Gear Controller Case-study (Time Added by the Plugin)

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Gear Controller Case-study (Time Added by the Plugin)

Context c0

CONTEXT
c0
CONSTANTS
ChangeDL
AXIOMS
axm1 :ChangeDL > 0
END

Context c1

CONTEXT
c1
EXTENDS
c0
CONSTANTS
R_TN *// ToNeu Releasing deadline*
R_NN *// NoNeu Releasing deadline*
S_NN *// NoNeu Setting deadline after a normal releasing process*
S_NN_RC *// NoNeu Setting deadline with opened clutch during releasing process*
S_FN *// FromNeu Setting deadline*
R_NN_NC_EX *// NoNeu Releasing without clutch expiry (500)*
AXIOMS
axm1 :R_TN > 0
axm2 :R_NN> 0
axm3 :S_NN> 0
axm4 :S_NN_RC > 0
axm5 :R_TN> 0
axm6 :R_TN ≤ ChangeDL
axm7 :R_NN + S_NN_RC ≤ ChangeDL
axm8 :R_NN_NC_EX + S_NN ≤ ChangeDL
axm9 :S_FN≤ ChangeDL
axm10 :S_FN> 0
END

Context c2

CONTEXT
c2
EXTENDS
c1
CONSTANTS
SyncOpen_DL *// 355*
SetGear_DL *// 350*
CloseClutch_DL *// 200*
Sync_EX *// 150*
AXIOMS
axm1 :SyncOpen_DL > 0
axm2 :SetGear_DL > 0
axm3 :CloseClutch_DL > 0
axm4 :SyncOpen_DL + SetGear_DL + CloseClutch_DL ≤ S_FN
axm5 :Sync_EX > 0
axm6 :Sync_EX ≤ SyncOpen_DL
END

Context c3

CONTEXT
c3
EXTENDS
c2
CONSTANTS
ZeroOpen_DL *// 455*
Release_DL *// 250*
Zero_EX *// 250*
AXIOMS
axm1 :ZeroOpen_DL > 0
axm2 :Release_DL >0
axm3 :ZeroOpen_DL + Release_DL + CloseClutch_DL ≤ R_TN

axm4 :Zero_EX >0
axm5 :Zero_EX ≤ ZeroOpen_DL
END

Context c4

CONTEXT
c4
EXTENDS
c3
AXIOMS
axm2 :Zero_EX + Release_DL ≤ R_NN_NC_EX
axm3 :ZeroOpen_DL + Release_DL + CloseClutch_DL ≤ R_NN
axm4 :SyncOpen_DL + SetGear_DL + CloseClutch_DL ≤ S_NN
axm5 :SetGear_DL + CloseClutch_DL ≤ S_NN_RC
END

Context c5

CONTEXT
c5
EXTENDS
c4
CONSTANTS
Zero_DL *// 155*
OpenClutch_DL *// 200*
Sync_DL *// 255*
OpenClutch_Zero_DE *// 250*
OpenClutch_Sync_DE *// 150*
AXIOMS
axm1 :Zero_DL > 0
axm2 :OpenClutch_DL > 0
axm3 :Zero_DL + OpenClutch_DL ≤ ZeroOpen_DL
axm4 :Sync_DL > 0
axm5 :Sync_DL + OpenClutch_DL ≤ SyncOpen_DL
axm6 :Zero_DL ≥ Zero_EX
axm7 :Sync_DL ≥ Sync_EX
axm8 :OpenClutch_Zero_DE > 0
axm9 :OpenClutch_Sync_DE > 0
axm10 :OpenClutch_Zero_DE > Zero_EX
axm11 :OpenClutch_Sync_DE > Sync_EX
axm12 :OpenClutch_Zero_DE ≤ Zero_DL
axm13 :OpenClutch_Sync_DE ≤ Sync_DL
END

Context c6

CONTEXT
c6
EXTENDS
c5
CONSTANTS
Channel_DL *// 5*
Engine_Sync_DL *// 100*
Engine_Zero_DL *// 200*
Clutch_Open_DL *// 150*
Clutch_Close_DL *// 150*
Gear_Set_DL *// 300*
Gear_Release_DL *// 200*
AXIOMS
axm1 :Channel_DL > 0
axm2 :Engine_Sync_DL > 0
axm3 :Engine_Zero_DL > 0
axm4 :2∗Channel_DL + Engine_Sync_DL ≤ Sync_EX
axm5 :2∗Channel_DL + Engine_Zero_DL ≤ Zero_EX
axm6 :Clutch_Open_DL > 0
axm7 :Clutch_Close_DL > 0
axm8 :2∗Channel_DL + Clutch_Open_DL < OpenClutch_DL
axm9 :2∗Channel_DL + Clutch_Close_DL < CloseClutch_DL
axm10 :Gear_Set_DL > 0

```
    axm11 :Gear_Release_DL >0
    axm12 :2∗Channel_DL + Gear_Set_DL < SetGear_DL
    axm13 :2∗Channel_DL + Gear_Release_DL < Release_DL
END
```

Machine m0

MACHINE
m0
SEES
c0
VARIABLES
Request
Response
Error *// Flags*
time
tRequest
tResponse
tError
INVARIANTS
inv1 :Request ∈ BOOL
inv2 :Error ∈ BOOL
inv3 :Response ∈ BOOL
time :time∈ℕ
tRequest :tRequest ∈ ℕ
tResponse :tResponse ∈ ℕ
tError :tError ∈ ℕ
Deadline1 :Request = TRUE ∧ Response = FALSE ∧ Error = FALSE ⇒ time ≤ tRequest + ChangeDL
ResponseDurationDeadline1 :Request = TRUE ∧ Response = TRUE ⇒ tResponse ≤ tRequest + ChangeDL
ErrorDurationDeadline1 :Request = TRUE ∧ Error = TRUE ⇒ tError ≤ tRequest + ChangeDL
inv4 :Request = FALSE ⇒ Response = FALSE ∧ Error = FALSE
inv5 :Response = TRUE ⇒ Error = FALSE
TIMING

Deadline1 :Deadline (Request, Response ∨ Error, ChangeDL)
EVENTS
INITIALISATION ≙
STATUS
ordinary
BEGIN
act1 :Error ≔ FALSE
act2 :Request ≔ FALSE
act3 :Response ≔ FALSE
time :time ≔ 0
tRequest :tRequest ≔ 0
tResponse :tResponse ≔ 0
tError :tError ≔ 0
END

Request ≙
STATUS
ordinary
WHEN
grd1 :Request = FALSE
THEN
act1 :Request ≔ TRUE
tRequest :tRequest ≔ time
END

Response ≙
STATUS
ordinary
WHEN
grd1 :Request = TRUE
grd2 :Error = FALSE
grd3 :Response = FALSE
THEN
act1 :Response ≔ TRUE
tResponse :tResponse ≔ time
END

Error ≙
STATUS
ordinary
WHEN
grd1 :Error = FALSE
grd2 :Request = TRUE
grd3 :Response = FALSE
THEN

```
        act1 :Error ≔ TRUE
        tError :tError ≔ time
END

    FINAL ≙
        STATUS
        ordinary
WHEN
        grd1 :Response = TRUE
THEN
        act1 :Request ≔ FALSE
        act2 :Response ≔ FALSE
END

    Tick_Tock ≙
        STATUS
        ordinary
ANY
        tick
WHERE
        tick :tick > 0
        Deadline1 :Request = TRUE ∧ Response = FALSE ∧ Error = FALSE ⇒ time + tick ≤ tRequest + ChangeDL
THEN
        act1 :time ≔ time+tick
END

END
```

