



Highway Division Maintenance Leadership Team Operational Notice

Number	Supersedes	Effective Date	Cancellation Date
MG-144-01	New	March 1, 2015	Until Further Notice
Subject		Issuing Body	
Traffic Signal return from Flashing operation		 State Maintenance & Operations Engineer	

PURPOSE:

Guidelines and considerations for ODOT employees to Return Traffic Signals to normal operation from a Flashing operation.

BACKGROUND:

Work began in 2007 during our Statewide Traffic System meetings to document what is best practice and to share knowledge about returning signals to normal operation. We gathered input from ODOT Traffic Support staff both Regional and Central as to the best techniques and considerations to consider when returning Traffic Signals to Normal operation. This input was reviewed and edited by a task force of Region Maintenance and Central Traffic staff to complete a document to present to ODOT leadership for their review. We finalized the review in July 2013.

PROCESS:

Performing Annual Inspection Conflict Test

This refers to when the controller is put into FLASH mode as part of the annual inspection process. The purpose of the conflict test is to ensure the conflict monitor detects a conflict and switches the traffic signal to FLASH mode. When performed correctly, the signal switches to FLASH mode for less than a second (excluding SCATS). The conflict test during annual inspection ideally takes a two-person team who communicate with each other.

Follow these guidelines and use your professional judgment when removing, inserting and testing the conflict monitor as part of the annual inspection.

Conflict Test for 170/IKS Controller:

1. Determine main street phase(s) by referring to the timing sheet or cabinet print, or by observing traffic. Typically these would be phases 2 and 6, however, they could be other phases depending on intersection geometry.
2. From Free display, go to **LOCATION 0 + 9** and enter the main street phase(s) for startup green if they are not already entered.
3. Remove the conflict monitor and perform annual inspection tests. When the monitor is removed, be careful to prevent the front cabinet door from closing as this will cause the signal to go into FLASH mode.

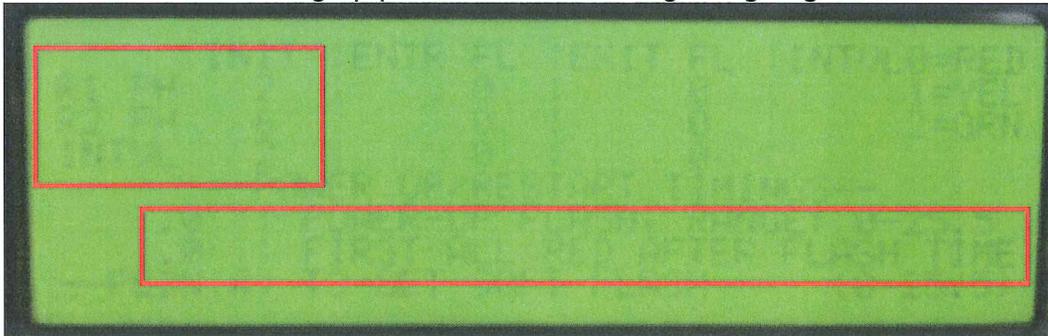
4. Once the conflict monitor is tested, wait until the startup phases (entered in step 2) turn green, insert the conflict monitor and push the **RESET** button. When performed correctly, the signal switches to FLASH mode for less than a second. Observe traffic signal operation.
5. Observe traffic, pedestrians and bicyclists to determine when practicable to introduce a signal conflict. Low volumes or minimal side street and left turn lane queues are preferred.
6. When the startup phase(s) turn green, introduce a conflict on opposing pedestrian phases where feasible, or opposing vehicle phases if pedestrian phases aren't available to conflict. Conflicting pedestrian phases presents a lower risk exposure for motorists as drivers typically don't watch pedestrian indications. Avoid conflicting when pedestrians are present.
7. Immediately push the **RESET** button after the conflict monitor registers the induced conflict. When performed correctly, the signal switches to FLASH mode for less than a second.
8. Restore **LOCATION 0 + 9** to original values shown on the timing sheet.
9. Observe signal operation to confirm that all phases function properly.

NOTE: If the signal goes to FLASH mode during or after the annual inspection process, follow the [Returning to Normal Operation from Cabinet FLASH Mode](#) guidelines.

