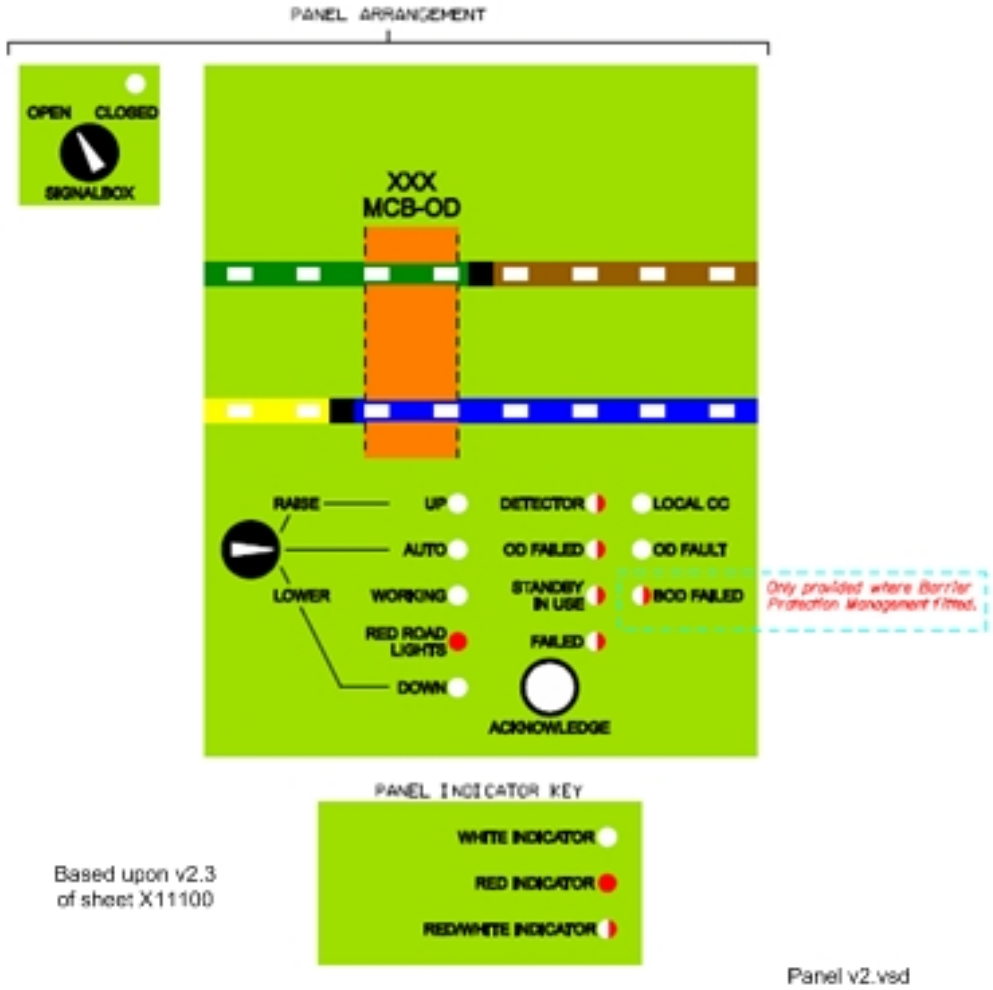
NX Panel and VDU MCB-OD Signaller Controls and Indications

NX Panel MCB-OD Controls



Signaller Fault Finding Guide

MCB – OD Crossings

NX Panel Application

Introduction

As a general rule, a flashing indication is usually accompanied by an audible warning too. The alarm should be acknowledged by pressing Acknowledge button which will silence the audible alarm, and change the flashing indication to steady. The AUTO indication flashing is used to grab the signallers attention. This document explains what the indications mean to the signaller and the signallers expected response.

Where text refers to white indications, these could be yellow if for example the panel uses yellow LEDs.

The Intention is that normally the forward route from each protecting signal will be left set, and the protecting signals in auto working. The MCB-OD crossing will also normally be set to and indicating itself to be in Auto. In this state the crossing will auto lower, it will manage the lowering of its barriers, it will raise its exit barriers to release any trapped object, it will generate Crossing Clear if able to do so and it will auto raise after the train has gone through, unless the minimum road open time cannot be achieved for a second train, in which case it will auto raise following the second train.

Note to raise the barriers at an MCB-OD requires all routes cancelled over the crossing before selecting the signallers RAISE control.

Local Crossing Clear Mode (CCU/XCU)

The crossing can be operated in local Crossing Clear mode by an attendant at the crossing who presses the Crossing Clear buttons. In local Crossing Clear (CCU/XCU) mode the crossing will work automatically and there is no need for verbal communication between signaller and attendant except to set up CCU/XCU mode and to go back to full Auto mode. Once in Local CC mode, trains can be signalled as normal over the MCB-OD crossing. The Local CC mode is normally used when the OD system is not available and can be used by S&T technicians, MOMs or attendants, they do not need to be Sentinel Level Crossing Attendants.

When all the barriers are down, the attendant will press the two Crossing Clear buttons if the crossing is clear. To return back to full AUTO working with OD, the CCU/XCU operator puts the switch back to normal and closes the CCU/XCU door. The Local CC flashes and needs acknowledging by the signaller and the crossing should now be in AUTO with OD. It is normal to come out of CCU/XCU mode with the barriers raised (unlike LCU mode below).

The CCU/XCU also has an SIGNALS ON facility for use by the attendant if they wish to withdraw the Crossing Clear that has been given. A feature of the MCB-OD crossings is that when the SIGNALS ON switch in the CCU is operated, the AUTO indication at the control centre will flash regardless of whether the crossing is working in manual or AUTO mode. If the protecting signal(s) have cleared, the signal aspect(s) will be replaced to danger and the DOWN indication will be extinguished. In order to reset the crossing controls and re-clear the signal(s), the signaller will need to cancel and re-stroke any route(s) set across the crossing, followed by the crossing attendant replacing the switch to the LOCAL CROSSING CLEAR position and pressing the CROSSING CLEAR buttons in the CCU. It should be noted that the LOCAL CROSSING CLEAR controls within the CCU will not reset until the signal route(s) set across the level crossing has fully normalised (approach locking timed).

Entering and exiting from CCU/XCU Mode – additional information

a) When entering CCU/XCU mode, the signaller should check that the MCB-OD crossing Auto indication is being given if it is intended to allow Auto Lower to be operative (also note the route(s) over the crossing also need to be set).

b) When exiting CCU/XCU mode, the signaller should check that the MCB-OD crossing Auto indication is being given if it is intended to allow Auto Lower to be operative (also note the route(s) over the crossing also need to be set).

