

**DRIVERS INTERVIEW
(CAPI)**

Form Approved O.M.B. No. 2127-0626
Expiration Date: XXXX



United States Department of Transportation
National Highway Traffic Safety Administration

Tire Pressure Monitoring System
Outage Rates and Repair Costs

Paperwork Reduction Act Burden Statement

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2127-0626 (Expiration date: XX/XX/XXXX). Public reporting for this collection of information is estimated to be approximately 10 minutes per response, including the time for reviewing instructions, completing and reviewing the collection of information. All responses to this collection of information are voluntary. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Information Collection Clearance Officer, National Highway Traffic Safety Administration, 1200 New Jersey Ave, S.E., Washington, DC, 20590. NHTSA Form 1274.

Formatting conventions:

Questionnaire item
///PROGRAMMING LOGIC///
Explanatory notes

Programmer Notes:

All variables are assumed to be numeric
For SELECT ALL THAT APPLY items, create a series of variables with _1, _2, etc. appended to original variable name to indicate selection status of each response option

Disposition Definitions:

26 = Refusal at INTRO1A
27 = Screen Out: Rental/Zipcar
28 = Screen Out: Unable to determine model year
29 = Screen Out: Model year < 2004
30 = Refused dash inspection
31 = Screen Out: Primary driver/upkeep not with respondent
32 = Screen Out: Could not speak to primary driver/upkeep
33 = Refusal after transfer
34 = Screen Out: Unable to locate primary driver/upkeep after transfer
35 = Screen Out: TPMS status unclear from dash inspection
36 = Screen Out: Phase-in vehicle, no indication of TPMS, not reported as disabled
37 = Screen Out: Phase-in vehicle, no indication of TPMS, not reported as equipped
61 = Complete: Phase-in vehicle, TPMS reported to be disabled
63 = Complete: Post-phase-in vehicle, TPMS reported to be disabled
64 = Complete: Post-phase-in vehicle, no lights, not reported as disabled
66 = Complete: TPMS system malfunction
67 = Complete: TPMS low pressure
68 = Complete: TPMS functioning properly
71 = At Quota: Phase-in vehicle, TPMS reported to be disabled
73 = At Quota: Post-phase-in vehicle, TPMS reported to be disabled
74 = At Quota: Post-phase-in vehicle, no lights, not reported as disabled
76 = At Quota: TPMS system malfunction
77 = At Quota: TPMS low pressure
78 = At Quota: TPMS functioning properly

MODULE INTRO

///**Enter MASTERID generated by Observer to sync this interview with Vehicle Observation data**///

INTRO1A Hi, I'm _____. My partner and I are conducting a survey for the US Department of Transportation about tire pressure monitoring systems. We would like to ask you some quick questions and give you some information about your vehicle's system and its current status. It should take five to ten minutes, about the time it takes to fill your car. Is this ok with you?

[INTERVIEWER: CONTINUING WITH INTERVIEW?]


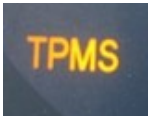



1. YES
2. NO

///**IF INTRO1A=2 SKIP TO END: SET DISPO=26, Refusal at INTRO1A**///

///**ASK IF INTRO1A=1, Continuing with interview**///

TPMSDASH Looking at these pictures - and allowing for minor variations in style - please point to those items that you have seen on your vehicle's dash at any time in the past, either when starting the engine or later when the vehicle was running.

[INTERVIEWER: SHOW RESPONDENT IMAGES OF TPMS SYMBOLS]

1.		2.	
3.		4.	
5.			

///**ASK IF INTRO1A=1**///

TPMSDASHA What does this light/these lights mean to you? [INTERVIEWER: BACKCODE RESPONSE; IF NECESSARY, ASK WHAT LIGHT(S) MEANS WITH REGARD TO SPECIFIC VEHICLE SYSTEMS]

1. RELATED TO TIRE PRESSURE/TPMS
2. OTHER
98. DON'T KNOW
99. REFUSED

///ASK IF INTRO1A=1, Continuing with interview///

DASHINT1 Let's check your vehicle's dash to see what lights are coming on. Can my partner do that now, while we are talking? Afterward, you can fuel your car while we finish the survey.

[Training note: Pause to provide educational materials and allow respondent to begin refueling vehicle as soon as ignition test is complete.]

1. YES
2. NO

///IF DASHINT1=2 SKIP TO END: SET DISPO=30, Refused dash inspection///

///ASK IF DASHINT1=1, Permission for dash inspection///

TPMSMALF [INTERVIEWER: ENTER CODE BASED ON OBSERVER VEHICLE INSPECTION: CURRENT TPMS STATUS]

1. INDICATOR(S) @ ON, SYSTEM MALF @ START
2. INDICATOR(S) @ ON, LOW PRESSURE ONLY @ START
3. NO INDICATOR(S) @ ON, NO INDICATOR(S) @ START
4. INDICATOR(S) @ ON, NO INDICATOR(S) @ START
5. STATUS UNCLEAR

//ASK IF TPMSMALF IN (01,02,03,04,05)

MALFCFRM DISPLAY TPMSMALF CODE (01-05) ENTERED BY INTERVIEWER
INTERVIEWER: REPORT CODE TO VEHICLE INSPECTOR FOR MATCH CONFIRMATION

Does your code match the vehicle inspector code?

1. YES
2. NO [GO BACK TO TPMSMALF]

///ASK IF TPMSMALF=5, AND SET DISPO=35, TPMS STATUS UNCLEAR FROM DASH INSPECTION///

SCREEN0 I won't have any more questions for you today. Thanks for your time.

1. CONTINUE

///ASK IF DASHINT1=1, Permission for dash inspection///

RENTAL Is this vehicle a short-term rental or part of a car sharing service, such as a Zipcar?
[INTERVIEWER: SHORT-TERM=1 MONTH OR LESS; CAR-SHARE=SHORT_TERM HOURLY RENTAL]

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF RENTAL=1,98,99, Vehicle is rental/Zipcar///

SCREEN1 I won't have any further questions for you today, since we're only surveying vehicles that are owned or leased. Thanks for your time.