Machine m1

MACHINE
m1
REFINES
m0
SEES
c0
VARIABLES
RequestFromNeu
RequestNoNeu
RequestToNeu
FromNeu *// Changing from the neutral gear to a gear*
ToNeu *// Changing from a gear to another gear*
NoNeu *// Changing from a gear to the neutral gear*
Error_FromNeu *// Flags*
Error_NoNeu
Error_ToNeu *// Flags*
isNeu *// Gear Status*
time
tRequestFromNeu
tError_FromNeu
tFromNeu
tRequestToNeu
tToNeu
tError_ToNeu
tRequestNoNeu
tError_NoNeu
tNoNeu
INVARIANTS
inv1 :{ToNeu, FromNeu, NoNeu, isNeu, RequestFromNeu, RequestNoNeu, RequestToNeu, Error_FromNeu, Error_NoNeu, Error_ToNeu} ∈ ℙ(BOOL)
inv2 :(FromNeu = TRUE ∨ ToNeu = TRUE ∨ NoNeu = TRUE) ⇒ Response = TRUE
inv3 :(FromNeu = FALSE ∧ ToNeu = FALSE ∧ NoNeu = FALSE) ⇒ Response = FALSE
inv4 :(RequestFromNeu = TRUE ∨ RequestNoNeu = TRUE ∨ RequestToNeu = TRUE) ⇒ Request = TRUE
inv5 :(RequestFromNeu = FALSE ∧ RequestNoNeu = FALSE ∧ RequestToNeu = FALSE) ⇒ Request = FALSE
inv6 :RequestFromNeu = TRUE ⇒RequestToNeu = FALSE ∧ RequestNoNeu = FALSE
inv7 :RequestToNeu = TRUE ⇒RequestFromNeu = FALSE ∧ RequestNoNeu = FALSE
inv8 :RequestNoNeu = TRUE ⇒RequestFromNeu = FALSE ∧ RequestToNeu = FALSE
inv9 :RequestNoNeu = TRUE ⇒ ToNeu = FALSE ∧ FromNeu = FALSE
inv10 :RequestToNeu = TRUE ⇒ FromNeu = FALSE ∧ NoNeu = FALSE
inv11 :RequestFromNeu = TRUE ⇒ ToNeu = FALSE ∧ NoNeu = FALSE
inv12 :NoNeu = TRUE ⇒ RequestNoNeu = TRUE
inv13 :FromNeu = TRUE ⇒ RequestFromNeu = TRUE
inv14 :ToNeu = TRUE ⇒ RequestToNeu = TRUE
inv15 :Error_FromNeu = TRUE ∨ Error_NoNeu = TRUE ∨ Error_ToNeu = TRUE ⇒ Error = TRUE
inv16 :Error_FromNeu = FALSE ∧ Error_NoNeu = FALSE ∧ Error_ToNeu= FALSE ⇒ Error = FALSE
inv17 :Error_FromNeu = TRUE ⇒ RequestFromNeu= TRUE
inv18 :Error_NoNeu = TRUE ⇒ RequestNoNeu= TRUE
inv19 :Error_ToNeu = TRUE ⇒ RequestToNeu= TRUE
inv20 :RequestFromNeu= TRUE ⇒ Error_NoNeu = FALSE ∧ Error_ToNeu = FALSE
inv21 :RequestNoNeu= TRUE ⇒ Error_FromNeu = FALSE ∧ Error_ToNeu = FALSE
inv22 :RequestToNeu= TRUE ⇒ Error_FromNeu = FALSE ∧ Error_NoNeu = FALSE
inv23 :FromNeu = TRUE ⇒ RequestFromNeu= TRUE
inv24 :NoNeu = TRUE ⇒ RequestNoNeu= TRUE
inv25 :ToNeu = TRUE ⇒ RequestToNeu= TRUE
inv26 :RequestFromNeu= TRUE ⇒ NoNeu = FALSE ∧ ToNeu = FALSE
inv27 :RequestNoNeu= TRUE ⇒ FromNeu = FALSE ∧ ToNeu = FALSE
inv28 :RequestToNeu= TRUE ⇒ FromNeu = FALSE ∧ NoNeu = FALSE
inv29 :FromNeu = TRUE ⇒ Error_FromNeu = FALSE
inv30 :NoNeu = TRUE ⇒ Error_NoNeu = FALSE
inv31 :ToNeu = TRUE ⇒ Error_ToNeu = FALSE
inv32 :FromNeu = TRUE ∨ ToNeu = TRUE ∨ NoNeu = TRUE ⇒ Error = FALSE
tRequestFromNeu :tRequestFromNeu ∈ ℕ
tError_FromNeu :tError_FromNeu ∈ ℕ
tFromNeu :tFromNeu ∈ ℕ
Deadline1 :RequestFromNeu = TRUE ∧ Error_FromNeu = FALSE ∧ FromNeu = FALSE ⇒ time ≤ tRequestFromNeu + ChangeDL
Error_FromNeuDurationDeadline1 : RequestFromNeu = TRUE ∧ Error_FromNeu = TRUE ⇒ tError_FromNeu ≤ tRequestFromNeu + ChangeDL
FromNeuDurationDeadline1 :RequestFromNeu = TRUE ∧ FromNeu = TRUE ⇒ tFromNeu ≤ tRequestFromNeu + ChangeDL
tRequestToNeu :tRequestToNeu ∈ ℕ
tToNeu :tToNeu ∈ ℕ
tError_ToNeu :tError_ToNeu ∈ ℕ
Deadline2 :RequestToNeu = TRUE ∧ ToNeu = FALSE ∧ Error_ToNeu = FALSE ⇒ time ≤ tRequestToNeu + ChangeDL
ToNeuDurationDeadline2 :RequestToNeu = TRUE ∧ ToNeu = TRUE ⇒ tToNeu ≤ tRequestToNeu + ChangeDL
Error_ToNeuDurationDeadline2 :RequestToNeu = TRUE ∧ Error_ToNeu = TRUE ⇒ tError_ToNeu ≤ tRequestToNeu + ChangeDL

tRequestNoNeu :tRequestNoNeu ∈ ℕ
tError_NoNeu :tError_NoNeu ∈ ℕ
tNoNeu :tNoNeu ∈ ℕ
Deadline3 :RequestNoNeu = TRUE ∧ Error_NoNeu = FALSE ∧ NoNeu = FALSE ⇒ time ≤ tRequestNoNeu + ChangeDL
Error_NoNeuDurationDeadline3 :RequestNoNeu = TRUE ∧ Error_NoNeu = TRUE ⇒ tError_NoNeu ≤ tRequestNoNeu + ChangeDL
NoNeuDurationDeadline3 :RequestNoNeu = TRUE ∧ NoNeu = TRUE ⇒ tNoNeu ≤ tRequestNoNeu + ChangeDL
inv33 :RequestFromNeu= TRUE ⇒ tRequestFromNeu = tRequest
inv34 :RequestNoNeu= TRUE ⇒ tRequestNoNeu = tRequest
inv35 :RequestToNeu= TRUE ⇒ tRequestToNeu = tRequest

