acceptance - Cultural differences range vast and wide, from religious beliefs to cultural norms. People from diverse backgrounds bring a number of different socially acceptable professional and personal practices into the workplace. Whether or not you agree with your colleagues, it is important to respect their differences. This means restraining yourself from commenting on things you are unfamiliar with or don't particularly agree with and accepting your colleagues' cultural backgrounds for what they are.

Leeway in Language Use - People who don't speak your native language might inadvertently use words or phrases that you might find inappropriate for the workplace. Give colleagues with new language skills leeway in how they use their words. If you feel a colleague inadvertently offends customers due to inexperience with certain accepted customs and practices, discuss the issue privately with your manager. This person is usually trained to deal with these types of situations in a professional and effective manner.

Willingness to Learn - Working with people from other backgrounds exposes you to customs, cultures and practices you might never have otherwise come in contact with. A willingness to get to know your colleagues on a personal level will create a sense of goodwill in the workplace that can translate to better professional collaboration. Most people, when asked in an appropriate way, are more than happy to talk about differences between cultures. This can give you greater insight into why people think, behave and act the way they do. Be open to discussing your own background and cultural beliefs, provided these conversations don't step into inappropriate workplace conversation.

SPECIAL NEEDS

If you are communicating with a special needs adult in your professional or personal life, there are a few things to keep in mind. The most important thing to consider when communicating with special needs adults is that, like anyone else, they respond well to respect and kindness. In many ways, communicating with a special needs adult is like communicating with other adults, but here are a few tips to ensure you are communicating effectively and respectfully.

Approach a special needs adult in the same way you would anyone else, with respect and courtesy. If the individual is in a wheelchair, take care not to lean on or put your weight on it, as it can be very uncomfortable and even painful for them. Individuals in wheelchairs may also appreciate if you sit down in order to engage with them at eye level, partly out of appreciation for the display of respect and partly out of appreciation for not having to look upwards, which can lead to uncomfortable neck strain.

Speaking clearly and directly - Is a great way to enter into any conversation with another individual. Don't assume that a person is hard of hearing just because they have special needs, but if you find in the midst of conversation that you are being asked to repeat yourself, you may speak up. When speaking to an adult with special needs, do not alter your tone of voice to align with that of the tone

you would use when speaking to a child. Special needs adults are after all adults, and you'll find that they prefer to be spoken to in the same manner in which other adults are spoken to.

Make eye contact - When communicating with a special needs adult, make eye contact. Eye contact indicates empathy and respect and conveys to the listener or speaker that you are interested in hearing what they have to say. Looking elsewhere when speaking to a special needs adult can convey that you are uncomfortable, which can in turn both offend and make the other person uncomfortable, leading to an awkward situation that is best avoided.

Listen attentively - Like eye contact, listening attentively conveys respect and an honest desire to hear and understand what someone has to say. When speaking to a special needs adult, ask them questions to further engage them in conversation, and let them know you are genuinely interested in their dialogue by offering the occasional nod or smile to let them know you understand and appreciate what they have to say.

Don't make decisions for them - Independence is something we all value to some degree. Just because an individual has special needs does not mean they are incapable of completing their own tasks and chores or making their own decisions. Don't try to take over or take charge of a task or activity for a person with special needs unless your help is specifically requested, and don't make decisions on their behalf, especially important decisions, without their consent or approval.

Don't make assumptions - All human beings are valuable, important, and unique. Just as with anyone else, it's not acceptable to make assumptions about adults with special needs and their perceived talents, capabilities, and intelligence level. When communicating with someone with special needs, don't assume they are hard of hearing and raise your voice to an unnecessarily loud level, don't assume they cannot hold an adult conversation just like others their age, and don't assume that they don't understand social cues or subtle changes in body language and tone of voice.

If you encounter an individual that you know is deaf, remember that they are most likely able to understand what you are saying through the act of lipreading. Keep your hands and other objects away from your mouth, speak slower and clearly pronounce words so that they are able to understand what you are saying.

WORKPLACE FORMS AND DOCUMENTS IN ELECTRONIC OR HARD COPY

Many people take one look at a form and have a panic attack. They can look very daunting and difficult - and many are! The reason that forms exist is to ensure that the right information goes to the right place at the right time. Therefore, it is essential that all forms are filled in completely, correctly and legibly. Remember, other people will have to read the form you fill in. For this reason, it is very important that you're reading and writing ability is of an acceptable standard. Today, many workplace forms are filled out and completed electronically or online, you should familiarise yourself with this process as it is likely to be an important part of your job description.

In the automotive industry, there are many workplace forms and documents you will have to complete. Some of these will be internal administrative documents which are designed to maintain the smooth running of the enterprise, job cards or repair orders document an accurate, short but complete summary of the work you completed, and some may have a financial or legal significance. Other forms and documents to be completed commonly include, workplace safety inspection forms, defective equipment reports, accident and incident reports and vehicle inspection forms.

Guidelines for filling in workplace forms and documents.

- Always read the form through to the end before starting to fill it in.
- Always print in capital (block) letters unless otherwise advised
- If a question does not apply, write NA (not applicable)
- Spell all words correctly, especially people's names
- If you're not sure about something, ask
- Answer all questions using a black pen
- Follow all instructions exactly

The words used on forms and documents are often not frequently used. The words may sound old fashioned and/or have a legal meaning. Never fill in a form or work document if you do not fully understand a word or sentence. It is important to know what information is being asked for in a workplace document so that it can be completed fully and accurately. The precise information required will vary depending on the purpose of the form or document.

Some factual data will be easy to complete, such as the vehicle driver's name, for example. However, some fields or questions on forms and documents can lead to some uncertainty in the person completing it, particularly when the document is seen for the first time or the level of information being requested is beyond the comprehension of the reader. Initially, it always pays to get guidance when completing a form for the first time and like most things, becomes easier after that.

WORKPLACE INSTRUCTIONS OR WORK ORDERS

A job card, repair order, or work order is a form used by workshops to collect information regarding a vehicle coming in for service or repair. Initial information for the repair order includes customer and vehicle details, along with a brief description of the customer's needs or issues.

The repair order is used by the technician to guide them to the service, repair or problem and by the customer service staff to create the invoice when the work is completed. Detailed information that will be on the repair order includes customer contact details, name and address; the vehicle make, model, and year; odometer reading; the date; customer concern information; the work performed; any issues detected during the work process; a diagnostic report on the cause of any problem(s) and the correction process taken; the hours of labour; and the parts used for the job.

The repair order should always include all of the information relating to the customer, vehicle, and cost of repair. Repair orders are legal documents that can be used as evidence in the event of a dispute. Make sure the information is complete and accurate whenever filling out a repair order and store it in an organised safe place, such as in a file or electronically on a secure computer network.

Repair orders are used also to inform the customer of needed repairs or service. This usually results in the customer agreeing to the needed repair, in which case all is well. However, if they don't agree to the repair and the vehicle is involved in an accident because of the faulty components, having the customer's initials on the repair order signifying that they except the safety implications, can help prevent the workshop from being held liable in the event of an accident.

MANUFACTURER SERVICE, REPAIR AND EQUIPMENT MANUALS

There is no way a technician can remember all of the procedures and specifications needed to service and repair vehicles correctly, therefore having accurate service information is crucial. Good information plus knowledge allows a technician to fix a problem with the least amount of frustration and at the lowest cost to the customer. The primary source for service and repair specification and information for any vehicle, motorcycle, or machinery, is the manufacturer. The manufacturer publishes appropriate service information each year, for every vehicle or equipment built.

The information may be divided into sections such as chassis, suspension, steering, emission control, fuel systems, brakes, basic maintenance, engine, transmission, body, and so on (example right). Each major section is divided into subsystems (example below). These cover all repairs, adjustments, specifications, diagnostic procedures, and any required special tools.

Chassis electrical

-  Air bags (supplemental restraint system)
-  Electrical distribution
-  Electronic feature group
-  Entertainment systems
-  Instrumentation & warning systems
-  Lighting
-  Wipers & washers

-  General information & identification
-  Body
-  Brakes
-  Chassis electrical
-  Diagnostics
-  Driveline
-  Engine cooling
-  Engine electrical
-  Engine mechanical
-  Engine performance & emission controls
-  Fuel systems
-  Heating, ventilation, & air conditioning
-  Steering
-  Suspension
-  Transmissions
-  Wiring diagrams

Since many technical changes occur on specific vehicles each year, manufacturers service manuals need to be constantly updated. Updates are published as service bulletins (often referred to as technical service bulletins or TSBs) that show the changes in specifications and repair procedures during the model year. These changes do not appear in the service manual until the next year. The vehicle manufacturer provides these bulletins to dealers and repair facilities on a regular basis.

Automotive manufacturers also publish a series of technician reference books. The publications provide general instructions about the service and repair of the manufacturers vehicles and also indicate their recommended techniques.

TYPES OF NON-VERBAL COMMUNICATION TECHNIQUES

In all communications, some of the true meaning is lost. In many cases, the heard message is often far different from the one intended. Because the words spoken are not always understood or are interpreted incorrectly because of personal views/feelings, you can alter the meaning of words significantly by changing the tone of your voice. Think of how many ways you can say “no”; you could express mild doubt, terror, amazement, anger, and other emotions.

It is important that you realize that a major part of communication, about 70%, are nonverbal practices. Nonverbal communication is the things you do while communicating. Pay attention to your nonverbal communication as well as to that of others.

Nonverbal communication includes such things as body language and voice tone. Body language includes facial expression, eye movement, posture, and gestures. All of us read people’s faces; we interpret what they say or feel. We also look at posture to give us a glimpse of how the other person feels about the message. Posture can indicate self-confidence, aggressiveness, fear, guilt, or anxiety. Similarly, we look at how they place their hands or give a handshake.

Many scholars have studied body language and have defined what certain behaviours indicate. Some divide postures into two basic groups:

- Open/closed is the most obvious. People with their arms folded, legs crossed, and bodies turned away are signalling that they are rejecting or are closed to messages, whereas people fully facing you with open hands and both feet planted on the ground are saying they are open to and accepting the message.
- Forward/back indicates whether people are actively or passively reacting to the message. When they are leaning forward and pointing toward you, they are actively accepting or rejecting the message. When they are leaning back, looking at the ceiling, doodling on a pad, or cleaning their glasses, they are either passively absorbing or ignoring the message.

VISUAL GESTURES AND SIGN LANGUAGE

Although both gestures and sign involve the use of the hands (with other parts of the body), they are rather different. Sign is like speech and is used instead of speaking, whereas gestures are mostly used while speaking. Examples of gestures are making a downward movement with one hand while talking about not doing very well in a test or making a twisting motion with one hand as you describe trying to open a bottle. The gestures are just part of the communicative act being performed.

In the study of non-verbal behaviour, a distinction can be drawn between gestures and emblems. Emblems are signals such as “thumbs up” (= things are good) or “shush” (= keep quiet) they function like fixed phrases and do not depend on speech. Emblems are conventional and depend on social knowledge (i.e., what is and isn’t considered offensive in a particular social world).

Types of gestures - Iconics are gestures that seem to be a reflection of the meaning of what is said, as when we trace a square in the air with a finger while saying I’m looking for a small box. By itself, an iconic gesture doesn’t mean the same as what is said, but it may add ‘meaning’.

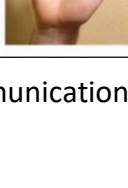
Another common group of gestures can be described as deictics. The term ‘deictic’ means ‘pointing’ and we often use gestures to point to things or people while talking. We can use deictics in the current context, as when we use a hand to indicate a table (with a cake on it) and ask someone, Would you like some cake? We can also use the same gesture and the same table (with cake no longer on it) when we later say, That cake was delicious.