1. CONTINUE

///**IF RENTAL=1,98,99, SKIP TO END: SET DISPO=27, Screened out: Rental/Zip car ///**

///**ASK IF RENTAL=2, Not a rental/Zipcar ///**

MY_VIN1 To get some basic information about your vehicle, like make and model, I need to scan the vehicle's ID number. This number will not be stored in my system. Can I do that now?

1. YES
2. NO

///**IF MY_VIN1=1, Permission obtained for VIN scan ///**

[INTERVIEWER: PROCEED TO SCAN VIN]

///**ASK IF MY_VIN1=1, Permission obtained for VIN scan ///**

MY_VIN2 **[INTERVIEWER: VIN SCAN SUCCESSFUL?]**

1. YES
2. NO

///**IF MY_VIN2 = 1 THEN SET MODELYEAR = MY EXTRACTED FROM VIN SCAN ///**

///**ASK IF MY_VIN1=2 OR MY_VIN2=2, Refused or Failed to obtain successful VIN scan ///**

MY_BPILLAR1 Can I look at the vehicle information sticker inside the driver's-side door?

1. YES
2. NO

///**ASK IF MY_BPILLAR1=01, Permission obtained for B pillar sticker inspection ///**

MY_BPILLAR2 **[INTERVIEWER: MODEL YEAR OBTAINED FROM B PILLAR STICKER?]**

1. YES
2. NO

///**ASK IF MY_BPILLAR2=1, Obtained model year from B pillar sticker ///**

MODELYEAR **[INPUT MODEL YEAR]**

/RECORD YEAR: RANGE = 1940-2015/

///**ASK IF MY_BPILLAR1=2 OR MY_BPILLAR2=2, Refused or Failed to obtain model year from B pillar sticker ///**

MY_MANUAL1 Do you have a copy of the owner's manual that I could check?

[IF NECESSARY: Could you please grab that manual for me?]

1. YES
2. NO

///**ASK IF MY_MANUAL1=1, Obtained owner's manual ///**

MY_MANUAL2 **[INTERVIEWER: MODEL YEAR OBTAINED FROM OWNER'S MANUAL?]**

1. YES
2. NO

///**ASK IF MY_MANUAL2=1, Obtained model year from owner's manual ///**

MODELYEAR **[INPUT MODEL YEAR]**

/RECORD YEAR: RANGE = 1940-2015/

///ASK IF MY_MANUAL1=2 OR MY_MANUAL2=2, Refused or failed to obtain model year from owner's manual ///

MY_RECALL1 What is the model year of this vehicle?
[IF NECESSARY: The year the vehicle was made.]
[IF NECESSARY: Your best guess about the year.]
/RECORD NUMBER: 1940 - 2015/
9998. DON'T KNOW
9999. REFUSED

///IF MY_RECALL1 IN (1940:2015) THEN SET MODELYEAR = MY_RECALL1 ///

///ASK IF MY_RECALL1=9998, Don't know exact model year///

MY_RECALL2 Is the model year of this vehicle 2004 or later?
1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///IF MY_RECALL2 = 1 THEN SET MODELYEAR = 3333 ///

///IF MY_RECALL2 = 2 THEN SET MODELYEAR = 1111 ///

///IF MY_RECALL1=9999 OR MY_RECALL2=98,99 SKIP TO END: SET DISPO=28, Unable to determine model year///

///IF MODELYEAR<2004///

SCREEN2 It appears your vehicle was manufactured prior to 2004. I won't have any further questions for you today, since we're only surveying vehicles from model year 2004 to present. Thanks for your time.
1. CONTINUE

///IF MODELYEAR<2004

SKIP TO END: SET DISPO=29, SCREENED OUT: Model year < 2004
Communicate to observer that case screened out

///

///ASK IF DASHINT1=1, Permission obtained for dash inspection///

PRIM1A Are you the main driver of this vehicle?
[IF NECESSARY: Are you the person who drives this vehicle most frequently?]
1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF DASHINT1=1, Permission obtained for dash inspection///

PRIM1B Are you mainly responsible for having this vehicle repaired or serviced, other than just refueling?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF PRIM1A=2,98,99 AND PRIM1B=2,98,99, Respondent is not primary driver and not primary for upkeep///

PRIM1C Is the main driver of this vehicle, or the person responsible for its upkeep, here with you?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF PRIM1C=2,98,99, Primary driver/upkeep not with respondent///

SCREEN3 I won't have any further questions for you today, since we're only surveying drivers who are primarily responsible for the upkeep of their car. Thanks for your time.

1. CONTINUE

///IF PRIM1C=2,98,99 SKIP TO END: SET DISPO=31, SCREENED OUT: Primary driver/upkeep not with respondent///

///ASK IF PRIM1C=1///

PRIM1D Can I speak with that person?
[IF NECESSARY: I need to talk in-person.]

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF PRIM1D=2,98,99, Could not speak to primary driver/upkeep///

SCREEN4 I won't have any further questions for you today, since we're only surveying drivers who are primarily responsible for the upkeep of their car. Thanks for your time.

1. CONTINUE

///IF PRIM1D=2,98,99 SKIP TO END: SET DISPO=32, SCREENED OUT: Could not speak to primary driver/upkeep///

///ASK IF PRIM1D=1///

INTRO1B Hi, I'm _____. My partner and I are conducting a survey for the US Department of Transportation about tire pressure monitoring systems. We would like to ask you some quick questions and give you some information about your vehicle's system and its current status. It should take five to ten minutes, about the time it takes to fill your car. Is this ok with you?
[INTERVIEWER: CONTINUING WITH INTERVIEW?]
1. YES
2. NO

///IF INTRO1B=2 SKIP TO END: SET DISPO=33, Refusal after transfer///

///ASK IF INTRO1B=1///

PRIM2A Are you the main driver of this vehicle?
[IF NECESSARY: Are you the person who drives this vehicle most frequently?]
1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF INTRO1B=1///

PRIM2B Are you mainly responsible for having this vehicle repaired or serviced, other than just refueling?
1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF PRIM2A=2,98,99 AND PRIM2B=2,98,99, Unable to locate primary driver/upkeep ///

SCREEN5 I won't have any further questions for you today, since we're only surveying drivers who are primarily responsible for the upkeep of their car. Thanks for your time.
1. CONTINUE

///IF PRIM2A=2,98,99 AND PRIM2B=2,98,99 SKIP TO END: SET DISPO=34, SCREENED OUT, Unable to locate primary driver/upkeep///

At this point, the primary driver or upkeeper has been located (if not original respondent) and agreed to participate (confirmed within-range model year and agreed to dash inspection); all others have screened out.