TIMING

Deadline1 :Deadline (RequestFromNeu, Error_FromNeu ∨ FromNeu, ChangeDL)
Deadline2 :Deadline (RequestToNeu, ToNeu ∨ Error_ToNeu, ChangeDL)
Deadline3 :Deadline (RequestNoNeu, Error_NoNeu ∨ NoNeu, ChangeDL)

EVENTS

INITIALISATION ≙
STATUS
ordinary

BEGIN
act1 :ToNeu ≔ FALSE
act2 :FromNeu ≔ FALSE
act3 :NoNeu ≔ FALSE
act4 :isNeu ≔ TRUE
act5 :RequestNoNeu ≔ FALSE
act6 :RequestToNeu ≔ FALSE
act7 :RequestFromNeu ≔ FALSE
act8 :Error_FromNeu ≔ FALSE
act9 :Error_NoNeu ≔ FALSE
act10 :Error_ToNeu ≔ FALSE
time :time ≔ 0
tRequestFromNeu :tRequestFromNeu ≔ 0
tError_FromNeu :tError_FromNeu ≔ 0
tFromNeu :tFromNeu ≔ 0
tRequestToNeu :tRequestToNeu ≔ 0
tToNeu :tToNeu ≔ 0
tError_ToNeu :tError_ToNeu ≔ 0
tRequestNoNeu :tRequestNoNeu ≔ 0
tError_NoNeu :tError_NoNeu ≔ 0
tNoNeu :tNoNeu ≔ 0
END

RequestFromNeu ≙
STATUS
ordinary
REFINES
Request
WHEN
grd1 :RequestFromNeu = FALSE
grd2 :RequestNoNeu = FALSE
grd3 :RequestToNeu = FALSE
grd4 :isNeu = TRUE
THEN
act1 :RequestFromNeu ≔ TRUE
tRequestFromNeu :tRequestFromNeu ≔ time
END

RequestNoNeu ≙
STATUS
ordinary
REFINES
Request
WHEN
grd1 :RequestFromNeu = FALSE
grd2 :RequestNoNeu = FALSE
grd3 :RequestToNeu = FALSE
grd4 :isNeu = FALSE
THEN
act1 :RequestNoNeu ≔ TRUE
tRequestNoNeu :tRequestNoNeu ≔ time
END

RequestToNeu ≙
STATUS
ordinary
REFINES
Request
WHEN
grd1 :RequestFromNeu = FALSE

grd2 :RequestNoNeu = FALSE
grd3 :RequestToNeu = FALSE
grd4 :isNeu = FALSE
THEN
act1 :RequestToNeu ≔ TRUE
tRequestToNeu :tRequestToNeu ≔ time
END

FromNeu ≙
STATUS
ordinary
REFINES
Response
WHEN
grd1 :RequestFromNeu = TRUE
grd2 :Error_FromNeu = FALSE
grd3 :FromNeu = FALSE
THEN
act1 :FromNeu ≔ TRUE
act2 :isNeu ≔ FALSE
tFromNeu :tFromNeu ≔ time
END

NoNeu ≙
STATUS
ordinary
REFINES
Response
WHEN
grd1 :RequestNoNeu = TRUE
grd2 :Error_NoNeu = FALSE
grd3 :NoNeu = FALSE
THEN
act1 :NoNeu ≔ TRUE
tNoNeu :tNoNeu ≔ time
END

ToNeu ≙
STATUS
ordinary
REFINES
Response
WHEN
grd1 :RequestToNeu = TRUE
grd2 :Error_ToNeu = FALSE
grd3 :ToNeu = FALSE
THEN
act1 :ToNeu ≔ TRUE
act2 :isNeu ≔ TRUE
tToNeu :tToNeu ≔ time
END

Error_FromNeu ≙
STATUS
ordinary
REFINES
Error
WHEN
grd1 :Error_FromNeu = FALSE
grd2 :RequestFromNeu = TRUE
grd3 :FromNeu = FALSE
THEN
act1 :Error_FromNeu ≔ TRUE
tError_FromNeu :tError_FromNeu ≔ time
END

Error_NoNeu ≙
STATUS
ordinary
REFINES
Error
WHEN
grd1 :Error_NoNeu = FALSE
grd2 :RequestNoNeu = TRUE
grd3 :NoNeu = FALSE
THEN
act1 :Error_NoNeu ≔ TRUE
tError_NoNeu :tError_NoNeu ≔ time
END

```
    Error_ToNeu ≙
        STATUS
      ordinary
REFINES
      Error
WHEN
      grd1 :Error_ToNeu = FALSE
      grd2 :RequestToNeu = TRUE
      grd3 :ToNeu = FALSE
THEN
      act1 :Error_ToNeu ≔ TRUE
      tError_ToNeu :tError_ToNeu ≔ time
END

    FINAL ≙
        STATUS
      ordinary
REFINES
      FINAL
WHEN
      grd1 :FromNeu = TRUE ∨ ToNeu = TRUE ∨ NoNeu = TRUE
THEN
      act1 :RequestFromNeu ≔ FALSE
      act2 :RequestNoNeu ≔ FALSE
      act3 :RequestToNeu ≔ FALSE
      act4 :FromNeu ≔ FALSE
      act5 :ToNeu ≔ FALSE
      act6 :NoNeu ≔ FALSE
END

    Tick_Tock ≙
        STATUS
      ordinary
REFINES
      Tick_Tock
ANY
      tick
WHERE
      tick :tick > 0
      Deadline1 :RequestFromNeu = TRUE ∧ Error_FromNeu = FALSE ∧ FromNeu = FALSE ⇒ time + tick ≤ tRequestFromNeu + ChangeDL
      Deadline2 :RequestToNeu = TRUE ∧ ToNeu = FALSE ∧ Error_ToNeu = FALSE ⇒ time + tick ≤ tRequestToNeu + ChangeDL
      Deadline3 :RequestNoNeu = TRUE ∧ Error_NoNeu = FALSE ∧ NoNeu = FALSE ⇒ time + tick ≤ tRequestNoNeu + ChangeDL
THEN
      act1 :time ≔ time+tick
END

END
```