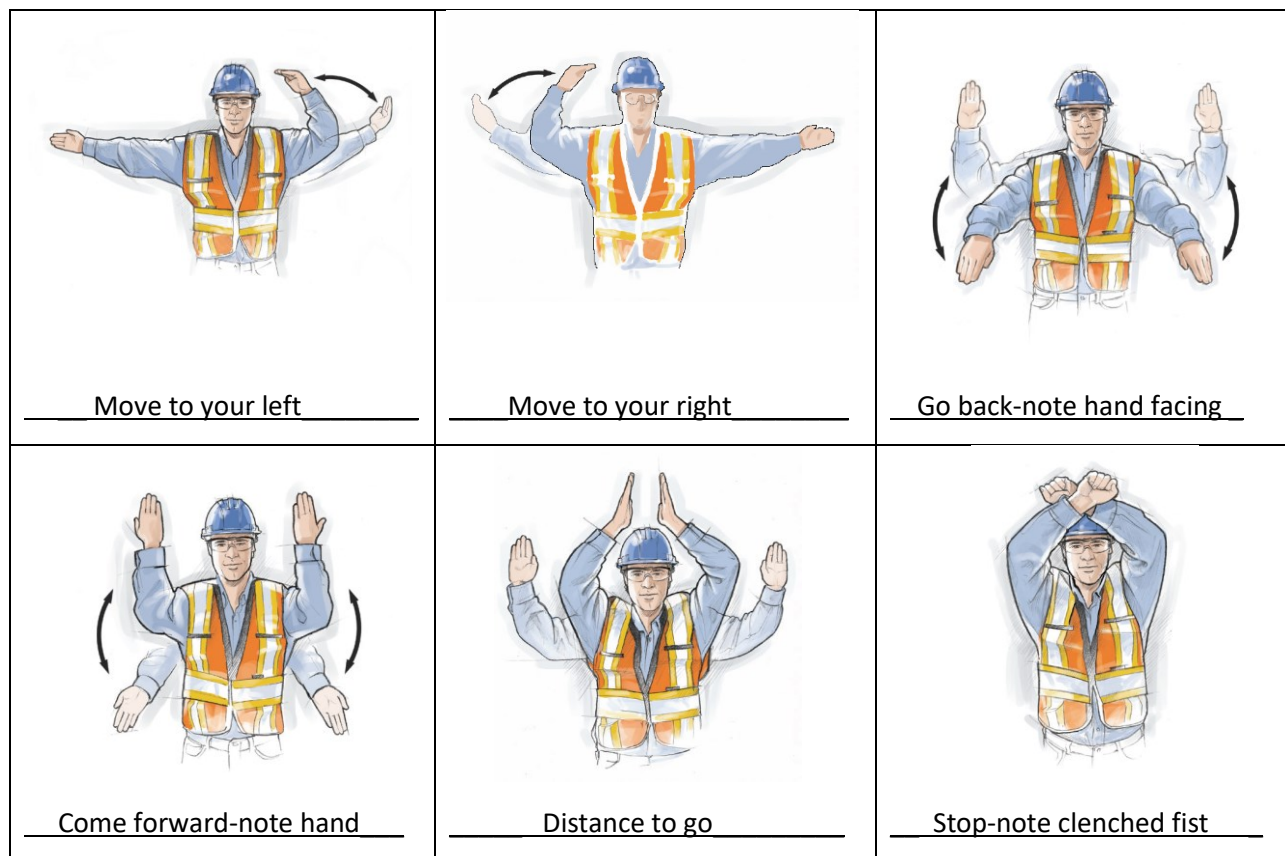
There are other gestures, such as those described as beats, which are short quick movements of the hand or fingers. These gestures accompany the rhythm of talk and are often used to highlight parts of what is being said or to mark a change from describing events in a story to commenting on those events.

Types of sign languages - There are two general categories of language involving the use of signs: alternate sign languages and primary sign languages. By definition, an alternate sign language is a system of hand signals developed by speakers for limited communication in a specific context where speech cannot be used.

In contrast, a primary sign language is the first language of a group of people who do not use a spoken language with each other. British Sign Language (BSL) and French Sign Language (SLF), as used for everyday communication among members of the deaf communities of Britain and France, are primary sign languages.

Spotters typically use hand signals to communicate with vehicle drivers. It's vital for the driver and spotter to agree on particular hand signals and their meanings. This prevents misunderstandings that could cause vehicle damage or accidents. Some of the more common hand signals used in the automotive industry are illustrated below.

	<i>“V” for victory.</i> Use this gesture with caution! While in North America it signs victory or peace, in England and Australia it means something closer to “take this!”
	<i>The “OK” gesture.</i> While in North America it means things are going well, in France it means a person is thought to be worthless, in Japan it refers to money, and in Brazil, Russia, and Germany it means something really not appropriate for the workplace.
	The <i>“thumbs up”</i> means one in Germany, five in Japan, but good job in North America. This can lead to confusion.
	<i>“Hook ‘em horns.”</i> In Texas this is the University of Texas rallying call because it looks like the horns of a bull. However, in Italy it means you are being tricked, while in Brazil and Venezuela it means you are warding off evil.
	<i>Waving your hand.</i> In much of Europe waving your hand indicates a disagreement. However, in North America it is routinely used as a way to signal greetings or to get someone’s attention.

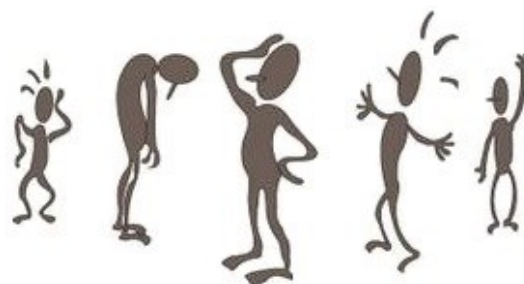


BODY LANGUAGE

Body language is a type of nonverbal communication in which physical behaviours, as opposed to words, are used to express or convey the information. Such behaviour includes facial expressions, body posture, gestures, eye movement, touch and the use of space. Although body language is an important part of communication, most of it happens without conscious awareness.

Body "language" must not be confused with sign language, as sign languages are languages and have their own complex grammar systems, as well as being able to exhibit the fundamental properties that exist in all languages. Body language, on the other hand, does not have a grammar system and must be interpreted broadly, instead of having an absolute meaning corresponding with a certain movement, it is not a language, and therefore is often misinterpreted and must be put into context.

In a society, there are agreed-upon interpretations of particular behaviour. Interpretations may vary from country to country, or culture to culture. On this note, there is controversy on whether body language is universal. Body language, a subset of nonverbal communication, complements verbal communication in social interaction. In fact, some researchers conclude that nonverbal communication accounts for the majority of information transmitted during interpersonal interactions. It helps to establish the relationship between two people and regulates interaction but can be ambiguous.



SIGNAGE

Signage is the design or use of signs and symbols to communicate a message. Signs are any kind of visual graphics created to display information to a particular audience. The main purpose of signs is to communicate, to convey information designed to assist the receiver with decision-making based on the information provided.

Signage communication may include verbal and non-verbal components, for example some of the signs seen in public places. An advantage of visual communication is that it is very direct, speaks many languages and almost impossible to misinterpreted.



EFFECTIVE WORKPLACE COMMUNICATION PROCEDURES

Workplace communication is the process of exchanging information and ideas, both verbal and non-verbal between one person/group and another person/group within an organisation. It also includes e-mails, text messages, notes, calls, etc. Effective communication is critical in getting the job done, as well as building a sense of trust and increasing the productivity of employees. To unite activities of all employees and restrain from any missed deadline or work that could affect the company negatively, communication is crucial. Effective workplace communication ensures that all the organisational objectives are achieved. Workplace communication is tremendously important to organisations because it increases productivity and efficiency.

Misunderstandings that cause friction between people can be avoided by effective workplace communication. Effective communication prevents barriers from forming among individuals within companies that might impede progress in striving to reach a common goal.

To be successful, you should carefully follow all verbal and written procedures that relate to your job description, following your company requirements. If you do not fully understand your workplace procedures and requirements, ask for clarification. You also need to be a good listener. Like other things in life, messages can appear to be good, bad or have little worth to you. Regardless of how you rate the message, you should show respect to the person giving the message. Look at the person while they are speaking and listen to the message before you respond. In order to totally understand the message, you may need to ask questions and gather as many details as possible. Do not try to control the conversation and give listeners a chance to speak. For example, try to put yourself in the other person's shoes and listen without bias.

Obviously, when you read something, you are receiving a message without the advantage of seeing the message sender. Therefore, you must take what you read at face value. This is important because being able to read and understand the information and specifications given in service manuals is essential for automotive technicians. Do your best to think through the words you use to convey a message to the customer or your supervisor. Pay attention to how they are listening and adjust your words and gestures accordingly. When writing a response, think about to whom the message is for and adjust your words to match their abilities and understanding. Also, keep in mind that more than one person may read it, so think of others needs as well.

The key to effective communications is respect. You should respect others and others should respect you. However, respect cannot be commanded; it must be earned. As a technician, you can earn respect in many ways. All of these result from the amount of professionalism you display. Professionalism is best shown by having a positive attitude, displaying good behaviour and accepting responsibility.

WORKPLACE DOCUMENT STYLE, FORMAT AND LAYOUT

A repair order (RO) is written for every vehicle brought into the workshop. ROs may also be called job cards, service or work orders. ROs contain information about the customer, the vehicle, the customer's concern or work request, and the time the services should be completed, some RO's also provide an estimate of the cost for the service/repair. ROs are legal documents that are used to creating the invoice to go to the customer for payment and many other purposes, such as payroll and general record keeping. Legally, an RO protects the workshop and the customer in the event of a dispute.

There are a large variety of workshop management systems and programs used in the auto repair industry and every workshop may enter different information onto the original RO, however most ROs contain the following information:

- Complete customer information
- Complete vehicle identification
- Service history of the vehicle
- The customer's concern and/or work required
- Preliminary diagnosis of any problems
- Estimate of the amount of time and costs required for the job
- Time the vehicle to be completed for customer pick up
- Name or other identification of the technician assigned to perform the work
- Report on the actual work performed with their labour times
- Parts replaced during the service/repair and their cost
- Notable items detected in the service/repair process
- Detailed diagnostic findings, if performed

If a signature is not required for changes in the original estimate, all phone conversations concerning the estimate should be noted on the RO. It is very important that the RO is filled in legibly and accurately as other people will need to read the information it contains, such as the service clerk when producing the customers invoice. In most cases when a customer signs the RO, they acknowledge the work performed, the parts and materials used, and workshop's right to impose a mechanic's lien.

This lien basically says that the workshop may gain possession of the vehicle if the customer does not pay for the agreed upon services and the vehicle remains at the premises for a period of 90 or more days. This clause ensures that the workshop will receive some compensation for the work performed, whether or not the customer pays the bill.

Service records are kept by the workshop to maintain the vehicle's service history and for legal purposes. Evidence of repairs and recommended repairs is very important for settling potential legal disputes with the vehicle's owner in the future.

USE OF COMMUNICATION SYSTEMS: EMAIL, TELEPHONE, INTERCOM AND SOCIAL MEDIA

Workshop policies and procedures are a set of documents that outline how tasks and activities in the workshop are to be conducted and managed. They also ensure that the workshop operates according to WHS and EPA laws and regulations.