///ASK IF PRIM1A=1 OR PRIM1B=1 OR PRIM2A=1 OR PRIM2B=1, Located eligible respondent///

TPMSEQ Some vehicles are equipped with a tire pressure monitoring system (known as TPMS). The TPMS checks the air in each tire. If the air pressure in any of the tires is low, a dash light comes on. Is this vehicle equipped with a TPMS—whether or not it is currently working?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF TPMSEQ=2,98,99 AND TPMSMALF=3, Phase-in vehicle, no indication of TPMS, not reported as equipped///

SCREEN8 I won't have any further questions for you today. Thanks for your time.

1. CONTINUE

///IF SCREEN8=1 SET DISPO=37, Screen Out: Phase-in vehicle, no indication of TPMS, not reported as equipped

///ASK IF TPMSEQ=1, Respondent reports vehicle is equipped with TPMS///

TPMSTYPE There are two basic types of TPMS systems. A "direct" TPMS has a sensor in the valve stem or the wheel of each tire that measures the tire's air pressure. An "indirect" TPMS has wheel-speed sensors in the anti-lock braking system of each tire that calculate the tire's air pressure. Is the TPMS system in this vehicle direct or indirect?

1. DIRECT
2. INDIRECT
98. DON'T KNOW
99. REFUSED

///ASK IF TPMSEQ=1, Respondent reports vehicle is equipped with TPMS///

RECALIB Occasionally the TPMS system in a vehicle may need to be "reset" or recalibrated. Do you know what would be required to recalibrate the TPMS system in this vehicle?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF PRIM1A=1 OR PRIM1B=1 OR PRIM2A=1 OR PRIM2B=1, Located eligible respondent///

NEXTVEH How important is it to you that your next personal vehicle be equipped with a TPMS system? Would you...

1. Strongly prefer the vehicle be equipped with TPMS?
2. Somewhat prefer the vehicle be equipped with TPMS?
3. Have no preference whether the vehicle is equipped with TPMS?
4. Somewhat prefer the vehicle NOT be equipped with TPMS?
5. Strongly prefer the vehicle NOT be equipped with TPMS?
98. DON'T KNOW
99. REFUSED

///ASK IF 2004≤MODELYEAR≤2007 AND TPMSEQ=1 AND TPMSMALF=3, Vehicle manufactured during phase-in is said to be equipped but no indicator lights @ ON///

DISABLE1 You said earlier that your vehicle is equipped with TPMS, but during our vehicle inspection we were not able to confirm that your vehicle has a functioning TPMS system. Has the TPMS system in this vehicle been disabled?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///

IF DISABLE1=1 THEN DO:

**IF STILL NEED DISABLED INTERVIEWS, SKIP TO MODULE DISABLED
ELSE SKIP TO SCREEN6**

///

///ASK IF DISABLE1=2,98,99 AND SET DISPO=36, Phase-in vehicle, no indication of TPMS, not reported as disabled ///

SCREEN7 I won't have any further questions for you today. Thanks for your time.

1. CONTINUE

///ASK IF MODELYEAR≥2008 AND TPMSMALF=3, Vehicle manufactured after phase-in (known to be equipped) but no indicator lights @ ON///

DISABLE2 Based on the model year of your vehicle, it should have been manufactured with a TPMS system, but during our vehicle inspection we were not able to confirm that your vehicle has a functioning TPMS system. Has the TPMS system in this vehicle been disabled?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF

((TPMSMALF=01 OR DISABLE1=01 OR DISABLE2=01,02,98,99) AND NUMBER OF COMPLETES WITH (DISPO 61, 63, 64, 66) >= 350)

OR

(TPMSMALF =02,04 AND NUMBER OF COMPLETES WITH (DISPO 67, 68) >= 350)

///

SCREEN6 I won't have any further questions for you today. Thanks for your time.

1. CONTINUE

Respondents continuing past this point will be given a complete ("in-depth") interview.

///**ASK IF TPMSMALF=1,2,4, Indicator lights on @ ON**///

INTRO1C When we checked your dash lights, we found that your vehicle is equipped with TPMS. As I mentioned earlier, the TPMS checks the air in each tire, and if the air pressure in any of the tires is low, a dash light comes on. This same dash light will flash or a separate TPMS malfunction light will come on if the TPMS system malfunctions - for example, due to a damaged pressure sensor. Properly inflating all of the vehicle's tires should cause the low pressure light to turn off, but it will NOT fix a malfunctioning TPMS system and the TPMS malfunction light will not turn off. This survey is specifically concerned with TPMS system malfunctions.

1. CONTINUE

///**IF DISABLE2=1 SKIP TO MODULE DISABLED**///

///**IF DISABLE2=2,98,99 SKIP TO MODULE MALFUNCTION #3**///

///**IF TPMSMALF=1 SKIP TO MODULE MALFUNCTION #1**///

///**IF TPMSMALF=2 SKIP TO MODULE MALFUNCTION #2**///

///**IF TPMSMALF=4 SKIP TO MODULE PAST MALFUNCTION #1**///

END MODULE INTRO

MODULE DISABLED: IF DISABLE1=1 OR DISABLE2=1 OR (LASTAF=10 AND TPMSMALF NE 3)

This module is entered by any respondents who report that the TPMS system in their vehicle was disabled.