Machine m2

MACHINE
m2
REFINES
m1
SEES
c0
VARIABLES
RequestFromNeu
RequestNoNeu
RequestToNeu
FromNeuNoClutch
NoNeuClutch *// Flags*
ToNeuNoClutch
NoNeuNoClutch
FromNeuClutch
ToNeuClutch *// nextline*
Error_FromNeu *// Flags*
Error_NoNeu *// Flage*
Error_ToNeu *// Flags*
isNeu *// Gear Status*
time
tRequestFromNeu
tError_FromNeu
tFromNeuNoClutch
tFromNeuClutch
tRequestToNeu
tToNeuNoClutch
tError_ToNeu
tToNeuClutch
tRequestNoNeu
tError_NoNeu
tNoNeuClutch
tNoNeuNoClutch
INVARIANTS
inv1 :FromNeuClutch ∈ BOOL
inv2 :FromNeuNoClutch ∈ BOOL
inv3 :ToNeuNoClutch ∈ BOOL
inv4 :ToNeuClutch ∈ BOOL
inv5 :NoNeuNoClutch ∈ BOOL
inv6 :NoNeuClutch ∈ BOOL
inv7 :FromNeuNoClutch = TRUE ∨ FromNeuClutch = TRUE ⇔ FromNeu = TRUE
inv8 :ToNeuNoClutch = TRUE ∨ ToNeuClutch = TRUE ⇔ ToNeu = TRUE
inv9 :NoNeuNoClutch = TRUE ∨ NoNeuClutch = TRUE ⇔ NoNeu = TRUE
inv10 :FromNeuNoClutch = FALSE ∧ FromNeuClutch = FALSE ⇔ FromNeu = FALSE
inv11 :ToNeuNoClutch = FALSE ∧ ToNeuClutch = FALSE ⇔ ToNeu = FALSE
inv12 :NoNeuNoClutch = FALSE ∧ NoNeuClutch = FALSE ⇔ NoNeu = FALSE
tFromNeuNoClutch :tFromNeuNoClutch ∈ ℕ
tFromNeuClutch :tFromNeuClutch ∈ ℕ
Deadline1 : RequestFromNeu = TRUE ∧ Error_FromNeu = FALSE ∧ FromNeuNoClutch = FALSE ∧ FromNeuClutch = FALSE ⇒ time ≤ tRequestFromNeu + ChangeDL
Error_FromNeuDurationDeadline1 : RequestFromNeu = TRUE ∧ Error_FromNeu = TRUE ⇒ tError_FromNeu ≤ tRequestFromNeu + ChangeDL
FromNeuNoClutchDurationDeadline1 : RequestFromNeu = TRUE ∧ FromNeuNoClutch = TRUE ⇒ tFromNeuNoClutch ≤ tRequestFromNeu + ChangeDL
FromNeuClutchDurationDeadline1 : RequestFromNeu = TRUE ∧ FromNeuClutch = TRUE ⇒ tFromNeuClutch ≤ tRequestFromNeu + ChangeDL
tToNeuNoClutch :tToNeuNoClutch ∈ ℕ
tToNeuClutch :tToNeuClutch ∈ ℕ
Deadline2 : RequestToNeu = TRUE ∧ ToNeuNoClutch = FALSE ∧ Error_ToNeu = FALSE ∧ ToNeuClutch = FALSE ⇒ time ≤ tRequestToNeu + ChangeDL
ToNeuNoClutchDurationDeadline2 :RequestToNeu = TRUE ∧ ToNeuNoClutch = TRUE ⇒ tToNeuNoClutch ≤ tRequestToNeu + ChangeDL
Error_ToNeuDurationDeadline2 :RequestToNeu = TRUE ∧ Error_ToNeu = TRUE ⇒ tError_ToNeu ≤ tRequestToNeu + ChangeDL
ToNeuClutchDurationDeadline2 :RequestToNeu = TRUE ∧ ToNeuClutch = TRUE ⇒ tToNeuClutch ≤ tRequestToNeu + ChangeDL
tNoNeuClutch :tNoNeuClutch ∈ ℕ
tNoNeuNoClutch :tNoNeuNoClutch ∈ ℕ
Deadline3 : RequestNoNeu = TRUE ∧ Error_NoNeu = FALSE ∧ NoNeuClutch = FALSE ∧ NoNeuNoClutch = FALSE ⇒ time ≤ tRequestNoNeu + ChangeDL
Error_NoNeuDurationDeadline3 :RequestNoNeu = TRUE ∧ Error_NoNeu = TRUE ⇒ tError_NoNeu ≤ tRequestNoNeu + ChangeDL
NoNeuClutchDurationDeadline3 :RequestNoNeu = TRUE ∧ NoNeuClutch = TRUE ⇒ tNoNeuClutch ≤ tRequestNoNeu + ChangeDL
NoNeuNoClutchDurationDeadline3 :RequestNoNeu = TRUE ∧ NoNeuNoClutch = TRUE ⇒ tNoNeuNoClutch ≤ tRequestNoNeu + ChangeDL
TIMING