A policy is a guiding principle that sets the workplace direction, whereas a procedure is a list of the steps required to get the same result each time a task or activity is performed. Telephone, internet and email communications are essential for performing modern business tasks, but companies must put rules in place to reduce the risks that come along with those technologies. Policies offer guidelines to help ensure that both IT and various communication system users, follow safe practices when using electronic communications such as messaging services, social media, and email tools. To control system costs and protect information assets, a policy defines acceptable and unacceptable use of systems and identify responsibilities for employees, staff, supervisors and managers. A communication policy presents a comprehensive outline for establishing rules and guidelines for using communication systems and security for company data.

A procedure would be a document that describes the steps and protocols required to operate the various communication systems in the workplace. For example, one of the most important aspects of success in business is the ability to communicate by phone. Answering the telephone is not a difficult task but using it in a business-like and professional manner is not so straightforward. Customers will often judge the company by the standard of the person answering the phone. If you are representing the company, a workplace communication procedure addresses how you are to answer and speak on the phone, how you need to structure an email and grammar used, what language is suitable over an intercom and content of social media posts.

Each workshop will have its own set of policies and procedures, including formal and informal rules, personal use of company devices and a system in place to make sure the policies and procedures are regularly reviewed and updated. You should review this information and make yourself familiar with company expectations when using and communicating with customers and work colleagues.

REPORTING

Most workplace reporting procedures or requirements are usually directed to your immediate supervisor or employer. Where your supervisor or employer are affected by or the cause of the event, there is always help available by contacting 000 or WorkSafe QLD. Incident reporting which we recently covered in AURASA102 – Follow safe work practices, is a form of reporting and documenting all workplace injuries, near misses, incidences and accidents. Like all reports, incident report should be completed at the time an incident occurs no matter how minor the injury or issue.

Reports should state all the essential information about the event, it may be preformatted (example right) or a blank sheet. It should contain the following key elements to ensure that all facts and necessary details are complete and properly documented. A report should be:

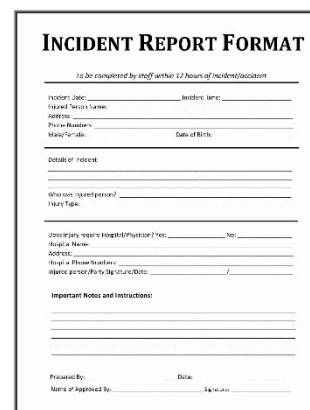
Accurate - All data must be clear and specific. Most inaccuracies are due to typos and simple grammar and spelling errors (e.g. incorrect details of names of people involved, date and time of the event, contact numbers, etc.). Provide more specific details of what you are referring to and avoid any vague statements that may cause confusion. Finally, always proof-read your report before submission to see errors that you might have overlooked.

Factual - A report should be objective and supported by facts. Avoid including emotional, opinionated and biased statements in the report. It should provide both sides of the story and should not favour one side. However, if there's a need to include statements from witnesses, make sure to quote them.

Complete - Ensure that all essential questions (what, where, when, why, and how) are covered in the report. Record not only the people who were involved and what caused the event to happen, but also include details such as people who witnessed and reported the event or those who will conduct an investigation.

Graphic - Photos, diagrams, and illustrations should be included as supporting evidence. Take many photos of the scene, any damage and surrounding environment. These supplements the facts stated and provides more clarity to be easily understood by the receiver.

Valid - Upon completion, those who are involved in the event (e.g., workers, witnesses, manager, etc.) should sign off to testify and validate all the information that was mentioned in the report. This confirms that the report is truthful and unquestionable.



INCIDENT REPORT FORMAT

To be completed by staff within 12 hours of incident/accident

Incident Date: _____ Incident Time: _____
 Incident Location: _____
 Report Number: _____
 Date of Birth: _____

Details of Incident:
 What was the incident? _____
 How was it reported? _____
 Injury Type: _____

Was anyone injured? Yes/No: _____
 Hospital Name: _____
 Address: _____
 Hospital Phone Number: _____
 Hospital Fax Number: _____

Important Notes and Instructions:

Prepared By: _____ Date: _____
 Name of Approver By: _____ Signature: _____

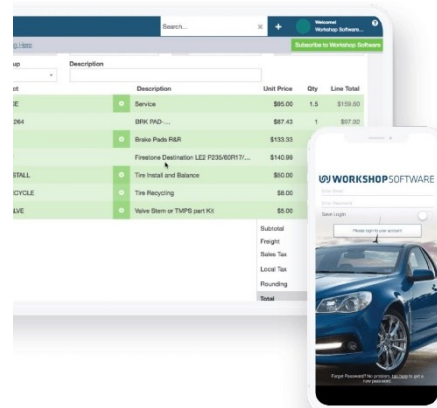
TYPES OF COMMUNICATION DEVICES IN AUTOMOTIVE WORKPLACES

With the fast evolution of technology, companies have to stay up to date with communication tools that facilitate the workplace communication. Technicians that work in remote locations or solo, often need to contact the workplace to obtain information, work procedures and specifications or help relating to safety issues. In these situations, a mobile phone or two-way radio is an invaluable tool. It is important to keep in mind that sending an email, or a message does not necessarily mean that communication has taken place. Only when a message has been sent, received and understood by the intended receiver, it can be said that communication has occurred.

Even though they facilitate communication, studies have shown that communication devices may distract employees from their duties. To reduce the interrupt effect, methods such as employee training and monitoring the environment can be implemented. Employees making themselves unavailable during specific times of the day or week can also help resolve this issue. This will increase concentration and as a result, productivity.

Changes in technology have transformed the automotive industry in a relatively short timeframe. Today's technicians do so much more than turn spanners, they work on complex vehicles using high-tech diagnostic equipment. Because of this shift in technology, technicians who are tech savvy and trained to work with the latest tools and equipment are in high demand. Examples of some mobile communication devices can include:

- Tablets, notebooks, and laptops
- Two-way radios and intercoms
- Mobile phones



OPERATING FEATURES OF COMMUNICATION DEVICES

A communication device is a hardware device capable of transmitting an analogue or digital signal over the telephone line, other communication wire, or wirelessly.

A classic example of a communication device is a computer modem, which converts a computer's digital information to an analogue signal for transmission over a telephone line. Similarly, a modem receives analogue signals, and converts them to digital, for processing by the computer. This process is called modulation/demodulation, from which the modem gets its name.

Below is a list of the different types of communications devices you may encounter when dealing with a computer.

- Bluetooth devices

- Infrared devices
- Modem (over phone line)
- Network card (using Ethernet)
- Smartphone
- Wi-Fi devices (using a Wi-Fi router)

A two-way radio is a radio that can both transmit and receive radio waves (a transceiver), unlike a broadcast receiver which only receives content. It is an audio (sound) transceiver, a transmitter and receiver in one unit, used for bidirectional person-to-person voice communication with other users with similar radios. Two-way radios are available in stationary (base station), mobile (installed in vehicles), and hand-held portable models.

Two-way radio systems usually use a single radio channel and operate in a half-duplex mode: only one user on the channel can transmit at a time, so users in a user group must take turns talking. The radio is normally in receive mode so the user can hear all other transmissions on the channel. When the user wants to talk, they press a "push-to-talk" button, which turns off the receiver and turns on the transmitter; when they release the button, the receiver is activated again. Multiple channels are provided so separate user groups can communicate in the same area without interfering with each other.

In general, radio waves travel in line of sight i.e., straight lines. They can go around and through things, but this can drastically affect the strength and clarity of the signal. This causes problems when you're operating a radio system in a built-up, hilly or mountainous area. Sometimes, even on flatter terrain, the sheer distance between the transmitting radio and the receiving radio weakens the signal to an unacceptable quality, or the signal may be lost altogether.

An intercom or interphone is a stand-alone voice communications system for use within a building or small collection of buildings, functioning independently of the public telephone network. Intercoms are generally mounted permanently in buildings and vehicles. Intercoms can incorporate connections to public address (PA) loudspeaker systems, walkie talkies, telephones, and to other intercom systems. Some intercom systems incorporate control of devices such as signal lights and door latches.

In the most basic form, a mobile phone is essentially a two-way radio, consisting of a radio transmitter and a radio receiver. When you chat with your friend on your mobile phone, your phone converts your voice into an electrical signal, which is then transmitted via radio waves to the nearest mobile phone tower. The network of mobile towers then relays the radio wave to your friend's phone, which converts it to an electrical signal and then back to sound again. In the basic form, a mobile phone works just like a walkie-talkie.

In addition to the basic function of voice calls, most modern mobile phones come with additional functions such as web surfing, taking pictures, playing games, sending text messages and playing music. More sophisticated smart phones can perform similar functions of a portable computer.

COMPUTERS AND TABLETS WITH EMAIL

Whether you're wanting to contact with a customer, making an enquiry of product availability, or responding to a work colleague, it's essential to know how to write and send professional emails when you're at work.

This can be harder than it sounds. Many professionals have grown used to a very casual approach to email in their personal lives. While slang, emoticons, and textspeak are usually OK when you're emailing close friends, they won't suite in work correspondence. It's important to know how to clean up your communications when you need to.



Whenever you send professional email messages, it's really important to make sure the message is structured properly and will be received appropriately. You don't want to blow an opportunity by making mistakes or sending the wrong meaning, either in how you send emails or how you keep track of them. Read your email before to press the send button, how will your words be interpreted by the receiver? A lot of people read into emails, meanings and interpretations what are never intended. This is not usually the reader's fault. The reason for this is often the combination of words and phrases used in the construction of your message. Learn what to include in your messages, what not to include and how to close, sign and send your email messages.

What to include in your email message:

- **Subject Line:** The subject line should concisely convey your purpose for writing. Your subject line can be as simple as "Vehicle make and model" or "Request for Recommendation."
- **Greeting:** Even if you are writing a very short email, include a greeting. If you know the name of the person, include it. Unless you are on a first-name basis, call them by their title.
- **Length:** Construct your message as concise and short as possible. People tend to skim long emails, so only include essential information. Aim for a neutral tone to your message using words that are easily understood and do not have an alternate meaning.
- **Closing:** Sign off with a brief "Thank you," "Regards," or another simple send-off, and then your name. Most email accounts let you embed a signature with your name, title and contact information into every email. It is a terrific way to make each correspondence more professional.

What not to include in your email message:

- **Font Style:** Avoid ornate, playful, or coloured fonts; these simply distract the recipient from your actual message. Avoid overusing bold and italics as well, which make an email look cluttered. Do not write in all capital letters either; this comes across as angry or overexcited in an email.
- **Emoticons:** Do not include emoticons in a professional email; save these for personal correspondence.

INTERCOMS AND TWO-WAY RADIOS

Intercoms - Many key telephone systems for office and workshop use provide access to multiple outside lines plus an intercom, incorporate connections to a public address loudspeaker system. The intercom/PA systems are often used to summon someone to the administration office or in an emergency situation, instruct everyone to evacuate. Accessing the workplace intercom/PA system is usually a relatively simple operation, depending on the device, however some workplaces may limit access to all location or certain personnel. A phone intercom/PA is commonly accessed by lifting the receiver and pressing the intercom/PA button, note that some system may have a dedicated number/s to access the PA, i.e., 8#.

Many people find speaking into a workplace intercom/PA system quite daunting for the first time but its really not that difficult. There are several things that you need to keep in mind:

- Your voice will be heard throughout the entire surroundings of the building.
- There is no need to lift the level of your voice, the PA system will do that.
- Know what you want to say before you press to speak.
- Speak clearly, calmly and keep your message short.
- Remember to turn the system off or hang up when finished.



Two-way radios - UHF CB or citizen band radio is a two-way radio system that uses the 476.4250–477.4125MHz, radio spectrum for short-distance communications. It is divided into 80 channels for various uses. The service is for public access and available to everyone but not all channels can be used by anyone for just any reason – there are significant penalties for misuse of channels. For example, the Australian Government has legislated that channels 5 and 35 on the UHF CB Band are reserved for emergency use only.