Conflict Test for 2070/Voyage Controller:

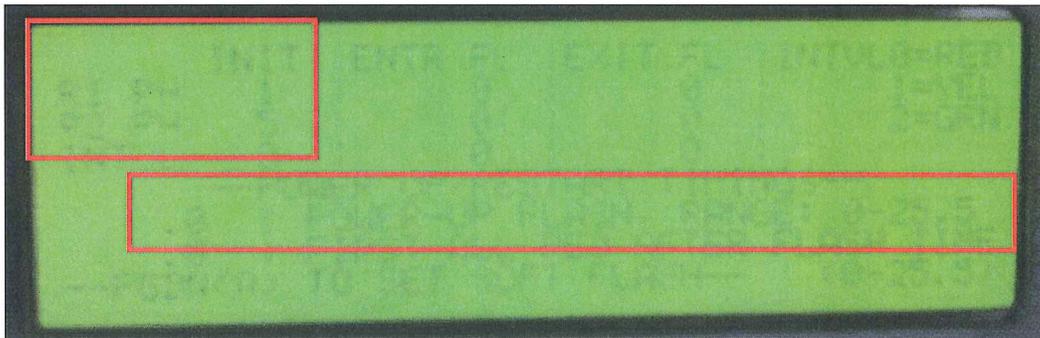
1. Determine main street phase(s) by referring to the timing sheet or cabinet print, or by observing traffic. Typically these would be phases 2 and 6, however, they could be other phases depending on intersection geometry.
2. Push **NEXT/2/2/5** to bring up the Power Up Flash Screen.
3. Set or verify INIT for R1 PH (Ring 1 Phase), R2 PH (Ring 2 Phase), INTVL (Interval – Red, Yellow, Green), POWER UP FLASH and FIRST ALL RED AFTER FLASH TIME.

Example: If main street startup phases are 2 and 6, then **INIT for R1 PH = 2, R2 PH = 6, INTVL = 2. Set/Verify POWER UP FLASH = 0 and FIRST ALL RED AFTER FLASH TIME = 0.** This will bring up phases 2 and 6 at beginning of green.



4. Remove the conflict monitor and perform annual inspection tests. When the monitor is removed, be careful to prevent the front cabinet door from closing as this will cause the signal to go into FLASH mode.
5. Once the conflict monitor is tested, wait until the startup phases (entered in step 3) turn green, insert the conflict monitor and push the **RESET** button. When performed correctly, the signal switches to FLASH mode for less than a second. Observe traffic signal operation.
6. Observe traffic, pedestrians and bicyclists to determine when practicable to introduce a signal conflict. Low volumes or minimal side street and left turn lane queues are preferred.
7. When the startup phase(s) turn green, introduce a conflict on opposing pedestrian phases where feasible, or opposing vehicle phases if pedestrian phases aren't available to conflict. Conflicting pedestrian phases presents a lower risk exposure for motorists as drivers typically don't watch pedestrian indications. Avoid conflicting when pedestrians are present.
8. Immediately push the **RESET** button after the conflict monitor registers the induced conflict. When performed correctly, the signal switches to FLASH mode for less than a second.
9. Restore all timing to original values as shown on the timing sheet.

Example: If startup phases are 1 and 5, then **INIT** for **R1 PH = 1**, **R2 PH = 5**, and **INTVL = 0**. Set/Verify **POWER UP FLASH = 0** and **FIRST ALL RED AFTER FLASH TIME = 6**. This will bring up phases 2 and 6 at beginning of green after the all-red time for phases 1 and 5. In rare situations, this may bring up other phases (usually if 1 and 5 are both lagging).



10. Observe signal operation to confirm that all phases function properly.

NOTE: If the signal goes to FLASH mode during or after the annual inspection process, follow the [Returning to Normal Operation from Cabinet FLASH Mode](#) guidelines.

Conflict Test for 2070/SCATS Controller:

1. Determine main street phase(s) by referring to the timing sheet or cabinet print, or by observing traffic. Typically these would be phases 2 and 6, however, they could be other phases depending on intersection geometry.

