

```

MutexAsyncLock(Aid, mid, req_a) ==
/\ Aid \in Actors
/\ pc[Aid] \in LockIns
/\ mid \in Mutexes
/\ req_a \in Addr
    (* if Actor <Aid> has no pending request on mutex <mid>, create a new
    one *)
/\ \/\ ~isMember(Aid, waitingQueue[mid])
    /\ Requests' = [Requests EXCEPT ![Aid]= Requests[Aid] \cup {mid}]
    /\ memory' = [memory EXCEPT ![Aid][req_a] = mid]
    /\ waitingQueue' = [waitingQueue EXCEPT ![mid] =
Append(waitingQueue[mid], Aid)]
    (* otherwise i.e. actor <Aid> already has a pending request on mutex
    <mid>, keep the variables unchanged *)
    \/\ isMember(Aid, waitingQueue[mid])
        /\ UNCHANGED <<waitingQueue, memory, Requests>>
    (* MutexAsyncLock is never blocking, in any case, pc[Aid] is incremented *)
/\ \E ins \in Instr : pc' = [pc EXCEPT ![Aid] = ins]
/\ UNCHANGED <<Communications>>

```