///ASK IF DISABLE1=1 OR DISABLE2=1///

DIS_OTH2 Who disabled the TPMS system in this vehicle?

1. RESPONDENT
2. MECHANIC/REPAIR FACILITY
3. FRIEND
4. RELATIVE
5. OTHER
98. DON'T KNOW
99. REFUSED

///ASK IF DISABLE1=1 OR DISABLE2=1///

DIS_HOW What was done to disable the TPMS system in this vehicle?

[SELECT ALL THAT APPLY]

1. REMOVED TIRE PRESSURE SENSORS
2. MODIFIED BRAKE SYSTEM/WHEELSPEED SENSORS
3. DISABLED ON-BOARD COMPONENTS
4. PULLED BULB OR FUSE
5. COVERED UP DASH LIGHT
6. OTHER
7. NOTHING
98. DON'T KNOW
99. REFUSED

///ASK IF DISABLE1=1 OR DISABLE2=1///

DIS_COST How much did it cost to disable the TPMS system? [INTERVIEWER: PROBE FOR NEAREST WHOLE NUMBER VALUE]

1. \$0.00
2. \$1 - \$49
3. \$50 - \$99
4. \$100 - \$299
5. \$300 - \$499
6. \$500 - \$999
7. \$1,000 OR MORE
98. DON'T KNOW
99. REFUSED

///ASK IF DISABLE1=1 OR DISABLE2=1///

DIS_WHY What was the primary reason you decided to disable the TPMS system in this vehicle?

[INTERVIEWER: BACKCODE]

1. TO GET THE DASH WARNING LIGHTS TO TURN OFF
2. TPMS IS NOT NECESSARY FOR VEHICLE OPERATION
3. TPMS WAS FAULTY/INACCURATE
4. TPMS WAS DISTRACTING/IRRITATING
5. TPMS IS TOO EXPENSIVE TO MAINTAIN/REPAIR
6. OTHER
98. DON'T KNOW
99. REFUSED

/// SKIP TO MODULE PAST MALFUNCTION #1 ///

END MODULE DISABLED: IF DISABLE1=1 OR DISABLE2=1 OR (LASTAF=10 AND TPMSMALF NE 3)

MODULE MALFUNCTION #1: IF TPMSMALF=1

This module is entered by respondents experiencing TPMS Malfunction #1: TPMS System Malfunction indicator is currently illuminated.

///ASK IF TPMSMALF=1///

MALF1AW1 Are you aware that a TPMS dash light is currently on in your vehicle?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF MALF1AW1=1///

MALF1AW1A What does this light mean to you? [INTERVIEWER: BACKCODE RESPONSE; IF NECESSARY, ASK WHAT LIGHT MEANS WITH REGARD TO SPECIFIC VEHICLE SYSTEMS]

1. LOW TIRE PRESSURE
2. TPMS MALFUNCTION
3. OTHER
98. DON'T KNOW
99. REFUSED

///ASK IF MALF1AW1=1, Aware that TPMS Malfunction light is on///

MALF1AW2 How long has this malfunction light been on? If the light has been turning on and off intermittently, please think back to the first time you noticed that the light was on.

1. LESS THAN 1 WEEK
2. 1 - 2 WEEKS
3. 3 - 4 WEEKS
4. 1 - 6 MONTHS
5. 7 - 12 MONTHS
6. MORE THAN 1 YEAR
98. DON'T KNOW
99. REFUSED

///ASK IF MALF1AW1=1, Aware that TPMS Malfunction light is on///

MALF1AF1A Did any of the following events occur shortly before the TPMS system malfunction light came on?

[SELECT ALL THAT APPLY]

1. The tires were rotated
2. Specialty (e.g., seasonal or off-road) tires were switched out
3. One or more new tires or wheels were installed or replaced
4. One or more tire stems were installed or replaced
5. One or more tire pressure sensors were installed or replaced
6. Work was performed on the braking system
7. Work was performed to on the on-board computer system
8. The vehicle was involved in an accident
9. The vehicle experienced an extended period of flooding / snow
10. Anything else?
11. NONE OF THE ABOVE
98. DON'T KNOW
99. REFUSED

///ASK IF MALF1AW1=2,98,99, Not aware that TPMS Malfunction light is on///

MALF1AF1B Did any of the following events occur recently?

[SELECT ALL THAT APPLY]

1. The tires were rotated
2. Specialty (e.g., seasonal or off-road) tires were switched out
3. One or more new tires or wheels were installed or replaced
4. One or more tire stems were installed or replaced
5. One or more tire pressure sensors were installed or replaced
6. Work was performed on the braking system
7. Work was performed to on-board computer system
8. The vehicle was involved in an accident
9. The vehicle experienced an extended period of flooding / snow
10. Anything else?
11. NONE OF THE ABOVE
98. DON'T KNOW
99. REFUSED

///ASK IF MALF1AF1A=4,5 OR MALF1AF1B=4,5, Tire stems/sensors replaced///

MALF1AF2 Did you install or replace the tire stems or tire pressure sensors yourself?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF MALF1AF1A=4,5 OR MALF1AF1B=4,5, Tire stems/sensors replaced///

MALF1AF3 How much did this work cost? [INTERVIEWER: PROBE FOR NEAREST WHOLE NUMBER VALUE]

1. \$0.00
2. \$1 - \$49
3. \$50 - \$99
4. \$100 - \$299
5. \$300 - \$499
6. \$500 - \$999
7. \$1,000 OR MORE
98. DON'T KNOW
99. REFUSED

///ASK IF MALF1AW1=1, Aware that TPMS Malfunction light is on///

MALFIX1 Has anyone explained to you what needs to be done to make the malfunction light turn off?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF MALFIX=1, Someone explained how to correct malfunction///