2. Remove the conflict monitor and perform annual inspection tests. When monitor is removed, be careful to prevent the front cabinet door from closing as this will cause the signal to go into FLASH mode.
3. Once the conflict monitor is tested, observe traffic, pedestrians and bicyclists movements. Don't replace the conflict monitor on any moving traffic. Wait for the side traffic signal to turn yellow, then insert the conflict monitor and push the **RESET** button. The SCATS program may switch the signal to FLASH mode followed by a minimum of 2 seconds all-red.
4. Observe traffic, pedestrians and bicyclists to determine when practicable to introduce a signal conflict. Low volumes or minimal side street and left turn lane queues are preferred.
5. When the startup phase(s) turn green, introduce a conflict on opposing pedestrian phases where feasible, or opposing vehicle phases if pedestrian phases aren't available to conflict. Conflicting pedestrian phases presents a lower risk exposure for motorists as drivers typically don't watch pedestrian indications. Avoid conflicting when pedestrians are present.
6. Immediately push the **RESET** button after the conflict monitor registers the induced conflict. The SCATS program will switch the signal to FLASH mode followed by a minimum of 2 seconds all-red.
7. Observe signal operation to confirm that all phases function properly.

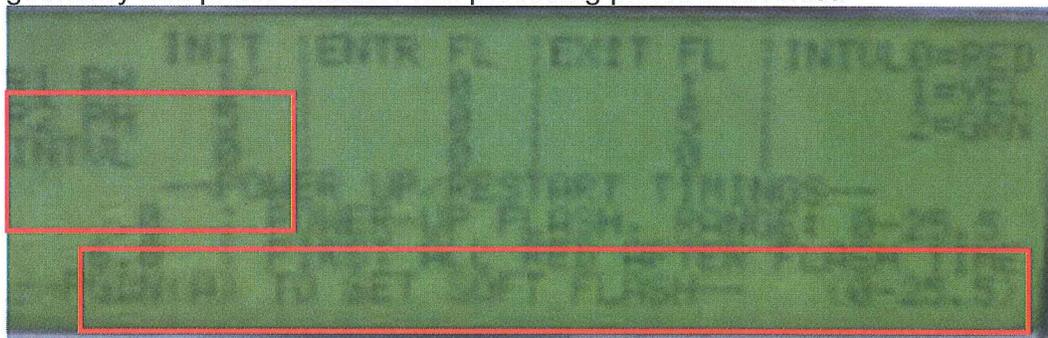
NOTE: If the signal goes to FLASH mode during or after the annual inspection process, follow the [Returning to Normal Operation from Cabinet FLASH Mode](#) guidelines.

NOTE: In these guidelines, words and phrases such as "where feasible," "where appropriate" and "when practicable" are used in conjunction with some minimization, avoidance and best management practices and techniques. These phrases, which allow some exercise of professional judgment, are not to be used for convenience or ease of operation. Rather, they are included to depict the unique nature of these activities. These activities, in many ways, are reactive to constraints outside the control of ODOT: weather events, the traveling public, physical and geographic restrictions, availability of equipment, state, federal and local laws, and federal highway design guidelines. Compliance with these guidelines means that ODOT staff will use the discretion provided by these phrases where one or more of these constraints make implementation of the full measure impossible.

Returning to Normal Operation from Cabinet FLASH Mode

This refers to when the signal goes into FLASH mode due to a manual switch, conflict of opposing indications, loss of DC power, controller malfunction, or other similar event. Follow these guidelines and use your professional judgement when returning the signal to normal operation from cabinet FLASH mode:

1. **Observe and document signal, controller and monitor indications.**
2. **Determine and troubleshoot the source of cabinet FLASH operation**, whether police panel switch, power distribution assembly (PDA) switch or conflict monitor.
 - a. If police panel or PDA switch is set to FLASH mode, continue to step 3.
 - b. If conflict monitor is source of FLASH, set the PDA switch to FLASH mode. Continue troubleshooting. Once problem is remedied, press the RESET button to verify monitor will not fail. If monitor fails, continue troubleshooting. Otherwise continue to step 3.
3. **Verify startup phases (all-red timing should be installed unless otherwise documented on the timing sheet).**
 - a. *For 170/IKS controller*, from Free display, go to **LOCATION 0 + 9** and remove startup phases unless otherwise documented. Removing startup phases provides for 8 seconds of all red followed by a green indication on phases 2 and 6.
 - b. *For 2070/Voyage controller*, push **NEXT/2/2/5** to bring up the Power Up Flash Screen. Set **FIRST ALL RED AFTER FLASH** to 6 or 8 seconds and **INTVL** to 0 (red). Verify that at least one phase (Ring 1, Ring 2 or both) is designated as a startup phase, which will be the phases that precede the main street phases (typically phases 1 and 5). It may be phases 4 and 8 if phases 1 and 5 don't exist, so that the first green indication is on the main street phase (typically phases 2 and 6). However, they could be other phases depending on intersection geometry and phase rotation. The preceding phase must exist.