It's important to understand that all communications on every channel is public. Anyone within range of you or a repeater that you're using can hear you and join in. For the most part, users are well behaved and respect the rules, but you may encounter people who want to cause trouble or new users who are unaware of the etiquette.

Become familiar with the etiquette of two-way radio communication. To make radio communication go more smoothly, over the years certain rules, or etiquette, have been established. Below are outlines of the basic etiquette a radio user should understand.

- When using a two-way radio you cannot speak and listen at the same time, as with a phone.
- Don't interrupt if you hear other people talking.
- Do not respond if you aren't sure the call is for you. Wait until you hear your call sign.
- Never transmit sensitive, confidential, financial or personal information.
- Your voice should be clear and a little slower than normal. Speak in a normal tone, do not shout.
- Keep your message simple enough for intended listeners to understand.
- Be precise and to the point.

TELEPHONE SYSTEMS, INCLUDING MOBILE PHONES

One of the most important aspects of success in business is the ability to communicate by phone. Answering the telephone is not a difficult task but using it in a business-like and professional manner is not so straightforward. Millions of dollars are lost every year by poor handling of telephone enquiries. Often the first point of contact with a company is through the telephone. Customers will learn to judge the company by the standard of the person answering the phone. Customers who are well handled will call again and bring more business.

The telephone is one of the most used but least understood business tools. In the vast majority of business today a receptionist will answer the company phone following the company protocol. Depending on the call, their enquiries may be handled at that time or transferred on to another person to who can best handle their enquiry.

In order to do the best for your company, and yourself should you find yourself in a position where you need to answer the phone, you are required to become familiar with the telephone system at your workplace. This should include the following:

- The company policy (protocol) in answering the phone
- How a call is placed on hold
- How calls are transferred to another department/person.
- How to take a messages

Here are some guidelines:

1. Answer promptly, speak clearly and put a smile on your voice.
2. Greet the customer with.
 - Hello
 - Your company name
 - Your name
 - How may I help you?
3. When transferring a call to another department/person:
 - Explain why and to whom you are transferring them.
 - Give them the option for the appropriate person to call back.
 - Give a direct extension number in case of disconnection.
4. If you have to put a caller on 'hold', you should offer them choices:
 - May I put you on 'hold' or would you prefer that I call you back?
 - Always thank the person for waiting.
5. Make yourself aware of the company policy for personal use of their phones.



AUTOMOTIVE TERMOLOGY, IN ALPHABETICAL ORDER.

Term	Meaning
Accelerator:	Pedal connected to the throttle valve that controls engine speed and power.
Accumulator:	In hydraulics or pneumatics, a device for storing pressurized fluid.
Ackerman's principle (steering):	A steering system where the inner wheel turns through a greater angle than the outer wheel
Actuator:	A device that performs a mechanical action in response to an input signal, either electrical or fluid.
Air bleed:	A small hole or jet that allows air to flow into the fuel being discharged from the carburettor, this helps to atomise the fuels and also corrects the air-fuel mixture.
Air cleaner/filter:	Mounted on or connected to the engine air intake. It filters the air to provide clean air to the engine.
Air-cooled engine:	Engine, is cooled by a flow of air across fins on the cylinder block and head, either by fan or by movement of the engine through the air.
Air gap:	The gap between a set of contact points, for example the gap between the electrodes across which the spark jumps in a spark plug.
Air Induction System:	The components through which combustion air is induced into the engine.
Air lock:	Air trapped in a system that normally holds liquid.
Air vent:	Small hole in the top of a fluid reservoir, float chamber or tank to allow atmospheric pressure to act on fluid.
Alloy:	Mixture of metals. Can be any type.
Alignment:	Usually refers to the adjustment of the front wheels or the setting of the headlight beams.
Alternative fuel:	Fuels other than petrol or diesel, this includes methane, ethanol, compressed natural gas and electricity.
Alternating current:	Electric current that continuously reverses its direction of flow.
Alternator:	Engine-driven electric generator that changes mechanical energy to electrical energy, it creates alternating current (ac) and rectifies it to direct current (dc).
Ammeter:	Electrical instrument for measuring current flow to and from the car's battery.
Ampere: (amp)	Unit of electrical current.
Ampere hour:	A measure of a battery's capacity to deliver a specified current for a number of hours (amps x hours).
Anode:	The positive pole or plate of an electrical device.
Antifreeze:	Chemicals used to prevent the coolant from freezing, usually ethylene glycol.

Term	Meaning
Antifriction bearings:	Ball and roller bearings which roll over a surface to reduced friction.
Antiknock chemical additives:	Chemicals that are added to petrol to increase its octane rating.
Armature:	The rotating part of a starter or electric motor.
Aspect ratio:	The height/width ratio of a tyre, tyre profile.
Atmospheric pressure:	Normal air pressure.
Atom:	A small particle of matter that contains positive and negative charges.
Atomisation (fuel):	Refers to breaking fuel into a fine spray.
Automatic choke:	Device in the carburettor that controls the choke flap according to the engine temperature.
Automatic transmission:	A gearbox that alters the gear ratio automatically and eliminates the need for a manual clutch and gear lever.
Axial:	Along the axis, for a shaft, along its centre.
Axle:	Transverse beam supporting the wheels, shaft driving the wheels.
Backfire:	A charge that fires in the manifold instead of charging in the combustion chamber.
Back pressure:	Pressure in the exhaust system due to a blocked muffler or other restriction.
Baffle:	A plate to regulate or divert the flow of liquid, gas or sound, used in petrol tanks to prevent surging, and in exhaust mufflers to reduce noise.
Ballast resistor:	A wire resistor used to reduce and control the voltage of an ignition coil, used with breaker-type ignition.
Ball joint:	A flexible joint used with steering and suspensions to allow parts to move, two components are joined end to end so that they can pivot in any direction relative to each other.
Barrel:	The cylindrical part of the carburettor through which the air and fuel mixture flows
Battery capacity:	The size of the battery, based on its ability to maintain current flow.
Baulk ring:	The part of a synchromesh unit used to synchronise the speed during a gearshift.
Bead (of tyre):	The reinforced edge of the tyre that mounts on the wheel rim.
Beam axle:	A rigid transverse axle with kingpins and stub axles, carrying wheels with no independent suspension.
Bearing:	Device for supporting a shaft with the minimum of friction and wear, can be a plain bearing, or a ball or roller bearing.
Bevel gears:	Conical shaped gears which operate at an angle, as in final drive

Term	Meaning
Big end:	Larger end of the connecting rod mounted on the crankpin of the crankshaft.
Big-end bearing:	The bearing at the 'big' end of the connecting rod where it attaches to the crankshaft
Bleeding brakes:	Expelling air from the brake system.
Block:	The cylinder block, the main and largest part of the engine.
Blowby:	Burnt gases that escape past the piston rings into the crankcase.
Boiling point:	The temperature at which a liquid boils, at this point, it changes from a liquid to a gas.
Bonded:	Joined tightly together, brake lining are heat bonded to the brake shoes.
Booster:	A device, such as the brake booster, that reduces the effort required of the driver by providing additional force to help apply the brakes.
Boot:	A synthetic flexible cover used to prevent dirt or water from entering moving parts.
Bore of cylinder:	The diameter of the cylinder, also used in relation to the internal wall of the cylinder
Boss:	A reinforced area around a pin or shaft.
Bottom dead-centre:	Lowest point of the piston's movement in the cylinder, the piston at the bottom of a stroke (BDC).
Brake back plate:	Fixed plate of a drum-brake assembly that carries the brake shoe.
Brake band:	A band around a brake drum, used in automatic transmissions.
Brake disc:	The cast iron disc of a disc brake assembly, when the brake is operated, the brake pads are clamped against the disc.
Brake drum:	A cast iron drum that rotates with the wheel, brake shoes inside the drums expand with friction which slows and eventually stops the wheels.
Brake fade:	Loss of braking efficiency due to brake pads or linings overheating from overuse.
Brake fluid:	Special fluid for use in hydraulic brakes to transfer energy from the pressing of the brake pedal to the operation of the discs or drums. Not all brake fluid is the same.
Brake horsepower:	Imperial method of measuring engine output, superseded by kilowatts.
Brake lining:	Asbestos-composition material used to line the brake shoes.
Brake pad:	Metal back with friction material used with disc brakes.
Brake shoe:	Segmentally shaped metal components with friction material on the outer side of the curve, used to brake the wheel inside the drum brake.

Term	Meaning
Breaker points:	The points that are used in a distributor to make and break the primary circuit of the ignition system, a transistor performs this function in an electronic ignition system.
Breather:	An opening or vent used to relieve internal pressure or allow air to enter a space by allowing for expansion and contraction of fluid in a container or housing.
Bronze:	An alloy of tin and copper, used for bushes.
Brush (electrical):	Small carbon or copper alloy pads that transfer current to the sliprings of an alternator, or to the commutator of a starter or other motor.
Bump stop:	Large rubber stop at the limit of suspension movement
Bush or bushing:	A sleeve, usually of metal, rubber or plastic fitted into a bore to act as a bearing.
Butane:	Petroleum gas that is liquefied and used as a fuel.
Butterfly (or butterfly valve):	A, disc of metal on a spindle that can be rotated to control the air flow and so the speed of the engine (see also throttle butterfly).
Bypass:	To redirect around, a passage that passes around another.
Bypass filter:	An oil filter in an engine lubrication system, it filters some oil from the oil pump before returning it to the engine sump.
Bypass valve:	A valve that controls the flow through a bypass passage.
Cable:	A number of strands of flexible wire used to operate the parking brake or clutch, often used with an outer cable. Cables include clutch, brake e, speedometer and accelerator cable.
Cable (electrical):	Strands of copper wire covered with plastic insulating.
Calibrate:	To accurately adjust, refers to correct setting of test instruments or gauges.
Caliper (brake):	The part of the disc brake that straddles the disc and carries the pistons and brake pads.
Cam:	A rounded wedge, usually on a shaft, used to change rotary motion to reciprocating motion, the camshaft has cams that open and close the valves.
Cam angle:	The, number of degrees that the distributor cam rotates from the time the breaker points close until they open again.
Cam follower:	Any component that transmits the motion of the cam to the next component in line, like a valve system.
Camber:	The angle at which the front wheels are set in relation to the 90° vertical position.
Camber angle:	Looking from the front of the vehicle, the angle by which the wheels deviate from 90° to the road. Positive camber means the wheels are further apart at the top, negative camber means the wheels are further apart at the bottom.