- MALFIX2 Who explained this to you?**
[INTERVIEWER: SELECT ALL THAT APPLY]
1. RELATIVE/FRIEND/COLLEAGUE
 2. DEALERSHIP/AUTO REPAIR SHOP/MECHANIC
 3. OWNER'S MANUAL
 4. OTHER BOOK, MAGAZINE, OR ARTICLE
 5. TV OR RADIO
 6. INTERNET
 7. SOCIAL MEDIA (E.G., FACEBOOK, TWITTER, YOUTUBE)
 8. OTHER
 98. DON'T KNOW
 99. REFUSED

///ASK IF MALFIX=1, Someone explained how to correct malfunction///

- MALFIX3 What were you told needed to be done to correct the malfunction? [INTERVIEWER: IF THE DRIVER PROVIDES MORE THAN ONE ACTION, ASK THE DRIVER TO STATE THE MOST IMPORTANT ACTION THEY WERE TOLD TO TAKE]**
1. RECALIBRATION
 2. REPAIR/REPLACE DIRECT OR INDIRECT PRESSURE SENSORS
 3. REPAIR/REPLACE ON-BOARD COMPONENTS (HARDWARE OR SOFTWARE)
 4. OTHER: SPECIFY
 98. DON'T KNOW
 99. REFUSED

///ASK IF MALF1AW1=1, Aware that TPMS Malfunction light is on///

- MALCOST1A Have you had the work required to correct the TPMS system malfunction priced (whether or not you had the work done)?**
1. YES
 2. NO
 98. DON'T KNOW
 99. REFUSED

///ASK IF MACLOST1A=1, Had the work priced///

- MALCOST1B What was the price for this work? [INTERVIEWER: PROBE FOR NEAREST WHOLE NUMBER VALUE]**
1. \$0.00
 2. \$1 - \$49
 3. \$50 - \$99
 4. \$100 - \$299
 5. \$300 - \$499
 6. \$500 - \$999
 7. \$1,000 OR MORE
 98. DON'T KNOW
 99. REFUSED

///ASK IF MALCOST1A=2,98,99, Haven't had repair priced/DK/REF ///

MALCOST2A Do you have a general idea of what the price to repair the system would be?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF MALCOST2A=1, Has an idea of cost of work///

MALCOST2B What is your estimate of the price to perform this repair? [INTERVIEWER: PROBE FOR NEAREST WHOLE NUMBER VALUE]

1. \$0.00
2. \$1 - \$49
3. \$50 - \$99
4. \$100 - \$299
5. \$300 - \$499
6. \$500 - \$999
7. \$1,000 OR MORE
98. DON'T KNOW
99. REFUSED

///ASK IF MALF1AW1=1, Aware that TPMS Malfunction light is on///

MALFIX4 Do you plan to correct the current malfunction in the system?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF MALFIX4=1, Plan to correct malfunction///

MALFIX5 How do you plan to correct the current malfunction?

1. TAKE MY VEHICLE INTO THE DEALERSHIP OR REPAIR FACILITY WITHIN THE NEXT TWO WEEKS
2. TAKE MY VEHICLE INTO THE DEALERSHIP OR REPAIR FACILITY WHEN I HAVE THE TIME
3. ORDER THE PARTS AND REPAIR IT MYSELF
4. REPAIR IT MYSELF WITH THE HELP OF OTHERS
5. OTHER
98. DON'T KNOW
99. REFUSED

///ASK IF MALFIX4=2, No plan to correct malfunction///

MALFIX6 What is the primary reason you are not planning to repair the current malfunction in the system?

[INTERVIEWER: BACKCODE]

1. CURRENTLY USING SEASONAL TIRES AND WILL SWITCH TIRES OUT WHEN THE WEATHER PERMITS, WHICH SHOULD FIX THE PROBLEM
2. CANNOT AFFORD THE COST TO REPAIR
3. TPMS SYSTEM IS A LUXURY AND NOT NECESSARY FOR THE OPERATION OF THE VEHICLE
4. IT IS NOT MANDATED BY THE STATE THAT I REPAIR THE SYSTEM
5. WILL BE SELLING / GETTING RID OF THIS CAR SHORTLY
6. NOT SURE THE TPMS MALFUNCTION INDICATOR IS ACCURATE
7. TOO INCONVENIENT/IT'S JUST A NUISANCE
8. OTHER
98. DON'T KNOW
99. REFUSED

///IF MALFIX6=6, Not sure if TPMS indicator is accurate///

MALCONF Why do you think the TPMS system malfunction indicator is inaccurate?

[IF NECESSARY: What is the primary reason?]

[INTERVIEWER: BACKCODE]

1. THE TPMS MALFUNCTION LIGHT HAS COME ON BEFORE AND TURNED OFF BY ITSELF, WITHOUT ANY REPAIRS
2. HEARD FROM OTHER SOURCES THAT IT MAY BE INACCURATE
3. OTHER
4. NO SPECIFIC REASON
98. DON'T KNOW
99. REFUSED

///ASK IF MALCONF NE 1 OR MALF1AW1=2,98,99, Driver does not say TPMS malfunction light is flashing intermittently OR Not aware that TPMS Malfunction light is on ///

MALPREV1 A previous malfunction would be an episode in which the TPMS system malfunction light turned on and then turned off and remained off for at least one week, either by itself or due to servicing the vehicle. Aside from the current malfunction, have there been any previous malfunctions of the TPMS system?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///**ASK IF MALCONF=1 OR MALPREV=1, Previous malfunction episode reported**///

MALPREV2 Other than the current malfunction, how many times has the TPMS system malfunctioned?

1. 1 OTHER TIME
2. 2 - 4 OTHER TIMES
3. 5 OR MORE OTHER TIMES
98. DON'T KNOW
99. REFUSED

///**SKIP TO MODULE CLOSE**///

END MODULE MALFUNCTION #1: IF TPMSMALF=1

MODULE MALFUNCTION #2: IF TPMSMALF=2

This module is entered by respondents experiencing TPMS Malfunction #2: TPMS Low Tire Pressure indicator is currently illuminated.