- c. *For 2070/SCATS controller*, verify main street phase(s) by referring to the timing sheet or cabinet print, or by observing traffic. Typically these would be 2 and 6, however, they could be other phases depending on intersection geometry.
4. **Observe and monitor traffic to determine appropriate time to reset.**
 - When a traffic signal has been in FLASH mode for an extended period, drivers are in a stop-and-go mode similar to a four-way stop. Their attention may be with

the other drivers at the intersection rather than the traffic signal itself. When the traffic signal returns to normal operation, the first few drivers at the intersection may not realize it has returned to normal operation and may proceed as if the traffic signal is still in FLASH mode.

- Where possible, advise pedestrians or bicyclists that you are about to reset the signal and ask them to wait. If unable to advise them, allow them to clear intersection before resetting.
 - If possible, get the attention of drivers, especially on the side streets and in left turn lanes, and indicate that you are about to reset the signal. If a two-person team, each person may take a side street when practicable.
5. **Reset to normal operation.** As the side street/minor movement/left turn traffic enters the intersection, return the appropriate AUTO/FLASH switch to **AUTO**. This initiates the transition to normal operation. The traffic signal will start with 6 to 8 seconds of an all red clearance interval followed by the beginning of the major street green interval (typically phases 2 and 6) when set up according to step 3 above.

NOTE: With 2070/SCATS controller, after switching to AUTO mode, the signal will continue to flash for up to 5 seconds. Once the cabinet FLASH mode ends, the controller will provide 6 seconds of all red followed by a green indication for the main street.

6. **Observe and document normal operation.** Verify signals have returned to normal operation. Test all pedestrian push buttons and verify operation. Confirm that all signal indications work as expected. Record in the logbook when you returned the signal to normal operation.

If signal is not operating properly, return the signal to FLASH mode and continue troubleshooting. Refer to [Initiating FLASH Mode Using Police Panel or PDA Switch](#) for guidance in initiating FLASH mode. If additional help is needed, contact a signal technician or electrician.

7. **Notify the Regional Traffic Operations Center of signal status:**

Region 1: 503-731-4652
Region 2: 503-362-0457
Region 3: 541-858-3103
Region 4/5: 541-383-0121

8. **Verify all cabinet doors are closed and locked before leaving the intersection.**

If a traffic accident or incident occurs:

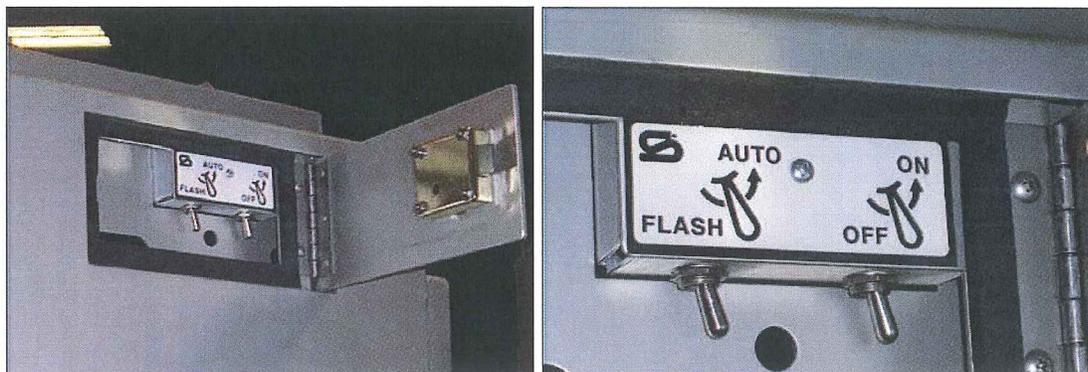
- Call 9-1-1.
- Call the Regional Traffic Operations Center.
- Document the situation, as much as possible. (See Module 1, Legal Liability.)
- Take photos, if possible.
- Inform your manager of the incident.