If the MCB-OD crossing AUTO indication has extinguished, the signaller will need to re-set AUTO by selecting either RAISE or LOWER (to match the position of the barriers at the crossing) and then re-select AUTO. The signaller should then check that the AUTO indication is being given.

Local Control Unit (LCU)

The MCB-OD is also provided with a Local Control Unit (LCU), this is separate to the CCU/XCU. The LCU is just like the LCU at other crossing types. Normally it is possible to operate the crossing in CCU/XCU mode, this is preferable to the LCU mode as it maintains interlocking and it allows automatic operation which reduces signaller workload, even in degraded crossing working. When the attendant opens the LCU the crossing will indicate failed (unlike CCU/XCU mode). The attendant will be able to raise and lower the barriers by operating the LCU controls. If the LCU is opened up and switched to Local with the barriers down, the LCU Raise will be prevented from operating for a time similar to approach locking time, once timed out the barriers can be raised and lowered by the LCU controls until the LCU door is closed and re-opened when it will be "approach locked" if the barriers are down when the LCU switch is turned to Local position. To come out of LCU mode, the attendant must lower the barriers, the signaller must then select Lower to correspond with the barriers, the attendant can then turn LCU switch to Normal and close the LCU door, this then allows the signaller to re-take control of the barriers by selecting Raise.

Once an LCU door is opened, the signaller still has the opportunity to lower and raise the barriers (with a FAILED indication displayed and critical audible alarm present) until the LCU is physically switched into operation.

Cautioning a train

When the OD system has detected an obstacle it will not be able to close the barriers and obtain Crossing Clear and will flash Auto indication to the signaller. The signaller can select Lower to lower the barriers when they are ready to caution a train past the protecting signal, or if the road will be closed for a long time before being ready to caution the train over the crossing, the signaller can select Raise to allow road traffic and pedestrians to cross, and then select lower when ready to caution to the train.

When necessary to caution a train over an MCB-OD the signaller should select Lower (and leave the switch in Lower position), The signaller should also check that the Red road lights indication is lit, and if required by Local Instruction also check the Down indication is steady or flashing. The Down indication (steady or flashing) proves there is no stored raise request at the crossing. After the train has passed over the crossing the signaller will need to select Raise to raise the barriers. Note after selecting Lower, the OD system, if available will check the crossing is clear and so it is possible to clear the protecting signal if the route is set.

OD Failures

There are two indications for problems with the OD system. The first indication will be OD FAULT, which may clear itself after about 40 seconds as the OD fault auto reset at the crossing is completed, or it may escalate to OD FAILED, in which case the crossing will need S&T attendance.

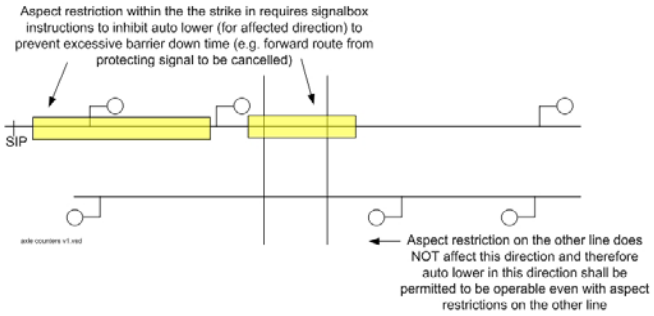
When OD FAULT or OD FAILED occur the signaller should check the AUTO indication is still given. If the crossing AUTO indication is no longer being given the signaller will need to re-set AUTO by selecting either RAISE or LOWER (to match the position of the barriers at the crossing) and then re-select AUTO. The signaller should then check that the AUTO indication is being given.

Protecting Signal Doesn't Clear (with crossing still in Auto)

If protecting signal doesn't clear (but the crossing stays in Auto), the signaller should cancel the route over the crossing (for the train that has now stopped at the protecting signal) and set the route again to try to clear the signal.
The signaller shall report crossing failed/signal failed to clear to enable diagnosis to find the root cause (may be intermittent barrier proving fault as the barriers were lowering).

Axle Counters

MCB-OD crossings can work perfectly normally with axle counters as part of the train detection system. However, if an axle counter has been disturbed and therefore aspect restrictions apply, the barrier down time can be extended significantly. To mitigate this signaller instructions are required to inhibit auto lower but only in the direction that the aspect restriction applies. This is achieved by cancelling the forward route over the crossing for the protecting signal in the direction concerned as shown:



Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
UP				
Steady White	When barriers are up and crossing control not working.	No	Normal condition no signaller intervention required	None
Flashing white	When the barriers have failed to raise successfully	Yes	Turn control switch to lower position, obtain down detection and then turn control switch to raise position and observe if steady UP detection indication is obtained. If no steady UP detection obtained turn control switch to lower position, fault equipment and call for attendant. If down detection obtained run trains normally. When attendant arrives initiate LCU control.	Possible barrier raise fault. Note it is possible that no barriers have started to move when receiving flashing UP indication.
AUTO				
Steady White	When auto lower and raise are available	No	Normal condition no signaller intervention required	None
Flashing White	When the crossing is in auto mode and requires signaller intervention.	Yes	If the train hasn't gone over the crossing, the protecting signal will not have cleared and the train will be at a stand or nearly at a stand. Select RAISE. After speaking to train driver, turn switch to lower and if signal shows a proceed aspect, the crossing will have detected clear and train can proceed normally. If crossing still occupied, protecting signal will not clear and train will have to be cautioned over the crossing in line with instructions. May also mean the crossing has been WORKING for too long.	The crossing lower sequence has failed to complete e.g. because there was a persistent object detected, or some other issue being indicated (check what other indications are showing). The DETECTOR indication may also become live and indicate that the crossing is still occupied. It may flash red for a few seconds if users take the chance to cross. Ask train driver to report what the problem was (they may be able to tell you if they can see crossing from protecting signal). If object is small and can be moved by train driver, ask them to move it as it will avoid delay to subsequent trains. It may be necessary to request someone to go to the crossing to remove an object that is being detected if the train driver doesn't move it clear. If no physical obstacle is reported then the obstacle detector system should be faulted.