///ASK IF TPMSMALF=2///****

MALF2AW1 Are you aware that a TPMS dash light is currently on in your vehicle?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF MALF2AW1=01///****

MALF2AW1A What does this light mean to you? [INTERVIEWER: BACKCODE RESPONSE; IF NECESSARY, ASK WHAT LIGHT MEANS WITH REGARD TO SPECIFIC VEHICLE SYSTEMS]

1. LOW TIRE PRESSURE
2. TPMS MALFUNCTION
3. OTHER
98. DON'T KNOW
99. REFUSED

///IF MALF2AW1=2,98,99 SKIP TO MODULE PAST MALFUNCTION #1///****

///ASK IF MALF2AW1=1, Aware that low tire pressure light is on///****

MALF2FIX1 Since this light came on, have you checked the pressure in any of your tires?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF MALF2FIX1=1, Checked tire pressure///****

MALF2FIX2 Were all of the checked tires properly inflated?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF MALF2AW1=1, Aware that low tire pressure light is on///****

MALF2AW2 How long has the low tire pressure light been on? If the light has been turning on and off intermittently, please think back to the first time you noticed that the light was on.

1. LESS THAN 1 WEEK
2. 1 - 2 WEEKS
3. 3 - 4 WEEKS
4. 1 - 6 MONTHS
5. 7 - 12 MONTHS
6. MORE THAN 1 YEAR
98. DON'T KNOW
99. REFUSED

///IF MALF2FIX1=2,98,99 OR MALF2FIX2=2,98,99, SKIP TO MODULE PAST MALFUNCTION #1///

///ASK IF MALF2FIX2=1, Verified all tires properly inflated///

MALF2AF1 Your TPMS system may be malfunctioning. Did any of the following events occur shortly before the low pressure light came on?

[SELECT ALL THAT APPLY]

1. The tires were rotated
2. Specialty (e.g., seasonal or off-road) tires were switched out
3. One or more new tires or wheels were installed or replaced
4. One or more tire stems were installed or replaced
5. One or more tire pressure sensors were installed or replaced
6. Work was performed on the braking system
7. Work was performed to on-board computer system
8. The vehicle was involved in an accident
9. The vehicle experienced an extended period of flooding / snow
10. The TPMS system was intentionally disabled
11. Anything else?
12. NONE OF THE ABOVE
98. DON'T KNOW
99. REFUSED

///ASK IF MALF2AF1=4,5, Tire stems/sensors replaced///

MALF2AF2 Did you install or replace the tire stems or tire pressure sensors yourself?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF MALF2AF1=4,5, Tire stems/sensors replaced///

MALF2AF3 How much did this work cost? [INTERVIEWER: PROBE FOR NEAREST WHOLE NUMBER VALUE]

1. \$0.00
2. \$1 - \$49
3. \$50 - \$99
4. \$100 - \$299
5. \$300 - \$499
6. \$500 - \$999

///ASK IF MALF2AF1=6, Work done to brake system///

MALF2AF4 Did you perform the work on the braking system yourself?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF MALF2AF1=6, Work done to brake system///

MALF2AF5 How much did this work cost? [INTERVIEWER: PROBE FOR NEAREST WHOLE NUMBER VALUE]

1. \$0.00
2. \$1 - \$49
3. \$50 - \$99
4. \$100 - \$299
5. \$300 - \$499
6. \$500 - \$999

///SKIP TO MODULE PAST MALFUNCTION #1///

END MODULE MALFUNCTION #2: IF TPMSMALF=2

MODULE MALFUNCTION #3: IF TPMSMALF=3 AND DISABLE2=2,98,99

This module is entered by respondents experiencing TPMS Malfunction #3: Vehicle is known to be equipped with TPMS and respondent denied disabling system, but no TPMS lights are illuminated at ON position.

///ASK IF TPMSMALF=3 AND DISABLE2=2,98,99///

MALF3RE At any time since you've had this vehicle, have you seen any TPMS dash lights on?
[IF NECESSARY: SHOW RESPONDENT IMAGES OF TPMS INDICATOR LIGHTS]

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF MALF3RE=1, Has seen TPMS indicator light previously///

MALF1AW2 When was the last time you noticed a TPMS dash light turned on?

1. LESS THAN 1 WEEK AGO
2. 1 - 2 WEEKS AGO
3. 3 - 4 WEEKS AGO
4. 1 - 6 MONTHS AGO
5. 7 - 12 MONTHS AGO
6. MORE THAN 1 YEAR AGO
98. DON'T KNOW
99. REFUSED

///ASK IF TPMSMALF=3 AND DISABLE2=2,98,99///

MALF3AF Since you've had this vehicle, have any of the following events occurred?
[SELECT ALL THAT APPLY]

1. The vehicle was involved in an accident
2. Service was performed that did or may have involved the vehicle's electrical wiring
3. The vehicle experienced an extended period of flooding / snow
4. Anything else?
5. NONE OF THE ABOVE
98. DON'T KNOW
99. REFUSED

///SKIP TO MODULE PAST MALFUNCTION #1///

END MODULE MALFUNCTION #3: IF TPMSMALF=3 AND DISABLE2=2,98,99

MODULE PAST MALFUNCTION #1: IF TPMSMALF=2,3,4

This module is entered by all respondents except those currently experiencing TPMS Malfunction #1 (TPMS System Malfunction indicator is illuminated). Purpose is to gather data about this kind of malfunction if it happened in the past (when not currently indicated).

///ASK IF MODELYEAR>2007 AND TPMSEQ IN 2,98,99 AND TPMSMALF=3///****

REMIND1 Earlier you indicated that your vehicle may not be equipped with a TPMS system, but based on the model year the vehicle should be equipped with TPMS.

1. CONTINUE

///ASK IF TPMSMALF=2,3,4///****

MALEVER Has the TPMS system malfunction dash light ever been on and stayed on while you were driving this vehicle?

[IF NECESSARY: SHOW RESPONDENT IMAGES OF MALFUNCTION INDICATOR LIGHT]

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF MALEVER=1, System malfunction light has been illuminated previously///****

LASTMAL When was the last time the TPMS system malfunction light was on?