Term	Meaning
CAN bus	CAN bus (for controller area network) is a vehicle data network designed to allow microcontrollers and devices to communicate with each other within a vehicle.
Camshaft:	Shaft with a cam to open and close each valve, it is driven at half engine speed (see also overhead camshaft), it may also drive the distributor and fuel pump.
Capacitor:	An electrical component that stores an electrical charge, also called a condenser.
Carbon:	A black, non-metallic element, often found as black deposits in combustion chambers, on piston heads and in spark plugs.
Carburettor:	A component of a petrol-powered vehicle that mixes fuel and air in the correct proportions to create a combustible gas and supplies this to the engine in the correct amount.
Casting:	A part made by pouring molten metal into a shaped mould.
Caster:	The angle at which the front wheels are tilted to provide light and stable steering.
Catalyst:	A material that speeds up or stimulates a chemical reaction, without itself being significantly chemically altered by the reaction.
Catalyst converter:	A device in the exhaust system that reduces emissions by enhancing certain chemical reactions, it has a honeycomb core coated with noble metals, platinum, palladium and rhodium.
Cathode:	Negative electrical pole or plate.
Cell (battery):	A compartment of a battery that contains a number of positive and negative plates suspended in electrolyte.
Centre pillar:	Vertical metal frame in the centre of a four-door body shell
Centre of gravity:	Point about which a body always balances. In a motor vehicle, a low centre of gravity is needed for stability.
Centrifugal advance (ignition):	A spark-advance mechanism in the distributor which uses weights and centrifugal force.
Centrifugal force:	A force pulling outwards on a rotating body.
Cetane number:	A measure of the performance properties of diesel fuels.
Charcoal canister:	Container in the engine compartment, filled with charcoal or carbon which absorbs and stores fuel vapour. When the engine is started, the vapour is taken into the engine and burnt.
Chassis:	The frame of a vehicle on which the body is mounted.
Chatter:	A vibration, usually applied to a clutch that vibrates when being engaged, or a brake that vibrates when being applied.
Check valve:	A valve that allows flow in one direction but prevents flow in the opposite direction.
Chemical additive:	Chemicals that are added to fuels, lubricants and coolants to make them more suitable.
Choke:	Valve at the top of the carburettor which closes off the air supply during starting, can be manually operated or may be automatic.

Term	Meaning
Circuit:	A path or loop showing flow, the term can be used for electrical circuits and hydraulic circuits.
Circuit breaker:	A protective device in an electrical circuit that opens a set of contacts if the circuit is overloaded.
Circuit (electrical):	Path of an electric current, with conventional current flow, in a direction from positive to negative.
Clearance:	Designed to allows parts to move without binding, eg clearance between gear teeth.
Clevis:	A forked end of a rod with holes for a clevis pin, used to connect linkage or cables.
Clockwise:	In the direction of the hands of a clock.
Cluster gear:	A number of gears joined together, also used to refer to the countershaft (cluster) gears in the transmission.
Clutch:	A mechanical device for connecting and disconnecting parts that carry power, the clutch is engaged to connect the transmission from the engine and disengaged to disconnect.
Clutch drag:	Inefficient disengagement of clutch caused by faulty adjustment or mechanical wear.
Clutch slip:	Describes the effect of the pressure plate failing to grip the driven plate correctly, usually caused by contamination or excessive wear.
Clutch-driven plate:	A metal disc mounted on the shaft leading to the gearbox, transmits drive from the flywheel through friction linings on its surface.
Clutch lining:	Bonded or riveted friction material on either side of the clutch-driven plate.
Coefficient of friction:	A measure of the friction of two surfaces in contact.
Coil (electrical):	A number of turns of copper wire around a former of some type, usually round. Provide the high voltage current necessary to cause a spark at the spark-plug gap by collapsing the magnetic field created by low-voltage current flowing through the outer winding and so inducing high voltage from the inner winding. Coils are used in various locations, in the ignition coil, the alternator, starter, wiper motor, relays and instruments.
Coil (ignition):	An induction coil that produces high-tension voltage for the spark plugs.
Combustion Chamber:	Part of the cylinder head above the piston where the charge of air-fuel mixture is ignited by the spark plug and burnt.
Commutator:	A series of copper bars connected to the armature winding of the starter or electric motor, brushes against the commutator carry current.
Compensating jet:	A carburettor jet that is used for mixture correction at higher speeds.

Term	Meaning
Compression ratio:	The amount that the charge is compressed in the cylinder, this is the ratio of the cylinder volume at the lowest position of a piston in the cylinder during the stroke (BDC) compared to its volume at the top position of a piston in the cylinder during the stroke (TDC). In general a higher compression ratio means a higher degree of compression during combustion and thus a more powerful engine.
Compression-ignition engine:	Combustion is achieved in the engine by the heat generated by compressed air (diesel engine). Ignition occurs when a charge of atomised fuel is injected into the hot compressed air in the combustion chamber.
Compression stroke:	Upstroke in the engine cycle that compresses the charge.
Compressor:	A device used for compressing gases, used with air conditioning and with some braking systems on commercial vehicles.
Condensation:	Liquid formed from cooling a gas.
Condense:	Change of state from a gas to a liquid.
Condenser (heat):	Transfer of heat through a solid.
Conductor (electrical):	A material that readily allows the flow of electric current.
Connecting rod:	The rod connecting the piston to the crankshaft, transferring the up and down motion of the piston to the rotary motion of the crankshaft.
Constant-mesh gears:	Gears that do not slide and which are always meshed together.
Constant-velocity joint:	A universal joint that gives a smooth drive without vibration, used particularly with front-wheel drive.
Contact points:	Points of a switch or switching device that are opened and closed to interrupt the flow of current and cause the current in the coil to collapse and provide high-voltage current.
Contraction:	Reduction in size due to cooling (this is the opposite of expansion).
Control arm:	A suspension arm that controls the position of a road wheel.
Control cable:	A cable, such as the clutch cable, that is used to operate the clutch.
Convection:	Transfer of heat in a liquid or gas by currents.
Coolant:	A mixture of water and chemicals used in the cooling system.
Corrode:	Wearing away of a surface due to chemical action, rusting of iron and steel is a common form of corrosion.
Cotter pin:	Split pin for use with a castellated nut.
Counterbore:	A bored recess to take the head of a bolt or similar part.
Countershaft:	An intermediary shaft with gears or pulleys that receives motion from one shaft and transfers it to another.
Counterweight:	A mass attached to a moving part so that it will be in balance.
Crankcase:	The lower part of the engine block that supports and encloses the crankshaft.

Term	Meaning
Crankpin:	The bearing surfaces on the crankshaft that carry the big-end bearings of the connecting rods.
Crankshaft:	A cranked or bent shaft that runs the length of the engine, set at the base of the cylinder block, it transmits the power developed by the pistons through the transmission and drive shafts to the wheels of the vehicle.
Cross-member:	A sub-frame mounted across the vehicle to which suspension or transmission parts are attached.
Crown wheel and pinion:	The final-drive gears in the rear axle, provides a gear ratio of around 4:1 and also change the direction of drive.
Curb weight:	The weight of an unloaded vehicle with all the standard features, a full tank of fuel or fluids necessary for the functioning of the vehicle.
Cylinder:	The cylindrical hole in the engine block in which the piston operates.
Cylinder block:	For liquid-cooled engines, usually a single iron or aluminium alloy cast block, housing the cylinders and their water-jackets and crankcase, an air-cooled engine may have cylinders separate from the crankcase.
Cylinder head:	Cast iron or aluminium piece that is bolted to the top of the cylinder block, it contains the valves and valve ports, and also the combustion chambers.
Cylinder liners:	Normally cast-iron sleeves that fit inside the cylinder block where the piston does not run directly in the block itself. Dry liners are surrounded by the metal of the block, wet liners are in direct contact with the coolant
Damper:	A term used to describe a shock absorber suspension system. Also refers to a device used to control the movement of the piston in a variable-jet carburettor by smoothing out the response to the throttle.
Dead axle:	An axle that supports wheels but does not turn, a live axle, such as those in the rear-axle housing, rotates with the wheel.
Deceleration:	Slowing down, opposite to acceleration.
Deionised water:	Water with chemicals removed, suitable for use in batteries.
Density:	Mass per unit volume.
Detent:	Spring-loaded ball or plunger that fits into a groove, used for locating a gear selector.
Detergent oil:	Engine oil that keeps the interior of the engine clean through the use of an additive to suspend sludge-forming material and prevent it from settling.
Detonation:	Noise caused by the last part of the fuel charge burning too fast.
Diaphragm spring:	A flexible rubber spring used with the clutch pressure plate.
Die:	Tool for cutting a thread, also a metal form for pressing metal to shape.

Term	Meaning
Diecasting:	Casting produced with molten metal in a die, instead of in a sand mould.
Diesel:	A class of internal combustion engine in which combustion is initiated by the high temperature of the compressed air in the cylinder rather than by an electrical spark
Dieseling:	A condition where a petrol engine continues to run on after the ignition switch is turned off.
Differential:	A set of gears that allows one driving wheel to turn faster than the other when a vehicle turns but still receive equal torque.
Digital circuits:	Electronic circuits whose outputs can change only at specific instances and between a limited number of different voltages.
Diode:	A semiconductor device that allows current to flow in only one direction.
Direct current:	Current that flows constantly in the one direction (dc), compared with alternating current (ac), which is constantly reversing its direction. Direct current is produced by a battery.
Disc brakes:	Heavy metal discs are pinched by friction pads mounted on calipers that surround the disc which is attached to the road wheel and rotates with it.
Discharge (battery):	Electrical energy being taken from the battery, opposite of 'charge' where energy is put back into the battery.
Displacement:	Amount of air displaced from the cylinder when the piston moves from BDC to TDC, usually expressed in millilitres.
Distilled water:	Purified water for use in batteries, same as deionised water.
Distributor (ignition):	The unit of the ignition system that accepts high-voltage current from the coil and then delivers it to each spark plug in the correct firing order. Conventional distributors have breaker points, distributors for electronic ignition have sensors.
Dog clutch:	A type of clutch used with synchromesh transmissions, the dog teeth around the edge of one half of the clutch mesh into corresponding indentations on the other.
Double Overhead Camshafts (DOHC):	Two camshafts in each cylinder head, one to control the intake valves, the other for the exhaust valves
Downdraft (carburettor):	A carburettor mounted vertically so that the air flows downwards
Drag link:	Part of the steering linkage which controls the track rod and is attached to the pitman arm.
Drain plug:	A plug screwed into the bottom of a component for draining fluid, usually found in the sump, gearbox, final drive or radiator.
Draw (current):	The current required to operate an electrical component.
Drive gear:	A gear that rotates another is the drive gear, the other gear is the driven gear
Drive line:	The components that carry the drive from the engine to the driving wheels.

Term	Meaning
Drive shaft (also half shafts):	Shaft between the transaxle and the front wheels, or between the transmission and the rear axle (propeller shaft), transmits the drive from the final drive to the road wheels.
Drive train:	The combination of mechanisms connecting the engine to the drive wheels, typically the transmission, driveshaft and differential in a rear wheel driven vehicle.
Drop-forged:	A part that has been formed to shape by forging a red-hot blank.
Drum brakes:	Brakes with shoes and a drum, the drums, which are attached to the wheels, are slowed by internal convex shoes lined with friction material, forced outwards by hydraulic pressure from the brake pedal.
Dual braking:	Two separate hydraulic braking systems fitted to ensure braking if one circuit should fail.
Dwell:	The time allowed for current to build in the primary circuit of the ignition coil for each spark generation.
Dynamic balance:	A tyre or other rotating part that is in balance when it is revolving.
Dynamometer:	An electrical or hydraulic device for loading an engine and measuring engine performance. An engine dynamometer measures directly from the engine, a chassis dynamometer has rollers which measure power at the wheels.
Earth:	The body and engine of the vehicle, an electrical connection to either part to affect a completed circuit.
Eccentric:	Two circles, one within the other, but with different centres, used to change rotary motion to reciprocating motion.
Electrode (spark plug):	Spark plugs have a centre electrode and an earth electrode, two wires of alloy steel with an air gap, across which the spark occurs.
Electrolyte:	Solution of sulphuric acid and distilled water in a battery.
Electromagnet:	A magnet produced by a current passing through a coil of wire wound on a soft-iron core.
Electromotive force:	Voltage, or the force providing voltage.
Electron:	Negatively-charged part of an atom.
Electronic:	Having semiconductor components, e.g. diodes.
Electronic control:	A control unit with electronic components.
Electronic fuel injection:	Fuel injected by spray and controlled by an electronic unit.
Electronic ignition:	Ignition system that uses sensors and transistor switching instead of breaker points, the electronic unit triggers pulses of high-tension electrical energy to the spark plugs.
Electronic throttle control:	Acceleration peddle controls the throttle by means of a computer-controlled stepping motor instead of the conventional linkage from peddle to throttle.
Electronic valve timing:	A system where the opening and closing times and lift of cylinder valves are controlled by computer