Deadline1 :Deadline (RequestFromNeu, Error_FromNeu ∨ FromNeuNoClutch ∨ FromNeuClutch, ChangeDL)
Deadline2 :Deadline (RequestToNeu, ToNeuNoClutch ∨ Error_ToNeu ∨ ToNeuClutch, ChangeDL)

```
        Deadline3 :Deadline (RequestNoNeu, Error_NoNeu ∨ NoNeuClutch ∨ NoNeuNoClutch, ChangeDL)
EVENTS
    INITIALISATION ≙
        STATUS
        ordinary
BEGIN
        act1 :ToNeuNoClutch ≔ FALSE
        act2 :FromNeuNoClutch ≔ FALSE
        act3 :NoNeuNoClutch ≔ FALSE
        act4 :ToNeuClutch ≔ FALSE
        act5 :FromNeuClutch ≔ FALSE
        act6 :NoNeuClutch ≔ FALSE
        act7 :RequestNoNeu ≔ FALSE
        act8 :RequestToNeu ≔ FALSE
        act9 :RequestFromNeu ≔ FALSE
        act10 :isNeu ≔ TRUE
        act11 :Error_FromNeu ≔ FALSE
        act12 :Error_NoNeu ≔ FALSE
        act13 :Error_ToNeu ≔ FALSE
        time :time ≔ 0
        tRequestFromNeu :tRequestFromNeu ≔ 0
        tError_FromNeu :tError_FromNeu ≔ 0
        tFromNeuNoClutch :tFromNeuNoClutch ≔ 0
        tFromNeuClutch :tFromNeuClutch ≔ 0
        tRequestToNeu :tRequestToNeu ≔ 0
        tToNeuNoClutch :tToNeuNoClutch ≔ 0
        tError_ToNeu :tError_ToNeu ≔ 0
        tToNeuClutch :tToNeuClutch ≔ 0
        tRequestNoNeu :tRequestNoNeu ≔ 0
        tError_NoNeu :tError_NoNeu ≔ 0
        tNoNeuClutch :tNoNeuClutch ≔ 0
        tNoNeuNoClutch :tNoNeuNoClutch ≔ 0
END

    RequestFromNeu ≙
        STATUS
        ordinary
REFINES
        RequestFromNeu
WHEN
        grd1 :RequestFromNeu = FALSE
        grd2 :RequestNoNeu = FALSE
        grd3 :RequestToNeu = FALSE
        grd4 :isNeu = TRUE
THEN
        act1 :RequestFromNeu ≔ TRUE
        tRequestFromNeu :tRequestFromNeu ≔ time
END

    RequestNoNeu ≙
        STATUS
        ordinary
REFINES
        RequestNoNeu
WHEN
        grd1 :RequestFromNeu = FALSE
        grd2 :RequestNoNeu = FALSE
        grd3 :RequestToNeu = FALSE
        grd4 :isNeu = FALSE
THEN
        act1 :RequestNoNeu ≔ TRUE
        tRequestNoNeu :tRequestNoNeu ≔ time
END

    RequestToNeu ≙
        STATUS
        ordinary
REFINES
        RequestToNeu
WHEN
        grd1 :RequestFromNeu = FALSE
        grd2 :RequestNoNeu = FALSE
        grd3 :RequestToNeu = FALSE
        grd4 :isNeu = FALSE
THEN
        act1 :RequestToNeu ≔ TRUE
        tRequestToNeu :tRequestToNeu ≔ time
END
```

```
    FromNeuNoClutch ≜
        STATUS
        ordinary
REFINES
        FromNeu
WHEN
        grd1 :RequestFromNeu = TRUE
        grd2 :Error_FromNeu = FALSE
        grd3 :FromNeuNoClutch = FALSE
        grd4 :FromNeuClutch = FALSE
THEN
        act1 :FromNeuNoClutch ≔ TRUE
        act2 :isNeu ≔ FALSE
        tFromNeuNoClutch :tFromNeuNoClutch ≔ time
END

    NoNeuNoClutch ≜
        STATUS
        ordinary
REFINES
        NoNeu
WHEN
        grd1 :RequestNoNeu = TRUE
        grd2 :Error_NoNeu = FALSE
        grd3 :NoNeuNoClutch = FALSE
        grd4 :NoNeuClutch = FALSE
THEN
        act1 :NoNeuNoClutch ≔ TRUE
        tNoNeuNoClutch :tNoNeuNoClutch ≔ time
END

    ToNeuNoClutch ≜
        STATUS
        ordinary
REFINES
        ToNeu
WHEN
        grd1 :RequestToNeu = TRUE
        grd2 :Error_ToNeu = FALSE
        grd3 :ToNeuNoClutch = FALSE
        grd4 :ToNeuClutch = FALSE
THEN
        act1 :ToNeuNoClutch ≔ TRUE
        act2 :isNeu ≔ TRUE
        tToNeuNoClutch :tToNeuNoClutch ≔ time
END

    FromNeuClutch ≜
        STATUS
        ordinary
REFINES
        FromNeu
WHEN
        grd1 :RequestFromNeu = TRUE
        grd2 :Error_FromNeu = FALSE
        grd3 :FromNeuClutch = FALSE
        grd4 :FromNeuNoClutch = FALSE
THEN
        act1 :FromNeuClutch ≔ TRUE
        act2 :isNeu ≔ FALSE
        tFromNeuClutch :tFromNeuClutch ≔ time
END

    NoNeuClutch ≜
        STATUS
        ordinary
REFINES
        NoNeu
WHEN
        grd1 :RequestNoNeu = TRUE
        grd2 :Error_NoNeu = FALSE
        grd3 :NoNeuClutch = FALSE
        grd4 :NoNeuNoClutch = FALSE
THEN
        act1 :NoNeuClutch ≔ TRUE
        tNoNeuClutch :tNoNeuClutch ≔ time
END

    ToNeuClutch ≜
```

```
        STATUS
    ordinary
REFINES
    ToNeu
WHEN
    grd1 :RequestToNeu = TRUE
    grd2 :Error_ToNeu = FALSE
    grd3 :ToNeuClutch = FALSE
    grd4 :ToNeuNoClutch = FALSE
THEN
    act1 :ToNeuClutch ≔ TRUE
    act2 :isNeu ≔ TRUE
    tToNeuClutch :tToNeuClutch ≔ time
END

  Error_FromNeu ≙
        STATUS
    ordinary
REFINES
    Error_FromNeu
WHEN
    grd1 :Error_FromNeu = FALSE
    grd2 :RequestFromNeu = TRUE
    grd3 :FromNeuClutch = FALSE
    grd4 :FromNeuNoClutch = FALSE
THEN
    act1 :Error_FromNeu ≔ TRUE
    tError_FromNeu :tError_FromNeu ≔ time
END

  Error_NoNeu ≙
        STATUS
    ordinary
REFINES
    Error_NoNeu
WHEN
    grd1 :Error_NoNeu = FALSE
    grd2 :RequestNoNeu = TRUE
    grd3 :NoNeuClutch = FALSE
    grd4 :NoNeuNoClutch = FALSE
THEN
    act1 :Error_NoNeu ≔ TRUE
    tError_NoNeu :tError_NoNeu ≔ time
END

  Error_ToNeu ≙
        STATUS
    ordinary
REFINES
    Error_ToNeu
WHEN
    grd1 :Error_ToNeu = FALSE
    grd2 :RequestToNeu = TRUE
    grd3 :ToNeuClutch = FALSE
    grd4 :ToNeuNoClutch = FALSE
THEN
    act1 :Error_ToNeu ≔ TRUE
    tError_ToNeu :tError_ToNeu ≔ time
END

  FINAL ≙
        STATUS
    ordinary
REFINES
    FINAL
WHEN
    grd1 :FromNeuNoClutch = TRUE ∨ ToNeuNoClutch = TRUE ∨ NoNeuNoClutch = TRUE ∨
          FromNeuClutch = TRUE ∨ ToNeuClutch = TRUE ∨ NoNeuClutch = TRUE
THEN
    act1 :RequestFromNeu ≔ FALSE
    act2 :RequestNoNeu ≔ FALSE
    act3 :RequestToNeu ≔ FALSE
    act4 :FromNeuNoClutch ≔ FALSE
    act5 :ToNeuNoClutch ≔ FALSE
    act6 :NoNeuNoClutch ≔ FALSE
    act7 :FromNeuClutch ≔ FALSE
    act8 :ToNeuClutch ≔ FALSE
    act9 :NoNeuClutch ≔ FALSE
END
```

```
    Tick_Tock ≙
        STATUS
      ordinary
REFINES
      Tick_Tock
ANY
      tick
WHERE
      tick :tick > 0
      Deadline1  RequestFromNeu = TRUE ∧ Error_FromNeu = FALSE ∧ FromNeuNoClutch = FALSE ∧ FromNeuClutch = FALSE ⇒ time + tick
      :          ≤ tRequestFromNeu + ChangeDL
      Deadline2  RequestToNeu = TRUE ∧ ToNeuNoClutch = FALSE ∧ Error_ToNeu = FALSE ∧ ToNeuClutch = FALSE ⇒ time + tick ≤
      :          tRequestToNeu + ChangeDL
      Deadline3  RequestNoNeu = TRUE ∧ Error_NoNeu = FALSE ∧ NoNeuClutch = FALSE ∧ NoNeuNoClutch = FALSE ⇒ time + tick ≤
      :          tRequestNoNeu + ChangeDL
THEN
      act1 :time ≔ time+tick
END

END
```

Machine m3

MACHINE
m3
REFINES
m2
SEES
c0
VARIABLES
isNeu *// Gear Status*
RequestFromNeu
RequestNoNeu
RequestToNeu
Setting_NoNeu_NoClutch *// Flags*
Setting_FromNeu_NoClutch
Releasing_ToNeu_NoClutch
Releasing_NoNeu_NoClutch *// Flags*
Setting_FromNeu_Clutch
Releasing_ToNeu_Clutch
Releasing_NoNeu_Clutch *// Flags*
Setting_NoNeu_Clutch
Setting_NoNeu_ReleaseClutch *// Flags*
Error_FromNeu *// Flags*
Error_Releasing_NoNeu *// Flage*
Error_Setting_NoNeu *// Flage*
Error_ToNeu *// Flags*
time
tRequestFromNeu
tError_FromNeu
tSetting_FromNeu_Clutch
tSetting_FromNeu_NoClutch
tRequestToNeu
tReleasing_ToNeu_NoClutch
tError_ToNeu
tReleasing_ToNeu_Clutch
tRequestNoNeu
tError_Releasing_NoNeu
tSetting_NoNeu_Clutch
tSetting_NoNeu_ReleaseClutch
tError_Setting_NoNeu
tSetting_NoNeu_NoClutch