1. LESS THAN A MONTH AGO
2. 1 - 6 MONTHS AGO
3. 7 - 12 MONTHS AGO
4. 1 - 2 YEARS AGO
5. 3 OR MORE YEARS AGO
98. DON'T KNOW
99. REFUSED

///ASK IF MALEVER=1, System malfunction light has been illuminated previously///****

LASTACT1 Did you take any action in response to the indicator light?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF LASTACT1=1, Took some action in response to malfunction light///****

LASTACT2 What needed to be done to correct the malfunction?

1. RECALIBRATION
2. REPAIR/REPLACE DIRECT OR INDIRECT PRESSURE SENSORS
3. REPAIR/REPLACE ON-BOARD COMPONENTS (HARDWARE OR SOFTWARE)
4. REPAIRS, OTHER THAN ABOVE
5. OTHER REPAIRS, SPECIFICS UNKNOWN
6. OTHER
98. DON'T KNOW
99. REFUSED

///ASK IF LASTACT1=1, Took some action in response to malfunction light///

LASTACT3 What actions did you take in response?

1. REPAIRED THE SYSTEM MYSELF
2. DISABLED THE SYSTEM
3. HAD THE DEALER / REPAIR FACILITY REPAIR THE SYSTEM
4. HAD THE DEALER / REPAIR FACILITY DISABLE THE SYSTEM
5. PURCHASED NEW TIRES AND TIRE PRESSURE MONITORING SENSORS
6. NONE, BECAUSE THE MALFUNCTION INDICATOR TURNED OFF ON ITS OWN
7. OTHER
98. DON'T KNOW
99. REFUSED

///ASK IF MALEVER=1, System malfunction light has been illuminated previously///

LASTAF Did any of the following events occur shortly before the TPMS system malfunction light came on?

[SELECT ALL THAT APPLY]

1. The tires were rotated
2. Specialty (e.g., seasonal or off-road) tires were switched out
3. One or more new tires or wheels were installed or replaced
4. One or more tire stems were installed or replaced
5. One or more tire pressure sensors were installed or replaced
6. Work was performed on the braking system
7. Work was performed to on-board computer system
8. The vehicle was involved in an accident
9. The vehicle experienced an extended period of flooding / snow
10. The TPMS system was intentionally disabled
11. Anything else?
12. NONE OF THE ABOVE
98. DON'T KNOW
99. REFUSED

///ASK IF LASTAF=4,5, Tire stems/sensors replaced///

LASTFIX1 Did you install or replace the tire stems or tire pressure sensors yourself?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF LASTAF=4,5, Tire stems/sensors replaced///

LASTFIX2 How much did this work cost? [INTERVIEWER: PROBE FOR NEAREST WHOLE NUMBER VALUE]

1. 0.00
2. \$1 - \$49
3. \$50 - \$99
4. \$100 - \$299
5. \$300 - \$499
6. \$500 - \$999
7. \$1,000 OR MORE
98. DON'T KNOW
99. REFUSED

///ASK IF LASTAF=6, Work done to brake system///

MALF2AF4 Did you perform the work on the braking system yourself?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF LASTAF=6, Work done to brake system///

MALF2AF5 How much did this work cost? [INTERVIEWER: PROBE FOR NEAREST WHOLE NUMBER VALUE]

1. 0.00
2. \$1 - \$49
3. \$50 - \$99
4. \$100 - \$299
5. \$300 - \$499
6. \$500 - \$999

///IF LASTAF=10 AND TPMSMALF NE 3, SKIP TO MODULE DISABLED, THEN RETURN///

///SKIP TO MODULE CLOSE///

END MODULE PAST MALFUNCTION #1

MODULE CLOSE

All respondents enter this module.

///**ASK ALL**///

TDRIVE **How long have you had this vehicle?**

1. LESS THAN 1 YEAR
2. 1 YEAR
3. 2 YEARS
4. 3 YEARS
5. 4 YEARS
6. 5 YEARS
7. 6 YEARS
8. 7 YEARS
9. 8 YEARS
10. 9 YEARS
11. 10 YEARS
12. MORE THAN 10 YEARS
98. DON'T KNOW
99. REFUSED

///**ASK ALL**///

MAINT2A **Does this vehicle currently have a manufacturer warranty or other vehicle protection/extended maintenance plan?**

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///**ASK IF MAINT2A=1**///

MAINT2B **Is this the original manufacturer warranty?**

1. Yes
2. NO
98. DON'T KNOW
99. REFUSED

///ASK ALL///

AIR1 **Where would you look to find the pressure required for correct inflation of the tires on this vehicle?**

[INTERVIEWER: BACKCODE RESPONSE]

1. ON THE TIRE WALL
2. DOOR PLACARD
3. OWNER'S MANUAL
4. RELATIVE/FRIEND/COLLEAGUE
5. DEALERSHIP/AUTO REPAIR SHOP/MECHANIC
6. OWNER'S MANUAL
7. OTHER BOOK, MAGAZINE, OR ARTICLE
8. TV OR RADIO
9. INTERNET
10. SOCIAL MEDIA (E.G., FACEBOOK, TWITTER, YOUTUBE)
11. OTHER
98. DON'T KNOW
99. REFUSED

///ASK ALL///

AIR2 **Do you know how to inflate your tires to the correct pressure?**

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK ALL///

TRYFIX1 **Has the TPMS low tire pressure light in your dash ever come on and remained on after driving your vehicle?**

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF TRYFIX1=1, Had low pressure light come on///

TRYFIX2 **Did you or someone else add air to the tires after this light came on?**

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF TRYFIX2=1, Had low pressure light come on and then added air to tires///

TRYFIX3 **Did the TPMS low tire pressure light continue to stay on even after adding air to the tires and driving?**

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF MALEVER=2, Has never experienced a TPMS system malfunction///

HYPMAL1 If the TPMS malfunction light turned on, indicating a problem with the system itself, would you take any action to fix the problem?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF HYPMAL1=1, Would take action to fix a TPMS malfunction///

HYPMAL2 What action would you most likely take in response?
[IF NECESSARY: What would be your primary action?]
[INTERVIEWER: BACKCODE]

1. HAVE THE DEALER / REPAIR FACILITY REPAIR THE SYSTEM
2. ORDER THE PARTS AND REPAIR THE SYSTEM MYSELF
3. HAVE THE DEALER / REPAIR FACILITY DISABLE THE SYSTEM
4. DISABLE THE SYSTEM MYSELF
5. OTHER
98. DON'T KNOW
99. REFUSED

///ASK IF HYPMAL1=1, Would take action to fix a TPMS malfunction///

HYPMAL3 How quickly would you try to get the problem fixed?