Term	Meaning
Emissions:	Polluting exhaust gases and fuel vapour.
Emission controls:	Controls designed to reduce emissions from the engine and fuel system.
Emulsion:	Mixture of oil and water
End-play:	End movement of a shaft or other part.
End thrust:	Thrust along a shaft (axially).
Engine crankshaft position:	The angular position of the crankshaft relative to a reference point
Engine type:	In-Line Type (I-type or L-type) engine refers to an engine layout where the engine cylinders are positioned in a single bank. V-Type engine refers to an engine layout where the engine cylinders are positioned in two banks separated by an angle.
Engine mapping:	A procedure of experimentally determining the performance of an engine at selected operation points and recording the results.
Ethylene glycol:	Chemical used as an antifreeze in cooling systems, it is mixed with corrosion-inhibiting chemicals to that it will not attack the metal of the cooling system.
Evaporate:	Change to a vapour
Evaporative emissions:	Evaporated fuel from the carburettor or fuel system that mixes with the surrounding air.
Exhaust gas:	Gases formed by the combustion of fuel and air, they include water vapour, carbon dioxide, carbon monoxide, nitrous oxides and unburnt hydrocarbons.
Exhaust-gas analyser:	Instrument for checking exhaust emissions by sampling the exhaust gas.
Exhaust gas oxygen (EGO):	The concentration of oxygen in the exhaust of an engine. An EGO sensor (or O ₂ sensor, or oxygen sensor) is used in closed-loop fuel control system to indicate rich or lean air/fuel ratio.
Exhaust gas recirculation (EGR):	A procedure in which a portion of exhaust is introduced into the intake of an engine primarily for NO _x .
Exhaust system (manifold):	The exhaust manifold on the engine, the exhaust pipes and the mufflers which take away the exhaust gases forced out of the cylinders
Expansion:	Increase in size due to heating.
Farad:	Unit of capacitance, relates to a capacitor or condenser.
Fatigue:	Weakness in metal caused by prolonged stress
Feeler gauge:	Thin strips of hardened steel of accurate thickness used for measuring clearances, e.g. valve to rocker clearance.
Ferrous metal:	Metal containing iron, non-ferrous metals have no iron.
Fibreglass:	A mixture of glass fibres and resins that produces a material that is light and tough when cured.

Term	Meaning
Field coil:	A coil that produces magnetic lines of force.
Field (magnetic):	Area of magnetic lines of force.
Filament:	Fine wire, inside a light bulb, heated to produce light.
Fillet:	Curved section of an angle joint, provides reinforcement and prevents a stress rise
Filter:	Fine material or device designed to remove impurities, for example, fuel filter, oil filter.
Final drive:	The gearing and differential in a rear axle or transaxle, the last phase of the transmission system.
Final drive ratio:	The reduction ratio of the gear set furthest from the engine. In general a low final drive ratio results in better fuel efficiency and a higher final drive ratio represents better performance.
Firewall:	Body panel at the back of the engine, also referred to as a bulkhead
Firing order:	The order in which the cylinders of an engine are fired, eg 1, 3, 4, 2.
Flame propagation:	Refers to the way the fuel charge burns in the combustion chamber.
Flat spot (carburettor):	A temporarily weak mixture which causes the engine to hesitate when accelerated.
Floating axle:	The way in which an axle shaft is supported in the rear axle, semi-floating, three-quarter floating and full-floating axles.
Flooding (carburettor):	Excess fuel due to over-choking or high float-bowl level.
Fluid coupling:	Coupling where power is transmitted from one member to another by oil in the coupling
Fluid reservoir:	Usually refers to a container that stores hydraulic fluid for the brake or clutch systems.
Flux (magnetic):	Area of magnetic lines of force around a magnet, same as field.
Foot-pound:	A unit of torque corresponding to a force of one pound (imperial measure) acting on a one-foot level arm.
Footprint (tyre):	The area of a tyre in contact with the road.
Four-stroke:	Common internal-combustion engine operating cycle (induction, compression, power, exhaust).
Frame:	The chassis or main structural body parts.
Friction:	Resistance to movement.
Friction pads:	Friction material pressed on to the disc in a disk braking system.
Front-wheel drive:	Transmission system where the engine drives the front wheels of the vehicle.
Fuel injector (electronic):	An electro-mechanical device that precisely measures fuel into an C.I. engine based on a timed electronic input.
Fuel line:	A pipe or hose that carries fuel.
Fuel mixture:	Combustible mixture of air and fuel.

Term	Meaning
Fuel pressure regulator:	Maintains fuel pressure to fuel injector to help ensure proper quantity is delivered to the engine.
Fuel pump:	Draws fuel from the tank and transfers it to the engine.
Fulcrum:	A point about which a lever operates.
Full-flow filter:	Oil filter through which engine oil passes before it reaches the engine bearings.
Full lock:	The front wheels are turned as far as they will go in one direction.
Fuse:	Electrical protection device incorporated in a circuit which breaks the circuit when overloaded.
Gap:	Space between two electrodes or contact-breaker points, air gap, spark plug gap
Gas-filled:	Shock absorbers that use nitrogen gas instead of air.
Gasket:	Sealing material between two surfaces, may be copper, cork, rubber, paper
Gassing:	Giving off gas, as in a battery which gives off hydrogen gas while charging, also used in relation to 'regassing' an air-conditioning system
Gear ratio:	Ratio of the number of teeth in each gear, e.g. 4:1. The relative speeds at which two gears revolve, that is the ratio of the number of turns that a small gear makes to one turn of a larger one.
Gearbox:	Any box, or housing, that contains gears.
Gear train:	More than two gears are in mesh. A simple train has one gear after another, compound gears have some gears joined together
Generator (dynamo):	Performs the same function as an alternator. Device that converts mechanical energy to electrical energy, used to charge the battery.
Glass-reinforced plastic (GRP):	Laminated material used in the manufacture and repair of some car bodies.
Glow plug:	A heating plug used with some diesel engines to provide heated air for cold starting
Governor:	A controlling device, can be used to limit speed of an engine, or control gearshifts in an automatic transmission.
Grommet:	A rubber insert fitted to a hole through which an electrical cable passes.
Ground (battery):	The negative terminal of the battery is connected to the body and the engine so that they provide a 'ground' with negative potential.
Halogen (bulb):	A headlamp bulb which has a quartz envelope and is filled with halogen gas.
Harmonic balancer:	A balancer on the front of the engine to dampen torsional vibrations.
Heat exchanger:	A device for transferring (exchanging) heat, e.g. a radiator.
Heat range (spark plug):	The range of temperatures within which the plug is designed to operate.
Heat sink:	A metal base in which diodes and transistors are mounted, prevents damage to a component by absorbing heat.

Term	Meaning
Helical gear:	Teeth cut on an angle, if the angle were taken far enough, it would form a helix.
High tension:	High voltage produced by the ignition coil.
Hone:	A tool with abrasive stones for reconditioning the cylinder walls, also a tool for reconditioning brake cylinders.
Horsepower:	The power of an engine (imperial measure), kilowatt (metric measure).
Hub	Centre of a wheel, or the part of the suspension that carries the bearings and mounting flange for the wheel.
Hunting (engine):	At idle, a regular increase and decrease in speed.
Hydraulics:	Use of liquids to transfer power.
Hydrocarbon:	A chemical compound consisting of hydrogen and carbon atoms, the basis of automotive fuels.
Hydrometer:	An instrument that uses a float for measuring density, or specific gravity, it is used for measuring the density of battery electrolyte to determine the state of charge.
Hygroscopic:	Ability to absorb moisture from the air.
Hypoid gears:	Spiral bevel gears used in a rear axle.
Idler arm:	An arm of the steering linkage which transfers motion.
Idler gear:	A gear in a gear train which transfers motion, but has no effect on the gear ratio, the reverse idler gear in a transmission.
Ignition:	Firing of the fuel charge in a cylinder by a spark from the spark plug, in a diesel, ignition by the heat of compression.
Ignition coil:	An induction coil which produces high voltage for ignition.
Ignition timing:	The time of occurrence of ignition measured in degrees of crankshaft rotation relative to top dead-centre (TDC) ,
Impeller:	A rotor with blades which forms part of a pump, e.g., water pump.
Independent suspension:	A suspension system where the movement of one wheel does not directly result in the movement of the opposite wheel, each wheel has its own spring and linkage with the car body.
Induction:	Inducing electricity from one conductor to another without any direction connection.
Induction stroke:	The stroke of a piston which takes in a charge, in the case of a diesel, the stroke of a piston which takes in air.
Inductor:	A magnetic device that stores energy in a magnetic field produced by current flowing in it.
Inertia:	Reluctance to move.
Inhibitor:	Chemical that prevents or delays an action, e.g. corrosion inhibitor.
Injection timing (diesel):	Timing of the diesel injection pump to inject at the right time.
Injector:	Used to spray fuel in fuel injection and diesel engines.

Term	Meaning
In-line engine:	Engine with all its cylinders in a straight line.
Input shaft:	The shaft that carries the drive from the clutch to the transmission.
Instrumentation:	A meter (often electrical) that is used for measurement or control and for the display of measurements or conditions.
Insulator (electrical):	A material that will not carry current.
Insulator (heat):	A material that does not readily transfer heat.
Integrated circuit:	A semiconductor device which contains many circuit functions on a single chip.
Intermittent:	Occurring occasionally, not regular.
Ion:	An electrically charged particle.
Ionise:	Air becomes ionised when it conducts electricity (spark or arc).
Jacking point:	Locations on a vehicle that are specifically designed for lifting and hoisting.
Jets:	Carburettor components with a small holes drilled in them, used for supplying a measured quantity of air or fuel.
Journal:	Part of a shaft with a surface to take a bearing.
Kilopascal:	Unit of pressure. Metric
Kilowatt:	Unit of power, used for measuring engine power.
Kingpin:	Large pin on which the stub axles of a front beam axle pivot. On most modern cars it has been replaced by two ball joints.
Knocking (engine):	Noises caused by worn or loose bearings, pistons, or other engine parts.
Knocking (fuel):	Detonation, noise caused by the sudden burning of the last of the fuel charge
Knuckle:	The part of the suspension that carries the wheel spindle and pivots for steering
Land:	Metal beside a groove, such as the lands beside the ring grooves in a piston.
Lap:	Obtaining a seal or fit between two parts by using abrasive paste and rubbing the parts together
Latent heat:	Hidden heat, heat applied and absorbed by a liquid or gas as it continues to boil.
Lateral:	Sideways.
Leaf spring:	A flat, flexible metal spring consisting of one, or more, flat blades.
Limited-slip differential:	A differential in a rear-wheel drive vehicle that is fitted with a mechanism that limits the angular velocity and torque differences between the two wheels. It ensures that the same torque is always distributed to both wheels, this is especially useful when the two wheels are on surfaces with different traction.
Live axle:	An axle that rotates with the wheel.