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
				If crossing is indicating steady DOWN but AUTO flashes white, this is indicating the crossing has been closed a long time. The signaller should consider if the crossing is still required to be DOWN, note auto raise will not work in this condition (with flashing AUTO). Signaller should either leave crossing controls as they are (if required to be down, but see next sentence) and manually RAISE when appropriate. If the barriers have been down a long time, this will cause flashing AUTO with steady DOWN, if the signaller would like to reset the long operating time warning they should select LOWER (whilst barriers are down) and then re-select AUTO, this will reset the long working timer and restore the crossing to AUTO (and auto raise will work).
No light	When auto lower and raise not available	Yes	When this the Auto indication is observedgoes out but the signaller wants to put the crossing back into Auto, the signaller needs to operate thetheir manual lower/raise control (so that the switch is in order to pass trains over the crossing and after the train has passed overcorrespondence with the barriers at the crossing.), and then operate the manual control switch back to Auto. NB the crossing won't go back into Auto if the barriers are UP with a train in the strike in with a route set over the crossing, in this situation the signaller must first cancel the route, then select raise before selecting Auto and re-stroking the route. The crossing will go back into Auto if the barriers are DOWN with a route set . If the barriers are neither UP or DOWN the crossing will NOT go back into Auto. The equipment must then be faulted. The crossing is then can be operated in Auto, but if it drops out of Auto again before the original fault has been rectified it will need to be operated via the manual control switch until the fault is rectified.	It is most likely that the auto lower system has failed, as auto raise is generated locally at the crossing.

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
WORKING				
Steady White	When the crossing is working, i.e. auto lower has acquired the approaching train, the crossing is not necessarily operating until it is required to do so.	No	Normal condition no signaller intervention required	None
Extinguished	When crossing has not been initiated	No	Normal condition no signaller intervention required OR if LOWER has been selected and WORKING does not illuminate, the barriers are being held up because the minimum road open time (MROT) has not occurred. This time is nominally 20 seconds. The LOWER selection will not be stored and will need to be re-selected after the MROT time has expired. When the crossing is in LCU mode MROT does not apply	None
Indication Received	**Meaning**	**Signaller Intervention**	**Signaller Action**	**Fault/Diagnosis**
RED ROAD LIGHT				
Steady Red Indication	When all red road lights are working	No	Normal condition no signaller intervention required	None
Flashing Red	When a single road light is not working but there is at least one working in each road traffic light	Yes	The equipment must then be faulted. The crossing is then to be operated normally	A road light non operational in a road traffic light signal cluster. (RTLS)
Extinguished (when road lights would be expected to be flashing i.e. crossing is Working)	If red road lights are not working or any individual road traffic light is not working – Barriers Will Not Lower	Yes	In this case the barriers will not lower. (even under manual control) The equipment to be faulted and trains not permitted to pass over the crossing until rectified	More than one light out in a road traffic light signal cluster. (RTLS)

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
DOWN - Barriers Down				
Flashing White	1) When all barriers are down and crossing closed but awaiting Crossing Clear from the obstacle detectors 2) If the signal has already cleared (barriers were down with crossing clear), flashing DOWN indication will occur if barrier down detection is lost and then remade. In this case, as the signal is not replaced, the signaller need not take any action except report possible down detection issue.	No	Normal condition no signaller intervention required	1) None – Normal sequence operation, however flashing white Down indication should change to steady white when crossing becomes clear. Once Crossing Clear has been obtained the Down indication will go steady white. If steady white Down indication is not given (in 4 to 6 seconds), and the signallers LOWER control has been operated the protecting signal will not clear and the train will need to be cautioned past the protecting signal (providing also have Red Road Lights steady red indication) 2) signaller need not take any action except report possible down detection issue at the crossing although the crossing can be used normally.
Steady White	When barriers are down AND crossing clear has been achieved	No	Normal condition no signaller intervention required	None

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
DETECTOR				
Extinguished	Indication is extinguished normally until Signaller Intervention Required	No	Normal condition no signaller intervention required	None
Steady Red	When signaller intervention is required and an obstacle is detected (AUTO will also be flashing)	Yes	Consult with train driver, operate manual control to LOWER (doing so will extinguish the DETECTOR indication), check that barriers down and road light indications are obtained. (or at least red road traffic light indications as a minimum) Inform driver to pass the protecting signal at danger and the likelihood that the crossing may be obstructed in line with instructions. Once a train has passed clear of the crossing the barriers are to be raised by manual control to RAISE. If the train driver can see no obvious reason for an obstacle being detected, the equipment must be faulted.	The equipment must be faulted, unless a physical obstruction has been found and removed. It may be necessary to ask for the removal of the obstruction by the fault control if the driver has been unable to do so. If the train driver saw no obvious reason for an obstacle being detected, it is possible that a small object such as vegetation is being detected (which may not be visible to the driver)
Flashing Red	Barrier Protection Management/ Barrier Lower zone occupied	Yes	Consult with train driver, operate manual control to LOWER, (this may not lower the barriers if the BPM is reporting obstructed) check road light indications are obtained. Inform driver to pass the protecting signal at danger and the likelihood that the crossing may be obstructed in line with instructions. Once a train has passed clear of the crossing the barriers are to be raised by manual control to RAISE. The equipment must be faulted,.	Accompanied with flashing white auto indication suggests that the Barrier Lower Zone may be obstructed. Flashing red detector overrides steady red for the detector indication so if crossing also occupied i.e. detected by the RADAR and/or LIDAR in addition to the barrier lower zone – the signaller will only obtain the barrier lower zone obstructed.
Steady White (Auto also flashing)	When signaller intervention is required and no obstacle is now detected. (AUTO will also be flashing)	Yes	Consult with train driver, operate manual control to LOWER, check that barriers down and road light indications are obtained. (or at least red road traffic light indications as a minimum) Inform driver to pass the protecting signal at danger and the likelihood that the crossing may be obstructed in line with instructions. If crossing is clear when barriers have lowered the protecting signal should clear and train may take signal aspect. Once a train has passed clear of the crossing the barriers	Indicates possible equipment fault The equipment must be faulted, unless a physical obstruction has been found and removed. It may be necessary to ask for the removal of the obstruction by the fault control if the driver has been unable to do so. been found and removed.