INVARIANTS
inv1 :{Setting_FromNeu_Clutch, Releasing_ToNeu_Clutch, Releasing_NoNeu_Clutch, Setting_NoNeu_Clutch, Setting_NoNeu_ReleaseClutch, Releasing_ToNeu_NoClutch, Releasing_NoNeu_NoClutch, Setting_NoNeu_NoClutch, Setting_FromNeu_NoClutch, Error_FromNeu ,Error_Releasing_NoNeu ,Error_Setting_NoNeu,Error_ToNeu} ∈ ℙ(BOOL)
inv2 :Setting_FromNeu_NoClutch = TRUE ⇔ FromNeuNoClutch = TRUE
inv3 :Setting_NoNeu_NoClutch = TRUE ⇔ NoNeuNoClutch = TRUE
inv4 :Releasing_ToNeu_NoClutch = TRUE ⇔ ToNeuNoClutch = TRUE
inv5 :Setting_FromNeu_Clutch = TRUE ⇔ FromNeuClutch = TRUE
inv6 :Setting_NoNeu_Clutch = TRUE ∨ Setting_NoNeu_ReleaseClutch = TRUE ⇔ NoNeuClutch = TRUE
inv7 :Releasing_ToNeu_Clutch = TRUE ⇔ ToNeuClutch = TRUE
inv8 :Releasing_NoNeu_NoClutch =TRUE ∨ Releasing_NoNeu_Clutch =TRUE ⇒ RequestNoNeu = TRUE
inv9 :Releasing_NoNeu_NoClutch =TRUE ⇒ Releasing_NoNeu_Clutch =FALSE
inv10 :Releasing_NoNeu_Clutch =TRUE ⇒ Releasing_NoNeu_NoClutch =FALSE
inv11 :Setting_NoNeu_Clutch = TRUE ∨ Setting_NoNeu_NoClutch = TRUE ⇒ Releasing_NoNeu_NoClutch = TRUE
inv12 :Setting_NoNeu_ReleaseClutch = TRUE ⇒ Releasing_NoNeu_Clutch = TRUE
inv13 :Error_Releasing_NoNeu = FALSE ∧ Error_Setting_NoNeu = FALSE ⇒ Error_NoNeu = FALSE
inv14 :Error_Releasing_NoNeu = TRUE ∨ Error_Setting_NoNeu = TRUE ⇒ Error_NoNeu = TRUE
inv15 :Releasing_NoNeu_Clutch = TRUE ∨ Releasing_NoNeu_NoClutch = TRUE ⇒ Error_Releasing_NoNeu = FALSE
inv16 : RequestNoNeu = TRUE ∧ Releasing_NoNeu_Clutch = FALSE ∧ Releasing_NoNeu_NoClutch = FALSE ⇒ Error_Setting_NoNeu = FALSE
tSetting_FromNeu_Clutch :tSetting_FromNeu_Clutch ∈ ℕ
tSetting_FromNeu_NoClutch :tSetting_FromNeu_NoClutch ∈ ℕ
Deadline1 : RequestFromNeu = TRUE ∧ Error_FromNeu = FALSE ∧ Setting_FromNeu_Clutch = FALSE ∧ Setting_FromNeu_NoClutch = FALSE ⇒ time ≤ tRequestFromNeu + ChangeDL
Error_FromNeuDurationDeadline1 : RequestFromNeu = TRUE ∧ Error_FromNeu = TRUE ⇒ tError_FromNeu ≤ tRequestFromNeu + ChangeDL
Setting_FromNeu_ClutchDurationDeadline1 : RequestFromNeu = TRUE ∧ Setting_FromNeu_Clutch = TRUE ⇒ tSetting_FromNeu_Clutch ≤ tRequestFromNeu + ChangeDL
Setting_FromNeu_NoClutchDurationDeadline1 : RequestFromNeu = TRUE ∧ Setting_FromNeu_NoClutch = TRUE ⇒ tSetting_FromNeu_NoClutch ≤ tRequestFromNeu + ChangeDL
tReleasing_ToNeu_NoClutch :tReleasing_ToNeu_NoClutch ∈ ℕ
tReleasing_ToNeu_Clutch :tReleasing_ToNeu_Clutch ∈ ℕ
Deadline2 : RequestToNeu = TRUE ∧ Releasing_ToNeu_NoClutch = FALSE ∧ Error_ToNeu = FALSE ∧ Releasing_ToNeu_Clutch = FALSE ⇒ time ≤ tRequestToNeu + ChangeDL

Releasing_ToNeu_NoClutchDurationDeadline2 : RequestToNeu = TRUE ∧ Releasing_ToNeu_NoClutch = TRUE ⇒ tReleasing_ToNeu_NoClutch ≤ tRequestToNeu + ChangeDL
Error_ToNeuDurationDeadline2 : RequestToNeu = TRUE ∧ Error_ToNeu = TRUE ⇒ tError_ToNeu ≤ tRequestToNeu + ChangeDL
Releasing_ToNeu_ClutchDurationDeadline2 : RequestToNeu = TRUE ∧ Releasing_ToNeu_Clutch = TRUE ⇒ tReleasing_ToNeu_Clutch ≤ tRequestToNeu + ChangeDL
tError_Releasing_NoNeu : tError_Releasing_NoNeu ∈ ℕ
tSetting_NoNeu_Clutch : tSetting_NoNeu_Clutch ∈ ℕ
tSetting_NoNeu_ReleaseClutch : tSetting_NoNeu_ReleaseClutch ∈ ℕ
tError_Setting_NoNeu : tError_Setting_NoNeu ∈ ℕ
tSetting_NoNeu_NoClutch : tSetting_NoNeu_NoClutch ∈ ℕ
Deadline3 : RequestNoNeu = TRUE ∧ Error_Releasing_NoNeu = FALSE ∧ Setting_NoNeu_Clutch = FALSE ∧ Setting_NoNeu_ReleaseClutch = FALSE ∧ Error_Setting_NoNeu = FALSE ∧ Setting_NoNeu_NoClutch = FALSE ⇒ time ≤ tRequestNoNeu + ChangeDL
Error_Releasing_NoNeuDurationDeadline3 : RequestNoNeu = TRUE ∧ Error_Releasing_NoNeu = TRUE ⇒ tError_Releasing_NoNeu ≤ tRequestNoNeu + ChangeDL
Setting_NoNeu_ClutchDurationDeadline3 : RequestNoNeu = TRUE ∧ Setting_NoNeu_Clutch = TRUE ⇒ tSetting_NoNeu_Clutch ≤ tRequestNoNeu + ChangeDL
Setting_NoNeu_ReleaseClutchDurationDeadline3 : RequestNoNeu = TRUE ∧ Setting_NoNeu_ReleaseClutch = TRUE ⇒ tSetting_NoNeu_ReleaseClutch ≤ tRequestNoNeu + ChangeDL
Error_Setting_NoNeuDurationDeadline3 : RequestNoNeu = TRUE ∧ Error_Setting_NoNeu = TRUE ⇒ tError_Setting_NoNeu ≤ tRequestNoNeu + ChangeDL
Setting_NoNeu_NoClutchDurationDeadline3 : RequestNoNeu = TRUE ∧ Setting_NoNeu_NoClutch = TRUE ⇒ tSetting_NoNeu_NoClutch ≤ tRequestNoNeu + ChangeDL