Term	Meaning
Live wire:	A wire which is carrying current or has battery voltage.
Lobe:	The high part of a cam.
Lubricant:	Anything that lubricates, usually oil or grease, but can be a dry lubricant such as graphite.
Lubrication:	Reducing friction by applying oil or grease to parts.
Lug:	An extended part, also refers to operating an engine under heavy load at too slow a speed.
MacPherson strut:	An independent suspension system that combines coil springs and shock absorbers in one compact unit at each wheel.
Magnet:	Magnetised special steel that will attract ferrous metals, electromagnet produced by a coil carrying an electric current.
Magneto:	A unit driven by the engine which produces a high voltage for ignition and does not need a battery.
Main-shaft:	The main shaft in a transmission, also called the output shaft.
Mandrel:	A shaft that is used to support a part, or on which a cutting or grinding tool is mounted.
Manifold:	A number of pipes joined together, a pipe with a number of branches.
Manifold absolute pressure (MAP):	The absolute pressure in the intake manifold of an engine.
Mass air flow sensor:	A device mounted in the engine's air induction system that provides an electrical signal representing the instantaneous rate of mass air flow.
Master cylinder:	The main pressure pump of a hydraulic brake or clutch system.
Metering rod:	A small rod used in a jet to meter the amount of fluid that it delivers.
Micrometre:	A precision measuring instrument.
Minimum ground clearance:	The perpendicular distance between the lowest point of the vehicle chassis to the ground.
Misfire:	A spark plug that misses a spark.
Modulator:	A control to vary or delay an action or pressure.
Molecule:	A very small particle consisting of atoms.
Molybdenum disulphide:	A lubricant that is added to grease, it adheres to metals under high pressure.
Momentum:	The tendency of a moving object to keep moving, its momentum is related to its mass and its speed.
Muffler:	A chamber in the exhaust system that reduces the energy in the exhaust gases and so reduces exhaust noise, it has a larger volume than the exhaust pipe and contains sound deadening materials which reduce resonance.
Multiplexing	Multiplexing provides the ability to use a single circuit to distribute and share information between several control modules throughout the vehicle.

Term	Meaning
Multi-point fuel injection:	An electronic fuel injection method that uses individual injectors to spray fuel directly into each intake port, bypassing the intake manifold.
Mutual induction:	Voltage induced into one coil from another, for example, in the ignition coil and transformers, coils are wound one on the other and induce voltage by mutual induction.
Needle bearing:	Small-diameter roller bearings, sometimes caged and sometimes loose.
Needle valve	A valve with a tapered end which seals on a conical seat.
Negative (electrical):	The negative battery terminal, the body and engine at negative potential.
Neutral:	Transmission with no gear engaged.
Neutron:	Particle of an atom without an electrical charge.
Nitrous oxides:	Some of the chemicals that are emitted from the exhaust
NO and Nox:	The various oxides of nitrogen.
Non-ferrous metals:	Metals that do not contain iron.
Non-return Valve:	A one-way valve to control liquids or gases
Nozzle:	Component of the carburettor that discharges fuel, part of a diesel injector that discharges a spray of fuel.
Octane rating:	A rating of petrol based on its ability to resist knocking.
Ohm:	Unit of electrical resistance.
Oil consumption:	The oil used or burnt in the engine.
Oil-control ring:	A piston ring that is fitted in the engine compression rings and used to control the amount of oil on the cylinder wall.
Oil cooler:	A cooler that transfers heat from the engine oil to the cooling system.
Oil filter:	A filter that prevents impurities from circulating through the engine with the oil.
Oil gallery:	A hole in the crankcase which provides a passage for the engine oil.
Oil seal:	Component, usually made of synthetic rubber, used to prevent oil leaking out along a shaft.
One-way clutch:	A clutch that locks a shaft in one direction and allows free rotation in the opposite direction.
Open circuit:	An electrical circuit that is 'open' due to a broken or disconnected wire, a faulty connection or switch.
Open-loop fuel control:	A mode where engine input air/fuel ratio is controlled by measuring the mass of input air and adding the correct mass of fuel to obtain a desired ratio.
O-ring:	A ring of rubber of circular section, used in a groove as a seal.
Oscillations:	Swinging or bouncing motion.

Term	Meaning
Oscilloscope:	A cathode ray tube (as in a television set) used as a test and diagnostic instrument for the ignition system.
Overdrive:	A gear set where the output shaft turns at a higher rate than the input drive. Overdrive gears reduce engine RPM at cruising speeds, thereby improving fuel economy. ,often the fourth gear of an automatic transmission and the fifth gear of a manual transmission.
Overhead camshaft:	A camshaft that is mounted on top of the cylinder head.
Oversquare (engine):	An engine where the bore diameter is larger than the stroke.
Oversteer:	Where the vehicle is over-responsive and tends to move into the curve.
Oxidise:	Effect of oxygen, the oxygen on exposed metal causes rust and corrosion.
Pascal's principle:	That pressure applied to a liquid can be transmitted throughout the liquid without loss.
Pawl:	Pin or lever that is engaged with a gear or other part as a lock, eg parking pawl in an automatic transmission.
PCV valve:	Valve used in the crankcase-ventilating system.
Petrol:	A light hydrocarbon fuel.
Pickup coil:	The part of a speed sensor in which a voltage pulse is induced, the pulse is input to the electronic control unit.
Piezoelectric:	means of producing voltage by compressing certain types of quartz
Piston:	Forms a movable gas and oil-tight seal in the engine cylinder. Transmits the force of the expanding gases to the small end of the connecting rod, usually made of aluminium.
Piston displacement:	The air displaced as a piston moves from the bottom to the top of its cylinder.
Pitch:	Distance between the crests of a screw thread, spacing between bolts.
Pitman arm:	Lever on the steering-box shaft to which the steering linkage is attached.
Pivot:	Shaft, pin or ball on which a part turns.
Planet carrier:	The part of a planetary gear set that carries the planet pinions.
Planetary gears:	A planetary gear set consists of a sun gear, planet carrier and an internal gear, the planetary gears can rotate around the sun gear to provide gear ratios.
Ply (tyre):	A layer of rubberised fabric in a tyre casing.
Poppet valve:	Valve with a head and stem, the type of valve used in an engine.
Porous:	Full of minute openings that allow liquid to pass through.
Port:	An opening, the cylinder head has intake and exhaust ports which are opened and closed by the valves.
Positive terminal:	Live Battery terminal.

Term	Meaning
Potentiometer:	An electrical component with a resistance which varies voltage.
Power:	The rate of doing work, engine power is rated in kilowatts.
Power flow:	The flow of power through a transmission or other torque-transmitting unit.
Power steering:	Steering that is assisted by hydraulic pressure.
Power stroke:	The working stroke of an engine during which the piston is forced downwards
Power take-off:	A mounting on a transmission or transfer case where a winch or other power-operated equipment can be fitted.
Power to weight ratio:	The maximum power output of the vehicle per unit mass.
Pre-ignition:	Firing of the charge in the cylinders before the spark occurs at the spark plug, caused by a hot spot that is hot enough to ignite the air-fuel mixture.
Preload:	Initial load placed on a bearing during adjustment.
Pressure cap:	Radiator cap with a valve that maintains a pressure in the system once the engine is hot.
Pressure plate:	The cast iron plate of the clutch assembly which holds the clutch disc against the flywheel.
Pressure-relief valve:	A valve that opens when a specified pressure is reached, also called a relief valve.
Primary circuit:	The low-tension circuit of the ignition system, the high-tension circuit is the secondary circuit.
Printed circuit:	Printed conductors on an insulated panel to which small electrical or electronic components are attached.
Procedure	A fixed, step-by-step sequence of activities or course of action that must be followed in the same order to correctly perform a task.
Process	A structured activities or tasks that produce a specific service or outcome.
Propane:	Petroleum gas used for fuel.
Propeller shaft:	The drive shaft between the transmission and the rear axel.
Proton:	The positive-charge part of an atom.
Pulse (electrical):	A small voltage generated by a sensor, used as an input signal to an electronic control unit.
Pushrod:	Rod used with overhead valves to transfer cam movement to the rocker assembly on top of the cylinder head, engines with pushrods are sometimes referred to as pushrod engines.
Quartz halogen bulb:	A headlamp bulb with a quartz envelope filled with halogen gas, produces a bright light.
Race:	A part of a bearing, inner and outer race.
Rack-and-pinion:	A steering mechanism with a rack (toothed bar) operated by a pinion gear on the steering shaft. When the steering shaft rotates, the rack moves from side to side, turning the wheels.

Term	Meaning
Radial tyre:	Tyre with cords that run in a radial direction, that is, from the centre.
Radiator:	Liquid to air heat exchanger used for lowering the temperature of the coolant which has absorbed heat from the engine.
Radiator core:	The centre part of the radiator, with the cooling fins.
Radius rod:	A rod on the suspension with one end moving in an arc.
Reach:	Length of the threaded portion of a spark plug.
Reamer:	A tool for accurately enlarging a hole, a reamer produces a better finish and a more accurate size than a drill.
Rebore:	Reconditioning the cylinders by boring them oversize with a boring bar and then fitting new pistons.
Reciprocating motion:	Backwards and forwards movement in a straight line, eg piston movement in the cylinder
Recirculating-ball:	A steering box in which the steering shaft turns a worm gear, this in turn, moves a toothed metal block to move back and forth turning the wheels. Ball bearings are used to reduce friction between the worm gear and the metal block.
Rectifier:	Electrical device that changes alternating current to direct current, in an alternator, this is done with diodes.
Refrigerant:	Refrigerant gas used in air-conditioning units. R134a
Regulator (electrical):	Unit used with an alternator to limit the alternator voltage.
Relay:	Electromagnetic switch by which a small current is used to control a larger one, a remote-controlled electric switch, eg headlamp relay and starter solenoid.
Release bearing (or throw-out bearing):	The thrust bearing that releases the clutch.
Relief valve:	Valve in a system which opens when a specified pressure is reached.
Resistance (electric):	Opposition to current flow, in a circuit, resistance causes voltage drop.
Resistor:	A poor conductor of electric current.
Retreading:	Moulding a new tread on a tyre
Rheostat:	A variable resistance used to control current, eg used to vary the brightness of instrument panel lighting.
Rich (fuel):	Too much fuel in the air-fuel mixture.
Rim:	Outer edge of the wheel on which the tyre is mounted.
Ring gear:	The gear fitted to the outside edge of the flywheel that is driven by the starter pinion during starting, the outer gear of a planetary gear set (also called the internal gear or annulus), the final-drive gear of a transaxle
Rocker arm:	Lever or arm that operates the valves in the cylinder head.
Rocker cover:	Encloses the valve-operating mechanism of an overhead valve.
Rotary engine:	Engine that has a rotor instead of pistons.

Term	Meaning
Rotary valve:	A cylindrical valve that opens and closes ports as it turns.
RPM (revolutions per minute):	The speed of rotation of the crankshaft of an engine or other rotation shaft.
SAE oil grade:	A system of grading oil by its viscosity
Safety rim:	A hump in the wheel rim which holds the bead of the tyre in place should it suddenly deflate.
Safety valve:	A valve that opens to relieve a build-up of pressure in a system.
Sandblast:	A blast of sand used for cleaning parts, spark plugs in particular.
Sealed beam:	A headlamp unit which has a bulb filament sealed between the reflector and lens.
Sealed bearing:	A bearing which is lubricated and fitted with seals during manufacture.
Seat:	The part against which a valve rests and seals when it is closed.
Secondary circuit:	The high-tension (voltage) section of the ignition system which delivers the voltage to the spark plugs for the spark.
Sector shaft:	A shaft in a steering box with teeth in the form of a sector of a gear.
Sediment:	Matter which settles in the bottom of a liquid, eg the dust and moisture collected in the bottom of a filter.
Selector shaft:	Shaft in a transmission for selecting gears.
Self-energising:	For brakes, a brake shoe that has a wedging action which assists braking.
Self-induction:	In a coil or transformer, voltage is induced from one set of winding into another
Semiconductor:	A material that is neither a good electrical conductor nor a good electric insulator, a diode.
Sensor:	An energy conversion device that measures some physical quantity and converts it to an electrical quantity.
Sequential fuel injection:	Fuel is electronically injected into the individual intake ports precisely at the beginning of each cylinder intake cycle.
Series circuit:	An electrical circuit where all the components of the circuit are connected end-to-end
Serviceable:	A part in good condition and suitable for use.
Shackle:	The connection between a leaf spring and the sub-frame.
Shift interlock:	A safety system used in automatic transmission that prevents the gear from shifting out of 'park' unless the brake pedal is depressed.
Shim:	A thin piece of steel fitted between parts, used to adjust clearance or preload.
Shock absorber:	Hydraulic damper used to dampen out spring oscillations thereby controlling body movement in relation to the suspension.
Short circuit:	An electrical fault that causes a circuit to be shorter than it should be.