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
			are to be raised by manual control to RAISE. If it is established that it is an obstacle detector fault, arrangements to be made to provide an attendant to operate the XCU equipment	

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
LOCAL CC (CCU/XCU Mode)				
Extinguished	normal	no	None	None
Flashing white	When in local crossing clear mode (XCU) and not acknowledged	Yes	The signaller to acknowledge the status of the condition and consult with attendant in line with instructions.	Crossing attendant (XCU) at crossing with XCU control box door open.
Steady white	When in local crossing clear mode (XCU) and acknowledged	No	Normal status when under XCU operation **When the crossing is put into XCU the signaller should check that the crossing AUTO indication is being given and if not the signaller will need to re-set crossing AUTO, by selecting LOWER or RAISE to match the barriers position and then AUTO.**	None
Extinguished with an audible alarm	Not in local crossing clear (XCU mode) anymore	yes	Acknowledge alarm	Crossing attendant (XCU) at crossing with XCU control box door closed.

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
OD FAILED - Obstacle Detector Failed				
Steady White	When in order and acknowledged	No	Normal condition no signaller intervention required	None
Flashing Red	When OD critical fault present and not acknowledged	Yes	Signaller to acknowledge status of the crossing condition	Critical OD Fault present
Steady Red	When OD critical fault present and acknowledged	Yes	Crossing will now not drop out of AUTO and will NOT automatically lower so will have to be operated manually cautioning trains past the protecting signals in line with instructions until crossing can be put into XCU mode by an attendant. **If the crossing is put into XCU the signaller should**	Critical OD Fault present.

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
			check that the crossing AUTO indication is being given and if not the signaller will need to re-set crossing AUTO, by selecting LOWER or RAISE to match the barriers position and then AUTO. The OD equipment must faulted	
Flashing White	When OD fault has been cleared and not acknowledged	Yes	This indication requires acknowledgement. **The signaller will need to check that the crossing AUTO indication is being given and if not the signaller should re-set crossing AUTO, by selecting LOWER or RAISE to match the barriers position and then AUTO.**	OD fault rectified. Equipment has re-set, non critical fault has cleared or Critical fault has been rectified by fault team.

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
OD FAULT				
Extinguished	No OD Fault present	No	Normal condition, note the OD FAILED indication will be steady white in its normal condition with OD FAULT steady not lit	None
Flashing White (Note, the OD FAILED goes out from steady white)	When OD fault present and not acknowledged	Yes	This indication requires acknowledgement	This is a non-critical fault of the obstacle detectors. The obstacle detectors will attempt to reset themselves which takes approximately 35 seconds. This non critical OD FAULT must be reported in order to allow them to be monitored and investigated
Steady White	When OD fault present and has been acknowledged.	Yes	Signaller to report OD FAULT indication occurred. At the end of the OD reset time, the signaller will observe the OD FAULT indication go out, and if OD system resets the OD FAILED indication will flash white (requiring acknowledgement) OR the OD FAILED indication will flash red if the OD systems does not reset (this will also require acknowledgement.	Equipment is re-setting itself. The OD reset takes approximately 35 seconds If the OD equipment successfully resets the white OD FAULT indication will go out with an audible alarm and OD FAILED will flash white. If the OD equipment does not successfully reset the OD Fault indication will go out and the OD FAILED indication will flash red with an audible alarm.
Extinguished with	State change, see signaller	yes	State change from acknowledged OD FAULT to either	

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
audible alarm and OD FAILED will either be flashing white or flashing red)	action column.		OD FAILED flashing white (i.e. OD FAULT has cleared) or OD FAILED flashing red (i.e. OD FAULT didn't clear and it is now FAILED) **The signaller will need to check that the crossing AUTO indication is being given and if not the signaller should re-set crossing AUTO, by selecting LOWER or RAISE to match the barriers position and then AUTO.**	

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
BOD FAILED (where provided)				
Steady White	When in order and acknowledged	No	Normal condition no signaller intervention required	
Flashing Red	Barrier obstruction detector has failed	Yes	Acknowledge	BOD failed e.g. inductive loop fault The decision to operate the crossing normally if the BOD/BPM has failed should be part of the signalbox instructions as this may not be desirable at certain crossings at certain times of the day, at such times it may be better to wait for an attendant.
Steady Red	Barrier obstruction detector has failed and has been acknowledged	Yes	Report equipment as failed Work crossing normally unless local instructions do not allow this.	Part of the barrier protection management system has failed, if blocking back were to occur there is a small risk of barrier damage.
Flashing White	When in order and requiring to be acknowledged	Yes	Acknowledge alarm	

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
STANDBY IN USE - Power				
Steady White Indication	When in order and acknowledged	No	Normal condition no signaller intervention required	None
Flashing Red	When standby power is in use and not acknowledged	Yes	The signaller to acknowledge the status of the condition of the crossing.	Power has been lost and crossing is running on its standby batteries.
Steady Red	When standby power is in use and acknowledged	Yes	The signaller must fault the condition and seek technical guidance for support.	Generally a minimum of 4 hours standby time will be provided, although this may be different for different crossings, the S&T will know the standby time provided, and determine the appropriate response time.

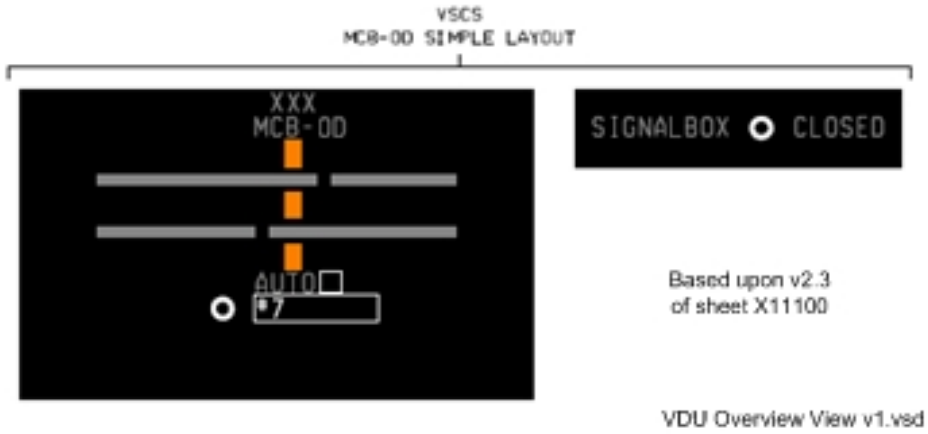
Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
Flashing White	When in order and not acknowledged	Yes	Signaller to acknowledge status of the crossing condition, work normally and inform control	Mains power restored.