TIMING

Deadline1 : Deadline (RequestFromNeu, Error_FromNeu ∨ Setting_FromNeu_Clutch ∨ Setting_FromNeu_NoClutch, ChangeDL)
Deadline2 : Deadline (RequestToNeu, Releasing_ToNeu_NoClutch ∨ Error_ToNeu ∨ Releasing_ToNeu_Clutch, ChangeDL)
Deadline3 : Deadline (RequestNoNeu, Error_Releasing_NoNeu ∨ Setting_NoNeu_Clutch ∨ Setting_NoNeu_ReleaseClutch ∨ Error_Setting_NoNeu ∨ Setting_NoNeu_NoClutch, ChangeDL)

EVENTS

INITIALISATION ≙

STATUS

ordinary

BEGIN

act1 : isNeu ≔ TRUE
act2 : RequestNoNeu ≔ FALSE
act3 : RequestToNeu ≔ FALSE
act4 : RequestFromNeu ≔ FALSE
act5 : Releasing_ToNeu_NoClutch ≔ FALSE
act6 : Setting_FromNeu_NoClutch ≔ FALSE
act7 : Releasing_NoNeu_NoClutch ≔ FALSE
act8 : Setting_NoNeu_NoClutch ≔ FALSE
act9 : Releasing_ToNeu_Clutch ≔ FALSE
act10 : Setting_FromNeu_Clutch ≔ FALSE
act11 : Releasing_NoNeu_Clutch ≔ FALSE
act12 : Setting_NoNeu_Clutch ≔ FALSE
act13 : Setting_NoNeu_ReleaseClutch ≔ FALSE
act14 : Error_FromNeu ≔ FALSE
act15 : Error_Releasing_NoNeu ≔ FALSE
act16 : Error_Setting_NoNeu ≔ FALSE
act17 : Error_ToNeu ≔ FALSE
time : time ≔ 0
tRequestFromNeu : tRequestFromNeu ≔ 0
tError_FromNeu : tError_FromNeu ≔ 0
tSetting_FromNeu_Clutch : tSetting_FromNeu_Clutch ≔ 0
tSetting_FromNeu_NoClutch : tSetting_FromNeu_NoClutch ≔ 0
tRequestToNeu : tRequestToNeu ≔ 0
tReleasing_ToNeu_NoClutch : tReleasing_ToNeu_NoClutch ≔ 0
tError_ToNeu : tError_ToNeu ≔ 0
tReleasing_ToNeu_Clutch : tReleasing_ToNeu_Clutch ≔ 0
tRequestNoNeu : tRequestNoNeu ≔ 0
tError_Releasing_NoNeu : tError_Releasing_NoNeu ≔ 0
tSetting_NoNeu_Clutch : tSetting_NoNeu_Clutch ≔ 0
tSetting_NoNeu_ReleaseClutch : tSetting_NoNeu_ReleaseClutch ≔ 0
tError_Setting_NoNeu : tError_Setting_NoNeu ≔ 0
tSetting_NoNeu_NoClutch : tSetting_NoNeu_NoClutch ≔ 0

END

RequestFromNeu ≙

STATUS

ordinary

REFINES

RequestFromNeu

WHEN

grd1 : RequestFromNeu = FALSE
grd2 : RequestNoNeu = FALSE
grd3 : RequestToNeu = FALSE
grd4 : isNeu = TRUE

THEN

act1 :RequestFromNeu ≔ TRUE
tRequestFromNeu :tRequestFromNeu ≔ time
END

RequestNoNeu ≙
STATUS
ordinary
REFINES
RequestNoNeu
WHEN
grd1 :RequestFromNeu = FALSE
grd2 :RequestNoNeu = FALSE
grd3 :RequestToNeu = FALSE
grd4 :isNeu = FALSE
THEN
act1 :RequestNoNeu ≔ TRUE
tRequestNoNeu :tRequestNoNeu ≔ time
END

RequestToNeu ≙
STATUS
ordinary
REFINES
RequestToNeu
WHEN
grd1 :RequestFromNeu = FALSE
grd2 :RequestNoNeu = FALSE
grd3 :RequestToNeu = FALSE
grd4 :isNeu = FALSE
THEN
act1 :RequestToNeu ≔ TRUE
tRequestToNeu :tRequestToNeu ≔ time
END

Setting_FromNeu_NoClutch ≙
STATUS
ordinary
REFINES
FromNeuNoClutch
WHEN
grd1 :RequestFromNeu = TRUE
grd2 :Error_FromNeu = FALSE
grd3 :Setting_FromNeu_NoClutch = FALSE
grd4 :Setting_FromNeu_Clutch = FALSE
THEN
act1 :Setting_FromNeu_NoClutch ≔ TRUE
act2 :isNeu ≔ FALSE
tSetting_FromNeu_NoClutch :tSetting_FromNeu_NoClutch ≔ time
END

Setting_FromNeu_Clutch ≙
STATUS
ordinary
REFINES
FromNeuClutch
WHEN
grd1 :RequestFromNeu = TRUE
grd2 :Error_FromNeu = FALSE
grd3 :Setting_FromNeu_Clutch = FALSE
grd4 :Setting_FromNeu_NoClutch = FALSE
THEN
act1 :Setting_FromNeu_Clutch ≔ TRUE
act2 :isNeu ≔ FALSE
tSetting_FromNeu_Clutch :tSetting_FromNeu_Clutch ≔ time
END

Releasing_NoNeu_NoClutch ≙
STATUS
ordinary
WHEN
grd1 :RequestNoNeu = TRUE
grd2 :Error_Releasing_NoNeu = FALSE
grd3 :Releasing_NoNeu_NoClutch = FALSE
grd4 :Releasing_NoNeu_Clutch = FALSE
THEN
act1 :Releasing_NoNeu_NoClutch ≔ TRUE
END