Term	Meaning
Short motor:	The engine block, complete with crankshaft and pistons, but without a cylinder head and accessories.
Shunt	A bypass electrical circuit, a circuit in parallel
Shunt coil:	A coil wired in parallel.
SI engine:	Spark ignition, internal combustion engine.
Sight glass:	Small glass window shows the condition of the refrigerant in the air-conditioning system, sight glass in the carburettor bowl shows the fuel level.
Single overhead camshaft (SOHC):	Engine with a single camshaft in each cylinder head that controls both intake and exhaust valves
Sintered (metal):	Small particles of bronze fused together, this gives a porous material which is used for bushes and filters.
Slave cylinder:	The actuating cylinder of a hydraulic clutch, converts hydraulic pressure back into mechanical effort
Sliding gear:	A transmission gear that slides into mesh with another gear, such as the reverse gear
Slip:	The ratio of the angular speed of the driving element to the angular speed of the driven element of a torque converter, also, the condition in which a driven tyre loses traction so that the driving torque does not produce vehicle motion.
Sludge:	Thick black sediment in the sump formed from oxidation of the oil and contamination
Small end:	The smaller (upper) end of a connecting rod that is connected to the piston by the piston pin, the lower end is referred to as the big end.
Snap ring:	A Spring ring that fits into a groove to retain a bearing or shaft.
Software:	The computer program instructions used to tell a computer what to do.
Solder:	An alloy of lead and tin, to join parts by soldering.
Solenoid:	An electrically charged wound coil of insulated wire that produces a magnetic field within the coil. When current is passed through the winding, the magnetic field produced causes the core to be pulled into the winding. The moving core can close large-area contacts. Movement of the core can be used to operate parts, e.g., to engage the starter pinion with the ring gear, and to operate valves in an automatic transmission.
Solvent:	A liquid that is used to thin or dissolve other materials, solvents are used as cleaners.
Spark advance:	The number of degrees of crankshaft rotation before top dead-centre (TDC) where the spark is fired.
Spark plug:	Device for igniting the fuel charge in the combustion chamber. It has a metal body that screws into the engine cylinder head and a central electrode insulated by ceramic material.
Spark timing:	The process of firing the spark plug at the correct moment to ignite the combustible mixture in the engine cylinders.

Term	Meaning
Specific gravity:	The ratio of the density of a substance to that of water, the specific gravity of the electrolyte of a battery is checked to determine its state of charge.
Spigot:	Small end of a shaft.
Spindle:	Shaft on which the hub of a wheel is mounted.
Spiral Bevel gears:	Bevel gears with a spiral-toothed pinion.
Splines:	Grooves in a shaft and its mating part which allow them to be joined together.
Sprocket:	A toothed wheel used with a chain drive.
Sprung mass:	The mass of a vehicle which is carried by the suspension, the remaining parts make up the un-sprung mass.
Spur gear:	A gear with straight external teeth.
Stabilizer bar:	A suspension component that reduces the rolling motion of the vehicle by resisting any unequal vertical motion between the two wheels to which it is connected.
Starter motor:	Small, powerful electric motor used to start the engine by engaging a small pinion gear on the engine flywheel.
Static balance:	A wheel where the mass is evenly distributed around the centre, when lightly mounted on a spindle, it will remain in any position in which it is placed.
Static electricity:	Electricity generated by friction between two objects.
Steering knuckle:	The part of the suspension that carries the wheel spindle and pivots during steering.
Steering linkage:	The rods that connect the front wheels together and/or to the steering box.
Stoichiometry:	The theoretical air/fuel ratio for perfect combustion, it enables exactly all of the fuel to burn using exactly all of the oxygen.
Stress:	The result of a force applied to a part.
Stub axle:	The end of a front beam axle that swivels for steering.
Subframe:	Reinforced part of the bodywork to carry the suspension, engine and other parts
Suction:	Low pressure created by the intake manifold.
Sulphation:	Damaging formation of lead sulphate on the battery plates.
Sump:	Container for oil.
Sun gear:	The central gear of a planetary gear set, about which the other gears revolve.
Supercharger:	A unit that forces air into the cylinders under pressure, this puts more air into the cylinders to increase the volumetric efficiency.
Suspension:	A system for supporting the body of the vehicle and absorbing road shocks
Sway bar (also stabiliser bar):	A bar across the suspension which resists being twisted as the body leans on corners, this helps to keep the vehicle stable.

Term	Meaning
Swing axles:	The open-type drive shafts of an independent suspension with rear-wheel drive
Synchromesh:	Component that causes two gears to revolve at the same speed before being meshed together to prevent clashing.
Synchronise:	Bring to the same speed, with gears - synchronise the speed of the gears during gear shifting.
Tachometer:	Instrument for measuring revolutions per minute.
Tail shaft:	Shaft that transmits torque from the gearbox to the rear axle in front engine, rear-wheel drive vehicles.
Tandem (master cylinder):	A master cylinder with two pistons
Tappet:	Usually a short, bucket-shaped cylinder, part of an engine's valve train, also called a cam follower or valve lifter
Taps (and dies):	Threading tools.
Temper:	The degree of hardness of steel.
Tensile strength:	Strength against stretching.
Thermistor:	Electrical resistance unit that changes its resistance with temperature, used with an engine temperature gauge.
Thermostat:	Temperature-operated valve in the cooling system to control coolant flow, opens when engine reaches normal operating temperature and closes when the engine is cold.
Throttle body fuel injector (TBFI):	An electronic fuel injection method where the injector(s) is positioned centrally in a throttle-body housing and a valve is used to precisely control the amounts of fuel injected into the air stream entering the intake manifold.
Throttle stop screw:	The screw on the carburettor the adjusts engine idle speed.
Throttle valve:	The valve in the carburettor or throttle body that controls engine speed and power
Thrust bearing:	A bearing that is capable of accepting a force.
Thrust washer:	A washer located where it will take a thrust load eg thrust washers at the ends of the countershaft gears.
Timing belt:	The toothed belt that connects the crankshaft timing pulley to the camshaft timing pulley
Timing (ignition):	Having the spark occur at a specified number of degrees before top dead centre on the compression stroke.
Tolerance:	The amount of variation permitted in a dimension or adjustment, often specified as a plus or minus.
Top dead-centre (TDC):	The extreme highest point of the piston during its stroke.
Torque:	Twisting or turning force. Can be applied in many ways, eg, through the firing strokes which exert a force to turn the engine camshaft so as to drive the car. Torque is also applied when a nut is released by use of a spanner.

Term	Meaning
Torque converter:	A form of fluid coupling used to transmit torque from the power plant to the rest of the drive train in automatic transmissions, it acts as a coupling and can increase torque, about 2:1.
Torque wrench:	A wrench for applying a specified torque to bolts or nuts.
Torsional vibration:	Vibrations in a shaft caused by twisting forces, the shaft tries to twist and untwist
Track:	The distance between the front wheels or the distance between the rear wheels (see wheel track).
Traction:	Grip or friction between the tread of the tyres and the road.
Trailing arm:	A rear-suspension arm with its front end attached to the sub-frame so that the wheel is following behind.
Transaxle:	A transmission that includes the functional parts of a rear axle, used with front-wheel drive.
Transfer case:	A gearbox attached to the transmission of a four-wheel-drive vehicle to provide the drive to the front axle.
Transformer:	An electrical device with coil winding, used to increase or decrease voltage.
Transistor:	An active semiconductor device that operates like a current valve, an electronic switching device.
Transmission:	Mechanical arrangement with gears which transmits and also increases torque
Transverse engine:	An engine mounted across the vehicle, used with front-wheel drive.
Turbine (engine):	An engine that uses a turbine rotor to produce power.
Turbocharger:	A supercharger that has an impeller driven by exhaust gas, and a compressor to provide forced air for the engine.
Universal joint:	A flexible joint between two shafts that permits changes in angle.
Un-sprung mass:	The part of the vehicle that are not supported by the suspension.
Vacuum:	Usually refers to, pressure lower than atmospheric.
Valves (engine):	Devices that open and close to control the passage of liquid or gas, types of valves are poppet, flap, spool, ball and rotary.
Valve overlap:	During the engine cycle, the exhaust valve closes just after the end of the exhaust stroke (after TDC), and the intake valve opens just before the start of the intake stroke (before TDC). For a short time, both valves are open, and this is referred to as valve overlap.
Valve train:	The valves and camshafts configuration within an engine, the valve operating mechanism from the camshaft to the valve stems.
Vapour:	Gaseous form of a substance which is normally a liquid, eg steam.
Vapour lock:	Fuel in a fuel pump or fuel line turned to a gas by heat from the engine, this prevents normal liquid-fuel flow.
Variable assist steering:	The amount of assistance to steering varies according to driving conditions. Maximum assistance is applied at low speeds, less assistance is applied at cruising speeds to provide greater vehicle stability.

Term	Meaning
Variable jet:	A jet with a metering rod which is used to vary the flow of fuel through the jet.
Velocity:	Speed, stated in metres per second or kilometres per hour.
Venturi:	A tube of a particular shape through which air flows In a carburettor, the venturi is used to provide a low pressure at the fuel discharge nozzle.
Viscosity:	A liquid's resistance to flow.
Volatility:	The tendency for a liquid to vaporise, petrol is very volatile because it readily turns to a vapour.
Volt:	Unit of electrical pressure.
Voltage drop:	Difference in voltage between two points in an electric circuit, resistance causes voltage drop.
Voltage regulator:	An electrical or electronic device for limiting the maximum alternator voltage.
Voltmeter:	Electrical instrument for measuring volts or voltage.
Volumetric efficiency:	The pumping efficiency of the engine as air is drawn into the cylinders, the amount of air that is actually taken into a cylinder, compared with the amount that could be taken in if the cylinder were completely filled.
Wattage	Is the rate of electrical power
Water-cooled:	Using water, or water mixture, as an engine coolant.
Water-jacket:	Space around the cylinders and in the cylinder head which is filled with coolant
Water pump:	Pump in the cooling system which circulates the coolant.
Wheelbase:	The distance between the centres of the front and rear wheels.
Wheel track:	The distance between the centres of the front tyres (measured across the vehicle), or the distance between the centres of the rear tyres (they are not always the same).
Wiring diagrams:	Drawings of the wiring circuits of a vehicle, sometimes referred to as schematics, used for diagnosis.
Wishbone:	A suspension control arm named because of its shape, usually used with front suspension, the lower control arm of front coil suspension.
Worm drive:	A rear axle with worm gearing, used on some heavy vehicles instead of a crown wheel and pinion.
Yield point:	Point beyond which stretched metal will not return to its original shape
Yoke:	Forked or U-shaped end of a rod or shaft which connect one part to another.
Zener diode (or breakdown diode):	A diode that will not conduct until a certain voltage is reached, it then breaks down and becomes a conductor.
Zinc:	A soft white metal used to prevent corrosion, as on zinc-plated bolts.