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
FAILED – Crossing Failed (see also OD Fault for OD related faults)				
Steady White	When crossing in order and acknowledged	No	Normal condition no signaller intervention required	None
Flashing Red	When crossing failed and not acknowledged	Yes	Signaller to check status of other indications to establish condition at crossing and acknowledge flashing red indication.	Crossing equipment fault. Note opening the LCU door will also cause FAILED indication
Steady Red	When crossing failed and acknowledged	Yes	Other indications must be checked to establish overall condition at crossing The condition must be faulted and IFC advised of panel status and arrangements set up to provide attendant for LCU operation. Trains operated over the crossing subject to equipment availability in line with instructions	Crossing equipment fault.
Flashing White	When crossing in order and not acknowledged	Yes	Signaller to acknowledge status of the crossing condition and work normally **The signaller will need to check that the crossing AUTO indication is being given and if not the signaller should re-set crossing AUTO, by selecting LOWER or RAISE to match the barriers position and then AUTO.**	None will occur when exiting LCU mode at the crossing (note signallers LOWER control and Barriers need to be in correspondence in order to exit LCU mode.)

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
Acknowledge				
Illuminated	When required to be pushed to acknowledge	Yes	The signaller to acknowledge alert in accordance with the condition to silence the audible alarm.	Acknowledgement of fault/status condition at crossing.

VDU MCB-OD Controls (Detailed and Overview)

Note the MCB-OD Detailed view does NOT have to be part of the Signalling Detailed View. The Signalling Detailed View should show as a minimum:



An MCB-OD Detailed View or similar screen should be provided to show the MCB-OD Detailed view shown below, in accordance with the note in red text on sheet X11100 version 2.3.

MCB-OD VSCS Detailed View (not necessarily on the Signalling Detailed View)

Signaller Fault Finding Guide

MCB – OD Crossings

VDU Application

Introduction

As a general rule, a flashing indication is usually accompanied by an audible warning too. The alarm should be acknowledged by pressing Acknowledge button which will silence the audible alarm, and change the flashing indication to steady. The AUTO indication flashing is used to grab the signallers attention. This document explains what the indications mean to the signaller and the signallers expected response.

Where text refers to white indications, these could be yellow if for example the panel uses yellow LEDs.

The Intention is that normally the forward route from each protecting signal will be left set, and the protecting signals in auto working. The MCB-OD crossing will also normally be set to and indicating itself to be in Auto. In this state the crossing will auto lower, it will manage the lowering of its barriers, it will raise its exit barriers to release any trapped object, it will generate Crossing Clear if able to do so and it will auto raise after the train has gone through, unless the minimum road open time cannot be achieved for a second train, in which case it will auto raise following the second train.

Note to raise the barriers at an MCB-OD requires all routes cancelled over the crossing before selecting the signallers RAISE control.

Local Crossing Clear Mode (CCU/XCU)

The crossing can be operated in local Crossing Clear mode by an attendant at the crossing who presses the Crossing Clear buttons. In local Crossing Clear (CCU/XCU) mode the crossing will work automatically and there is no need for verbal communication between signaller and attendant except to set up CCU/XCU mode and to go back to full Auto mode. Once in Local CC mode, trains can be signalled as normal over the MCB-OD crossing. The Local CC mode is normally used when the OD system is not available and can be used by S&T technicians, MOMs or attendants, they do not need to be Sentinel Level Crossing Attendants.

When all the barriers are down, the attendant will press the two Crossing Clear buttons if the crossing is clear. To return back to full AUTO working with OD, the CCU/XCU operator puts the switch back to normal and closes the CCU/XCU door. The Local CC flashes and needs acknowledging by the signaller and the crossing should now be in AUTO with OD. It is normal to come out of CCU/XCU mode with the barriers raised (unlike LCU mode below).

The CCU/XCU also has an SIGNALS ON facility for use by the attendant if they wish to withdraw the Crossing Clear that has been given. A feature of the MCB-OD crossings is that when the SIGNALS ON switch in the CCU is operated, the AUTO indication at the control centre will flash regardless of whether the crossing is working in manual or AUTO mode. If the protecting signal(s) have cleared, the signal aspect(s) will be replaced to danger and the DOWN indication will be extinguished. In order to reset the crossing controls and re-clear the signal(s), the signaller will need to cancel and re-stroke any route(s) set across the crossing, followed by the crossing attendant replacing the switch to the LOCAL CROSSING CLEAR position and pressing the CROSSING CLEAR buttons in the CCU. It should be noted that the LOCAL CROSSING CLEAR controls within the CCU will not reset until the signal route(s) set across the level crossing has fully normalised (approach locking timed).

Entering and exiting from CCU/XCU Mode – additional information

a) When entering CCU/XCU mode, the signaller should check that the MCB-OD crossing Auto indication is being given if it is intended to allow Auto Lower to be operative (also note the route(s) over the crossing also need to be set).

b) When exiting CCU/XCU mode, the signaller should check that the MCB-OD crossing Auto indication is being given if it is intended to allow Auto Lower to be operative (also note the route(s) over the crossing also need to be set).

If the MCB-OD crossing AUTO indication has extinguished, the signaller will need to re-set AUTO by selecting either RAISE or LOWER (to match the position of the barriers at the crossing) and then re-select AUTO. The signaller should then check that the AUTO indication is being given.

Local Control Unit (LCU)

The MCB-OD is also provided with a Local Control Unit (LCU), this is separate to the CCU/XCU. The LCU is just like the LCU at other crossing types. Normally it is possible to operate the crossing in CCU/XCU mode, this is preferable to the LCU mode as it maintains interlocking and it allows automatic operation which reduces signaller workload, even in degraded crossing working. When the attendant opens the LCU the crossing will indicate failed (unlike CCU/XCU mode). The attendant will be able to raise and lower the barriers by operating the LCU controls. If the LCU is opened up and switched to Local with the barriers down, the LCU Raise will be prevented from operating for a time similar to approach locking time, once timed out the barriers can be raised and lowered by the LCU controls until the LCU door is closed and re-opened when it will be "approach locked" if the barriers are down when the LCU switch is turned to Local position. To come out of LCU mode, the attendant must lower the barriers, the signaller must then select Lower to correspond with the barriers, the attendant can then turn LCU switch to Normal and close the LCU door, this then allows the signaller to re-take control of the barriers by selecting Raise.

Once an LCU door is opened, the signaller still has the opportunity to lower and raise the barriers (with a FAILED indication displayed and critical audible alarm present) until the LCU is physically switched into operation.

Cautioning a train

When the OD system has detected an obstacle it will not be able to close the barriers and obtain Crossing Clear and will flash Auto indication to the signaller. The signaller can select Lower to lower the barriers when they are ready to caution a train past the protecting signal, or if the road will be closed for a long time before being ready to caution the train over the crossing, the signaller can select Raise to allow road traffic and pedestrians to cross, and then select lower when ready to caution to the train.