NOTE: In these guidelines, words and phrases such as “where feasible,” “where appropriate” and “when practicable” are used in conjunction with some minimization, avoidance and best management practices and techniques. These phrases, which allow some exercise of professional judgment, are not to be used for convenience or ease of operation. Rather, they are included to depict the unique nature of these activities. These activities, in many ways, are reactive to constraints outside the control of ODOT: weather events, the traveling public, physical and geographic restrictions, availability of equipment, state, federal and local laws, and federal highway design guidelines. Compliance with these guidelines means that ODOT staff will use the discretion provided by these phrases where one or more of these constraints make implementation of the full measure impossible.

Initiating FLASH Mode Using Police Panel or PDA Switch

This refers to when an operating traffic signal is manually placed in FLASH mode using the police panel or power distribution assembly (PDA) switch. These two switches perform the same function, but are located in different areas of the signal cabinet. Both require a key to access them.

The police panel switch may be accessed from the outside of the cabinet. See Figure 1 below.
Figure 1. Police Panel Switch



The PDA switch requires access to the inside of the signal cabinet. Once the front cabinet door is open to access the PDA switch, the signal controller is available and needs to be protected. The PDA switch is clearly labeled and typically located about midway down the front to the cabinet; its location may vary depending on the power supply used on the cabinet. See Figure 2 below.

Figure 2. Power Distribution Assembly (PDA) Switch



Only ODOT-trained personnel may operate the police panel or PDA switch on an ODOT traffic signal.

Follow these guidelines and use your professional judgment when initiating FLASH mode using the police panel or PDA switch.

Initiating FLASH mode using police panel or PDA switch:

1. Open the police panel or signal cabinet with the corresponding key. Confirm the AUTO/FLASH switch is set to **AUTO** and the ON/OFF switch is set to **ON**.
2. Observe traffic, pedestrians and bicyclists. When practicable, set the AUTO/FLASH switch to **FLASH**. This may be when pedestrians and cyclists are not present and a reasonable gap in traffic occurs or at the end of the main street red interval (just prior to the start of the green in both directions on the main street).
3. Check all indications to confirm FLASH mode operation.
4. Record the time when you switched the signal to FLASH mode in the logbook or Project Manager's General Daily Progress Report.
5. Notify the Regional Traffic Operations Center of signal status:
Region 1: 503-731-4652
Region 2: 503-362-0457
Region 3: 541-858-3103
Region 4/5: 541-383-0121

NOTE: In these guidelines, words and phrases such as “where feasible,” “where appropriate” and “when practicable” are used in conjunction with some minimization, avoidance and best management practices and techniques. These phrases, which allow some exercise of professional judgment, are not to be used for convenience or ease of operation. Rather, they are included to depict the unique nature of these activities. These activities, in many ways, are reactive to constraints outside the control of ODOT: weather events, the traveling public, physical and geographic restrictions, availability of equipment, state, federal and local laws, and federal highway design guidelines. Compliance with these guidelines means that ODOT staff will use the discretion provided by these phrases where one or more of these constraints make implementation of the full measure impossible.

Initiating Flagging Operation on Controlled Intersection

This situation refers to when a controlled intersection has its signal operations temporarily replaced by flagging operations. During flagging operations, ORS 811.265 requires traffic signals to be turned off.

Follow these guidelines and use your professional judgment when turning traffic signal operations off and placing an intersection under control of flagging operations.

Turning a traffic signal off under flagging operation:

1. Verify that proper signs, lane closures and flagger stations are in place; communicate with flaggers and ensure they know the sequence of how you will switch the operational signal to FLASH mode and then OFF.
2. With the flaggers in position and fully aware of what you will be doing, open the signal cabinet or police panel with the key.
3. Observe traffic, pedestrians and bicyclists. When practicable, set the AUTO/FLASH switch to **FLASH**. This may be when pedestrians and cyclists are not present and a reasonable gap in traffic occurs or at the end of the main street red interval (just prior to the start of the green in both directions on the main street).
4. Check all indications to confirm FLASH mode operation.
5. Confirm flaggers are in place and are ready to control traffic.
6. Flip the ON/OFF switch to **OFF** to turn off the power to the signal heads. As soon as signal indications are dark, have the flaggers take control of the intersection.
7. Record the time when you transferred the intersection to flagging operations in the logbook or Project Manager's General Daily Progress Report.
8. Notify the Regional Traffic Operations Center of signal status:
Region 1: 503-731-4652
Region 2: 503-362-0457
Region 3: 541-858-3103
Region 4/5: 541-383-0121