1. I WOULD FIX IT AS SOON AS I COULD GET THE VEHICLE TO THE SHOP
2. I WOULD HAVE IT FIXED, BUT TIMING WOULD DEPEND UPON THE COST OF REPAIR
3. I WOULD HAVE IT FIXED AT MY NEXT SCHEDULED MAINTENANCE APPOINTMENT (INCLUDING OIL CHANGE, TIRE ROTATION, ETC.)
4. I WOULD NOT FIX IT UNTIL I WAS GOING TO GET RID OF THE CAR
5. I DOUBT I WOULD HAVE IT FIXED
98. DON'T KNOW
99. REFUSED

///

IF MALFIX5=1,2,3 OR LASTACT3=3,4,5 OR MALF1AF1A=4,5 OR MALF1AF1B=4,5 OR MALF2AF1=4,5 OR LASTAF=4,5 OR HYPMAL2=1,2,3 THEN AUTOPUNCH PAYFIX1=1, Has already indicated spending money to repair TPMS

ELSE, ASK ALL

///

PAYFIX1 Would you ever be willing to spend money to repair a malfunctioning TPMS system?

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK IF PAYFIX1=1, Willing to spend money on TPMS repair///

PAYFIX2 **What is the most you would be willing to spend to repair a malfunctioning TPMS system?**

/SLIDER VALUE: ANCHORS [\$50 OR LESS → \$1,000 OR MORE)]/

99. REFUSED

///ASK ALL///

RESET1 **Who would be able to reset the TPMS system in your vehicle when needed, such as after work has been done to the tires or wheels?**

[INTERVIEWER: SELECT ALL THAT APPLY]

1. THE OWNER/DRIVER
2. THE REPAIR SHOP OR DEALER
3. OTHER
98. DON'T KNOW
99. REFUSED

///ASK ALL///

RESET2 **What action is required to reset the TPMS system?**

1. THE OWNER/DRIVER PRESSES A BUTTON
2. SPECIAL TOOLS ARE USED BY A REPAIR SHOP/DEALER
3. OTHER
98. DON'T KNOW
99. REFUSED

///ASK ALL///

TPMSREQ **To your knowledge, is the TPMS system in your vehicle legally required to be functioning properly?**

1. YES
2. NO
98. DON'T KNOW
99. REFUSED

///ASK ALL///

INTRO2 **Now I just need to ask you some basic demographic information.**

1. CONTINUE

///ASK IF INTRO2=1///

AGE **What is your age? [INTERVIEWER: IF RESPONDENT HESITATES TO REPORT SINGLE AGE READ THE LIST OF CATEGORIES AND ASK THEM TO INDICATE THE CATEGORY THAT BEST MATCHES THEIR AGE]**

1. UNDER 18
2. 18 - 25
3. 26 - 35
4. 36 - 45
5. 46 - 55
6. 56 - 65
7. 65 OR OLDER
98. DON'T KNOW
99. REFUSED

///ASK IF INTRO2=1///

EDUC What is the highest level of education you have completed?

1. SOME ELEMENTARY/MIDDLE/HIGH SCHOOL
2. HIGH SCHOOL GRADUATE (OR DIPLOMA) OR GED
3. ASSOCIATE'S DEGREE / SOME COLLEGE
4. BACHELOR'S DEGREE
5. GRADUATE/PROFESSIONAL DEGREE
98. DON'T KNOW
99. REFUSED

///IF DISABLE1=1 AND SCREEN6 NE 1 THEN SET DISPO = 61, Complete: Phase-in vehicle, TPMS reported to be disabled ///

///IF DISABLE1=1 AND SCREEN6 = 1 THEN SET DISPO = 71, At Quota: Phase-in vehicle, TPMS reported to be disabled ///

///IF DISABLE2=1 AND SCREEN6 NE 1 THEN SET DISPO = 63, Complete: Post-phase-in vehicle, TPMS reported to be disabled ///

///IF DISABLE2=1 AND SCREEN6 = 1 THEN SET DISPO = 73, At Quota: Post-phase-in vehicle, TPMS reported to be disabled ///

///IF DISABLE2=2,98,99 AND SCREEN6 NE 1 THEN SET DISPO = 64, Complete: Post-phase-in vehicle, no lights, not reported as disabled ///

///IF DISABLE2=2,98,99 AND SCREEN6=1 THEN SET DISPO = 74, At Quota: Post-phase-in vehicle, no lights, not reported as disabled ///

///IF TPMSMALF=1 AND SCREEN6 NE 1 THEN SET DISPO = 66, Complete: TPMS system malfunction ///

///IF TPMSMALF=1 AND SCREEN6=1 THEN SET DISPO = 76, At Quota: TPMS system malfunction ///

///IF TPMSMALF=2 AND SCREEN6 NE 1 THEN SET DISPO = 67, Complete: TPMS low pressure ///

///IF TPMSMALF=2 AND SCREEN6=1 THEN SET DISPO = 77, At Quota: TPMS low pressure ///

///IF TPMSMALF=4 AND SCREEN6 NE 1 THEN SET DISPO = 68, Complete: TPMS functioning properly ///

///IF TPMSMALF=4 AND SCREEN6=1 THEN SET DISPO = 78, At Quota: TPMS functioning properly ///

///SKIP TO MODULE END///

END MODULE CLOSE

MODULE END

///ASK ALL///

THANK **Thank you for your participation in this survey.**
1. CONTINUE

END MODULE END