When necessary to caution a train over an MCB-OD the signaller should select Lower (and leave the switch in Lower position), The signaller should also check that the Red road lights indication is lit, and if required by Local Instruction also check the Down indication is steady or flashing. The Down indication (steady or flashing) proves there is no stored raise request at the crossing. After the train has passed over the crossing the signaller will need to select Raise to raise the barriers. Note after selecting Lower, the OD system, if available will check the crossing is clear and so it is possible to clear the protecting signal if the route is set.

OD Failures

There are two indications for problems with the OD system. The first indication will be OD FAULT, which may clear itself after about 40 seconds as the OD fault auto reset at the crossing is completed, or it may escalate to OD FAILED, in which case the crossing will need S&T attendance.

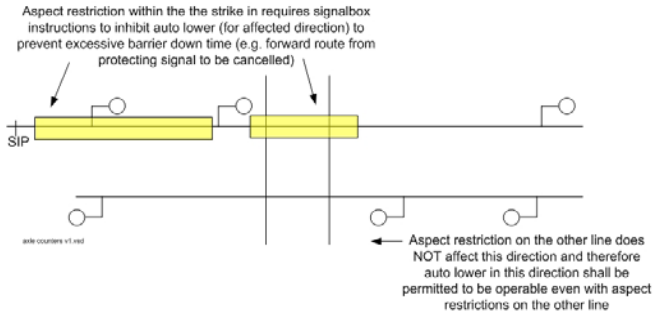
When OD FAULT or OD FAILED occur the signaller should check the AUTO indication is still given. If the crossing AUTO indication is no longer being given the signaller will need to re-set AUTO by selecting either RAISE or LOWER (to match the position of the barriers at the crossing) and then re-select AUTO. The signaller should then check that the AUTO indication is being given.

Protecting Signal Doesn't Clear (with crossing still in Auto)

If protecting signal doesn't clear (but the crossing stays in Auto), the signaller should cancel the route over the crossing (for the train that has now stopped at the protecting signal) and set the route again to try to clear the signal.
The signaller shall report crossing failed/signal failed to clear to enable diagnosis to find the root cause (may be intermittent barrier proving fault as the barriers were lowering).

Axle Counters

MCB-OD crossings can work perfectly normally with axle counters as part of the train detection system. However, if an axle counter has been disturbed and therefore aspect restrictions apply, the barrier down time can be extended significantly. To mitigate this signaller instructions are required to inhibit auto lower but only in the direction that the aspect restriction applies. This is achieved by cancelling the forward route over the crossing for the protecting signal in the direction concerned as shown:


Aspect restriction within the the strike in requires signalbox instructions to inhibit auto lower (for affected direction) to prevent excessive barrier down time (e.g. forward route from protecting signal to be cancelled)
SIP
Aspect restriction on the other line does NOT affect this direction and therefore auto lower in this direction shall be permitted to be operable even with aspect restrictions on the other line

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
Up				
Steady White	When barriers are up and crossing control not working.	No	Normal condition no signaller intervention required	None
Flashing white	When the barriers have failed to raise successfully	Yes	Turn control switch to lower position, obtain down detection and then turn control switch to raise position and observe if steady UP detection indication is obtained. If no steady UP detection obtained turn control switch to lower position, fault equipment and call for attendant. If down detection obtained run trains normally. When attendant arrives initiate LCU control.	Possible barrier raise fault. Note it is possible that no barriers have started to move when receiving flashing UP indication.

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
AUTO				
Steady White	When auto lower and raise are available	No	Normal condition no signaller intervention required	None
Flashing White	When the crossing is in auto mode and requires signaller intervention.	Yes	If the train hasn't gone over the crossing, the protecting signal will not have cleared and the train will be at a stand or nearly at a stand. Select RAISE. After speaking to train driver, turn switch to lower and if signal shows a proceed aspect, the crossing will have detected clear and train can proceed normally. If crossing still occupied, protecting signal will not clear and train will have to be cautioned over the crossing in line with instructions. May also mean the crossing has been WORKING for too long.	The crossing lower sequence has failed to complete e.g. because there was a persistent object detected, or some other issue being indicated (check what other indications are showing). The DETECTOR indication may also become live and indicate that the crossing is still occupied. It may flash red for a few seconds if users take the chance to cross. Ask train driver to report what the problem was (they may be able to tell you if they can see crossing from protecting signal). If object is small and can be moved by train driver, ask them to move it as it will avoid delay to subsequent trains. It may be necessary to request someone to go to the crossing to remove an object that is being detected if the train driver doesn't move it clear. If no physical obstacle is reported then the obstacle detector system should be faulted. If crossing is indicating steady DOWN but AUTO flashes white, this indicating the crossing has been closed a long time. The signaller should consider if the crossing is still required to be DOWN, note auto raise will not work in this condition (with flashing AUTO). Signaller should either leave crossing controls as they are (if required to be down, but see next sentence) and manually RAISE when appropriate. If the barriers have been down a long time, this will cause flashing AUTO with steady DOWN, if the signaller would like to reset the long operating time warning they should select LOWER (whilst barriers are down) and then re-select AUTO, this will reset the long working timer and restore the crossing to AUTO (and auto raise will work).

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
No light	When auto lower and raise not available	Yes	When this the Auto indication is observedgoes out but the signaller wants to put the crossing back into Auto, the signaller needs to operate thetheir manual lower/raise control (so that the switch is in order to pass trains over the crossing and after the train has passed overcorrespondence with the barriers at the crossing.), and then operate the manual control switch back to Auto. NB the crossing won't go back into Auto if the barriers are UP with a train in the strike in with a route set over the crossing, in this situation the signaller must first cancel the route, then select raise before selecting Auto and re-stroking the route. The crossing will go back into Auto if the barriers are DOWN with a route set . If the barriers are neither UP or DOWN the crossing will NOT go back into Auto. The equipment must then be faulted. The crossing is then can be operated in Auto, but if it drops out of Auto again before the original fault has been rectified it will need to be operated via the manual control switch until the fault is rectified.	It is most likely that the auto lower system has failed, as auto raise is generated locally at the crossing.