NOTE: In these guidelines, words and phrases such as "where feasible," "where appropriate" and "when practicable" are used in conjunction with some minimization, avoidance and best management practices and techniques. These phrases, which allow some exercise of professional judgement, are not to be used for convenience or ease of operation. Rather, they are included to depict the unique nature of these activities. These activities, in many ways, are reactive to constraints outside the control of ODOT: weather events, the traveling public, physical and geographic restrictions, availability of equipment, state, federal and local laws, and federal highway design guidelines. Compliance with these guidelines means that ODOT staff will use the discretion provided by these phrases where one or more of these constraints make implementation of the full measure impossible.

Ending Flagging Operation on Controlled Intersection

This situation refers to when a controlled intersection is being returned to normal signal operations after being temporarily replaced by flagging operations. It may also apply in construction or other similar situations where a traffic signal is being initialized for the first time.

NOTE: ORS 811.265 requires signals to be turned off during flagging operations.

Follow these guidelines and use your professional judgment when returning a signal to normal operations after an intersection has been under flagger control.

Returning a signal to normal operation after flagging operation:

1. Communicate with the flaggers and ensure they know the sequence of how you will switch the operational signal from OFF to FLASH to AUTO mode.
2. When practicable and safe, have the flaggers stop all traffic.
3. Open the signal cabinet or police panel with the corresponding key and confirm the AUTO/FLASH switch is set to **FLASH**.
4. Set the ON/OFF switch to **ON** to turn on the power to the signal heads. The signal will be in the all-way red FLASH mode.
5. Set the AUTO/FLASH switch to **AUTO** to return the signal to normal (or automatic) operations. The traffic signal may start with 6 to 8 seconds of an all red clearance interval or in any phase when you change from FLASH to AUTO mode. Use professional judgement and appropriate caution to determine when practicable to initiate the change from FLASH to AUTO.

NOTE: With 2070/SCATS controller, after switching to AUTO mode, the signal will continue to flash for up to 5 seconds. Once FLASH mode ends, the controller provides 6 seconds of all red followed by a green indication for the main street.

6. When practicable and safe to let traffic flow with the signal, the flaggers should indicate to the motorists that the motorists are now under traffic signal control, and the flaggers should step out of the way and release the traffic.
7. Observe every indication (vehicle: red, yellow and green; pedestrian: walk and flashing don't walk). During off-peak hours, if you do not observe an indication, it may be necessary to drive your vehicle in lanes to actuate that indication and/or test the pedestrian push buttons to ensure correct operation.
8. Confirm all signals are working as expected.
If the signal is not operating properly, return the intersection to flagger control, turn the signal off, and call the Regional Traffic Operations Center to notify the signal technician or electrician on call. Refer to [Initiating Flagging Operation on Controlled Intersection](#) for guidance in returning the intersection to flagger control and turning the signal off.
9. Record when you returned the signal to normal operations in the logbook or Project Manager's General Daily Progress Report .
10. Notify the Regional Traffic Operations Center of signal status:
Region 1: 503-731-4652
Region 2: 503-362-0457

Region 3: 541-858-3103

Region 4/5: 541-383-0121

NOTE: In these guidelines, words and phrases such as “where feasible,” “where appropriate” and “when practicable” are used in conjunction with some minimization, avoidance and best management practices and techniques. These phrases, which allow some exercise of professional judgment, are not to be used for convenience or ease of operation. Rather, they are included to depict the unique nature of these activities. These activities, in many ways, are reactive to constraints outside the control of ODOT: weather events, the traveling public, physical and geographic restrictions, availability of equipment, state, federal and local laws, and federal highway design guidelines. Compliance with these guidelines means that ODOT staff will use the discretion provided by these phrases where one or more of these constraints make implementation of the full measure impossible.