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
WORKING				
Steady White	When the crossing is working, i.e. auto lower has acquired the approaching train, the crossing is not necessarily operating until it is required to do so.	No	Normal condition no signaller intervention required	None
No light	When crossing has not been initiated	No	Normal condition no signaller intervention required OR if LOWER has been selected and WORKING does not illuminate, the barriers are being held up because the minimum road open time (MROT) has not occurred. This time is nominally 20 seconds. The LOWER selection will not be stored and will need to be re-selected after the MROT time has expired. When the crossing is in LCU mode MROT does not apply	None

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
RED ROAD LIGHT				
Steady Red Indication	When all red road lights are working	No	Normal condition no signaller intervention required	None
Flashing Red	When a single road light is not working but there is at least one working in each road traffic light	Yes	The equipment must then be faulted. The crossing is then to be operated normally	A road light non operational in a road traffic light signal cluster. (RTLS)
Extinguished (when road lights would be expected to be flashing i.e. crossing is Working)	If red road lights are not working or any individual road traffic light is not working – Barriers Will Not Lower	Yes	In this case the barriers will not lower. (even under manual control) The equipment to be faulted and trains not permitted to pass over the crossing until rectified	More than one light out in a road traffic light signal cluster. (RTLS)

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
DOWN - Barriers Down				
Flashing White	1) When all barriers are down and crossing closed but awaiting Crossing Clear from the obstacle detectors 2) If the signal has already cleared (barriers were down with crossing clear), flashing DOWN indication will occur if barrier down detection is lost and then remade. In this case, as the signal is not replaced, the signaller need not take any action except report possible down detection issue.	No	Normal condition no signaller intervention required	1) None – Normal sequence operation. , however flashing white Down indication should change to steady white when crossing becomes clear. Once Crossing Clear has been obtained the Down indication will go steady white. If steady white Down indication is not given (in 4 to 6 seconds), and the signallers LOWER control has been operated the protecting signal will not clear and the train will need to be cautioned past the protecting signal (providing also have Red Road Lights steady red indication) 2) signaller need not take any action except report possible down detection issue at the crossing although the crossing can be used normally.
Steady White	When barriers are down AND crossing clear has been achieved	No	Normal condition no signaller intervention required	None

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
DETECTOR message text				
No text (DETECTOR no light)	Indication is extinguished normally until Signaller Intervention Required	No	Normal condition no signaller intervention required	None
OBSTACLE (Steady Red DETECTOR)	When signaller intervention is required and an obstacle is detected (AUTO will also be flashing)	Yes	Consult with train driver, operate manual control to LOWER (doing so will extinguish the OBSTACLE indication), check that barriers down and road light indications are obtained. (or at least red road traffic light indications as a minimum) Inform driver to pass the protecting signal at danger and the likelihood that the crossing may be obstructed in line with instructions. Once a train has passed clear of the crossing the barriers are to be raised by manual control to RAISE. If the train driver can see no obvious reason for an obstacle being detected, the equipment must be faulted.	The equipment must be faulted, unless a physical obstruction has been found and removed. It may be necessary to ask for the removal of the obstruction by the fault control if the driver has been unable to do so. If the train driver saw no obvious reason for an obstacle being detected, it is possible that a small object such as vegetation is being detected (which may not be visible to the driver)
BOD OCCUPIED (Flashing Red DETECTOR)	Barrier Protection Management/ Barrier Lower zone occupied	Yes	Consult with train driver, operate manual control to LOWER, (this may not lower the barriers if the BPM is reporting obstructed) check road light indications are obtained. Inform driver to pass the protecting signal at danger and the likelihood that the crossing may be obstructed in line with instructions. Once a train has passed clear of the crossing the barriers are to be raised by manual control to RAISE. The equipment must be faulted,.	Accompanied with flashing white auto indication suggests that the Barrier Lower Zone may be obstructed. Flashing red detector overrides steady red for the detector indication so if crossing also occupied i.e. detected by the RADAR and/or LIDAR in addition to the barrier lower zone – the signaller will only obtain the barrier lower zone obstructed.
CLEAR (Steady White DETECTOR) (Auto also flashing)	When signaller intervention is required and no obstacle is detected. (AUTO will also be flashing)	Yes	Consult with train driver, operate manual control to LOWER, check that barriers down and road light indications are obtained. (or at least red road traffic light indications as a minimum) Inform driver to pass the protecting signal at danger and the likelihood that the crossing may be obstructed in line with instructions. If crossing is clear when barriers have lowered the protecting signal should clear and train may take signal aspect. Once a train has passed clear of the crossing the barriers	Indicates possible equipment fault The equipment must be faulted, unless a physical obstruction has been found and removed. It may be necessary to ask for the removal of the obstruction by the fault control if the driver has been unable to do so. been found and removed.

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
			are to be raised by manual control to RAISE. If it is established that it is an obstacle detector fault, arrangements to be made to provide an attendant to operate the XCU equipment	
LOCAL CC with flashing roundel # (Flashing white LOCAL CC)	When in local crossing clear mode (XCU) and not acknowledged	Yes	The signaller to acknowledge the status of the condition and consult with attendant in line with instructions.	Crossing attendant (XCU) at crossing with XCU control box door open.
LOCAL CC (CCU/XCU Mode)				
LOCAL CC with flashing roundel # (Steady(Flashing white LOCAL CC)	When in local crossing clear mode (XCU) and not acknowledged	NoYes	Normal status when under XCU operation The signaller to acknowledge the status of the condition and consult with attendant in line with instructions.	None Crossing attendant (XCU) at crossing with XCU control box door open.
LOCAL CC # (Steady white LOCAL CC)	When in local crossing clear mode (XCU) and acknowledged	No	Normal status when under XCU operation **When the crossing is put into XCU the signaller should check that the crossing AUTO indication is being given and if not the signaller will need to re-set crossing AUTO, by selecting LOWER or RAISE to match the barriers position and then AUTO.**	None
No Text With flashing roundel and an audible alarm (LOCAL CC extinguished with an audible alarm)	Not in local crossing clear (XCU mode) anymore	yes	Acknowledge alarm	Crossing attendant (XCU) at crossing with XCU control box door closed.

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
OD Health Text field #				
No text (OD FAILED Steady white)	Normal	No	Normal condition no signaller intervention required	None
OD FAILED With flashing roundel (Flashing Red OD FAILED)	When OD critical fault present and not acknowledged	Yes	Signaller to acknowledge status of the crossing condition	Critical OD Fault present
OD FAILED (Steady Red OD FAILED)	When OD critical fault present and acknowledged	Yes	Crossing will now not drop out of AUTO and will NOT automatically lower so will have to be operated manually cautioning trains past the protecting signals in line with instructions until crossing can be put into XCU mode by an attendant. **If the crossing is put into XCU the signaller should check that the crossing AUTO indication is being given and if not the signaller will need to re-set crossing AUTO, by selecting LOWER or RAISE to match the barriers position and then AUTO.** The OD equipment must faulted	Critical OD Fault present.
OD FAULT with flashing roundel (Flashing white OD FAULT)	When OD fault present and not acknowledged	Yes	The signaller to acknowledge the status of the condition of the crossing.	This is a non-critical fault of the obstacle detectors. The obstacle detectors will attempt to reset themselves which takes approximately 35 seconds. This non critical OD FAULT must be reported in order to allow them to be monitored and investigated
OD FAULT (Steady white OD FAULT)	When OD fault present and has been acknowledged.	Yes	Signaller to acknowledge status condition of crossing. Signaller observes OD Fault indication go flashing white or red.	Equipment is re-setting itself. The OD reset takes approximately 35 seconds If the OD equipment successfully resets the OD FAULT indication will go out with an audible alarm and OD FAILED/FAULT roundel will flash (see next row). If the OD equipment does not successfully reset the

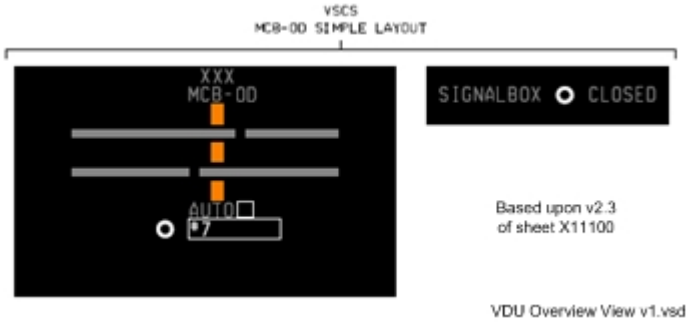
Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
				OD Fault indication will go out and the OD FAILED/FAULT roundel will flash and OD FAILED text will flash with an audible alarm.
Flashing Roundel (Flashing White OD FAILED)	When OD FAULT has been cleared and not acknowledged	Yes	This indication requires acknowledgement. **The signaller will need to check that the crossing AUTO indication is being given and if not the signaller should re-set crossing AUTO, by selecting LOWER or RAISE to match the barriers position and then AUTO.**	OD equipment rectified. Equipment has re-set, non critical fault has cleared or Critical fault has been rectified by fault team.

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
BOD FAILED (where provided) #				
No text (BOD FAILED steady white)	Normal	No	Normal condition no signaller intervention required	
BOD FAILED With flashing roundel (flashing red BOD FAILED)	Barrier obstruction detector has failed	Yes	Acknowledge	BOD failed e.g. inductive loop fault The decision to operate the crossing normally if the BOD/BPM has failed should be part of the signalbox instructions as this may not be desirable at certain crossings at certain times of the day, at such times it may be better to wait for an attendant.
BOD FAILED (steady red BOD FAILED)	Barrier obstruction detector has failed	Yes	Report equipment as failed Work crossing normally unless local instructions do not allow this.	BOD failed e.g. inductive loop fault The decision to operate the crossing normally if the BOD/BPM has failed should be part of the signalbox instructions as this may not be desirable at certain crossings at certain times of the day, at such times it may be better to wait for an attendant.Part of the barrier protection management system has failed, if blocking back were to occur there is a small risk of barrier damage.
No text With flashing roundel (flashing white BOD Failed)	Barrier obstruction detector can be restored to normal	yes	Acknowledge	

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault/Diagnosis
STANDBY IN USE – Power #				
POWER ON (STANDBY IN USE Steady white)	When in order and acknowledged	No	Normal condition no signaller intervention required	None
STANDBY IN USE With flashing roundel (STANDBY IN USE Flashing Red)	When standby in use and not acknowledged	Yes	The signaller to acknowledge the status of the condition of the crossing.	Power has been lost and crossing is running on its standby batteries.
STANDBY IN USE (STANDBY IN USE Steady red Indication)	When in order and acknowledged	Yes	The signaller must fault the condition and seek technical guidance for support.	NoneGenerally a minimum of 4 hours standby time will be provided, although this may be different for different crossings, the S&T will know the standby time provided, and determine the appropriate response time.
POWER ON With flashing roundel (STANDBY IN USE Flashing white)	When mains power is available and not acknowledged	Yes	The signaller to acknowledge the status of the condition of the crossing.	Power Mains power has been restored

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault Diagnosis
Failed (Crossing, see OD Health text for OD related faults) #				
IN ORDER (FAILED Steady White)	When crossing in order and acknowledged	No	Normal condition no signaller intervention required	None
FAILED With flashing roundel (FAILED Flashing Red)	When crossing failed and not acknowledged	Yes	Signaller to check status of other indications to establish condition at crossing and acknowledge flashing red indication.	Crossing equipment fault.
FAILED (FAILED Steady Red)	When crossing failed and acknowledged	Yes	Other indications must be checked to establish overall condition at crossing The condition must be faulted and IFC advised of panel status and arrangements set up to provide attendant for LCU operation. Trains operated over the crossing subject to equipment availability in line with instructions	Crossing equipment fault.
IN ORDER	When crossing in order and	Yes	Signaller to acknowledge status of the crossing	None will occur when exiting LCU mode at the

Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault Diagnosis
With flashing roundel (FAILED Flashing White)	not acknowledged		condition and work normally **The signaller will need to check that the crossing AUTO indication is being given and if not the signaller should re-set crossing AUTO, by selecting LOWER or RAISE to match the barriers position and then AUTO.**	crossing (note signallers LOWER control and Barriers need to be in correspondence in order to exit LCU mode.)



Indication Received	Meaning	Signaller Intervention	Signaller Action	Fault Diagnosis
Overview Alarm message area				
ALARM with flashing roundel	Occurs on any alarm change of state indicated with a hash(#) above	yes	Go to detailed view to find out status of crossing and Acknowledge the alarm	As appropriate to the alarm
ALARM	Crossing has an Acknowledged alarm	No	Wait for change of alarm status	
IN ORDER With flashing roundel	All alarms are in order and waiting acknowledgment by the signaller	yes	Acknowledge and resume normal working for that crossing **The signaller will need to check that the crossing AUTO indication is being given and if not the signaller should re-set crossing AUTO, by selecting LOWER or RAISE to match the barriers position and then AUTO.**	None
IN ORDER	Crossing is in order	no	Normal state	None