Releasing_NoNeu_Clutch ≙

```
            STATUS
        ordinary
WHEN
        grd1 :RequestNoNeu = TRUE
        grd2 :Error_Releasing_NoNeu = FALSE
        grd3 :Releasing_NoNeu_Clutch = FALSE
        grd4 :Releasing_NoNeu_NoClutch = FALSE
THEN
        act1 :Releasing_NoNeu_Clutch ≔ TRUE
END

    Setting_NoNeu_NoClutch ≙
            STATUS
        ordinary
REFINES
        NoNeuNoClutch
WHEN
        grd1 :Releasing_NoNeu_NoClutch = TRUE
        grd2 :Error_Setting_NoNeu = FALSE
        grd3 :Setting_NoNeu_NoClutch = FALSE
        grd4 :Setting_NoNeu_Clutch = FALSE
THEN
        act1 :Setting_NoNeu_NoClutch ≔ TRUE
        tSetting_NoNeu_NoClutch :tSetting_NoNeu_NoClutch ≔ time
END

    Setting_NoNeu_Clutch ≙
            STATUS
        ordinary
REFINES
        NoNeuClutch
WHEN
        grd1 :Releasing_NoNeu_NoClutch = TRUE
        grd2 :Error_Setting_NoNeu = FALSE
        grd3 :Setting_NoNeu_Clutch = FALSE
        grd4 :Setting_NoNeu_NoClutch = FALSE
THEN
        act1 :Setting_NoNeu_Clutch ≔ TRUE
        tSetting_NoNeu_Clutch :tSetting_NoNeu_Clutch ≔ time
END

    Setting_NoNeu_ReleaseClutch ≙
            STATUS
        ordinary
REFINES
        NoNeuClutch
WHEN
        grd1 :Releasing_NoNeu_Clutch = TRUE
        grd2 :Error_Setting_NoNeu = FALSE
        grd3 :Setting_NoNeu_ReleaseClutch = FALSE
THEN
        act1 :Setting_NoNeu_ReleaseClutch ≔ TRUE
        tSetting_NoNeu_ReleaseClutch :tSetting_NoNeu_ReleaseClutch ≔ time
END

    Releasing_ToNeu_NoClutch ≙
            STATUS
        ordinary
REFINES
        ToNeuNoClutch
WHEN
        grd1 :RequestToNeu = TRUE
        grd2 :Error_ToNeu = FALSE
        grd3 :Releasing_ToNeu_NoClutch = FALSE
        grd4 :Releasing_ToNeu_Clutch = FALSE
THEN
        act1 :Releasing_ToNeu_NoClutch ≔ TRUE
        act2 :isNeu ≔ TRUE
        tReleasing_ToNeu_NoClutch :tReleasing_ToNeu_NoClutch ≔ time
END

    Releasing_ToNeu_Clutch ≙
            STATUS
        ordinary
REFINES
        ToNeuClutch
WHEN
        grd1 :RequestToNeu = TRUE
        grd2 :Error_ToNeu = FALSE
```

```
        grd3 :Releasing_ToNeu_Clutch = FALSE
        grd4 :Releasing_ToNeu_NoClutch = FALSE
THEN
        act1 :Releasing_ToNeu_Clutch ≔ TRUE
        act2 :isNeu ≔ TRUE
        tReleasing_ToNeu_Clutch :tReleasing_ToNeu_Clutch ≔ time
END

    Error_ToNeu ≙
        STATUS
        ordinary
REFINES
        Error_ToNeu
WHEN
        grd1 :Error_ToNeu = FALSE
        grd2 :RequestToNeu = TRUE
        grd3 :Releasing_ToNeu_NoClutch = FALSE
        grd4 :Releasing_ToNeu_Clutch = FALSE
THEN
        act1 :Error_ToNeu ≔ TRUE
        tError_ToNeu :tError_ToNeu ≔ time
END

    Error_Releasing_NoNeu ≙
        STATUS
        ordinary
REFINES
        Error_NoNeu
WHEN
        grd1 :Error_Releasing_NoNeu = FALSE
        grd2 :RequestNoNeu = TRUE
        grd3 :Releasing_NoNeu_Clutch = FALSE
        grd4 :Releasing_NoNeu_NoClutch = FALSE
THEN
        act1 :Error_Releasing_NoNeu ≔ TRUE
        tError_Releasing_NoNeu :tError_Releasing_NoNeu ≔ time
END

    Error_Setting_NoNeu ≙
        STATUS
        ordinary
REFINES
        Error_NoNeu
WHEN
        grd1 :Error_Setting_NoNeu = FALSE
        grd2 :Releasing_NoNeu_Clutch = TRUE ∨ Releasing_NoNeu_NoClutch = TRUE
        grd3 :Setting_NoNeu_NoClutch = FALSE
        grd4 :Setting_NoNeu_Clutch = FALSE
        grd5 :Setting_NoNeu_ReleaseClutch = FALSE
THEN
        act1 :Error_Setting_NoNeu ≔ TRUE
        tError_Setting_NoNeu :tError_Setting_NoNeu ≔ time
END

    Error_FromNeu ≙
        STATUS
        ordinary
REFINES
        Error_FromNeu
WHEN
        grd1 :Error_FromNeu = FALSE
        grd2 :RequestFromNeu = TRUE
        grd3 :Setting_FromNeu_NoClutch = FALSE
        grd4 :Setting_FromNeu_Clutch = FALSE
THEN
        act1 :Error_FromNeu ≔ TRUE
        tError_FromNeu :tError_FromNeu ≔ time
END

    FINAL ≙
        STATUS
        ordinary
REFINES
        FINAL
WHEN
        grd1
        :
            Setting_FromNeu_NoClutch = TRUE ∨ Setting_NoNeu_NoClutch = TRUE ∨ Releasing_ToNeu_NoClutch = TRUE ∨
            Setting_FromNeu_Clutch = TRUE ∨ Setting_NoNeu_Clutch = TRUE ∨ Setting_NoNeu_ReleaseClutch = TRUE ∨
            Releasing_ToNeu_Clutch = TRUE
THEN
```

act1 :RequestFromNeu ≔ FALSE
act2 :RequestNoNeu ≔ FALSE
act3 :RequestToNeu ≔ FALSE
act4 :Releasing_ToNeu_NoClutch ≔ FALSE
act5 :Setting_NoNeu_NoClutch ≔ FALSE
act6 :Setting_FromNeu_NoClutch ≔ FALSE
act7 :Releasing_NoNeu_NoClutch ≔ FALSE
act8 :Releasing_ToNeu_Clutch ≔ FALSE
act9 :Setting_NoNeu_Clutch ≔ FALSE
act10 :Setting_NoNeu_ReleaseClutch ≔ FALSE
act11 :Setting_FromNeu_Clutch ≔ FALSE
act12 :Releasing_NoNeu_Clutch ≔ FALSE

END

Tick_Tock ≙
STATUS
ordinary

REFINES
Tick_Tock

ANY
tick

WHERE
tick :tick > 0
Deadline1 : RequestFromNeu = TRUE ∧ Error_FromNeu = FALSE ∧ Setting_FromNeu_Clutch = FALSE ∧ Setting_FromNeu_NoClutch = FALSE ⇒ time + tick ≤ tRequestFromNeu + ChangeDL
Deadline2 : RequestToNeu = TRUE ∧ Releasing_ToNeu_NoClutch = FALSE ∧ Error_ToNeu = FALSE ∧ Releasing_ToNeu_Clutch = FALSE ⇒ time + tick ≤ tRequestToNeu + ChangeDL
Deadline3 : RequestNoNeu = TRUE ∧ Error_Releasing_NoNeu = FALSE ∧ Setting_NoNeu_Clutch = FALSE ∧ Setting_NoNeu_ReleaseClutch = FALSE ∧ Error_Setting_NoNeu = FALSE ∧ Setting_NoNeu_NoClutch = FALSE ⇒ time + tick ≤ tRequestNoNeu + ChangeDL

THEN
act1 :time ≔ time+tick

END

END

Machine m4

MACHINE
m4
REFINES
m3
SEES
c1
VARIABLES
isNeu *// Gear Status*
Setting_FromNeu_NoClutch
Releasing_ToNeu_NoClutch
Releasing_NoNeu_NoClutch *// Flags*
Setting_NoNeu_NoClutch
RequestFromNeu
RequestNoNeu
RequestToNeu
Setting_FromNeu_Clutch
Releasing_ToNeu_Clutch
Releasing_NoNeu_Clutch
Setting_NoNeu_Clutch
Setting_NoNeu_ReleaseClutch
Error_FromNeu *// Flags*
Error_Releasing_NoNeu *// Flage*
Error_Setting_NoNeu *// Flage*
Error_ToNeu *// Flags*
time
tRequestFromNeu
tError_FromNeu
tSetting_FromNeu_Clutch
tSetting_FromNeu_NoClutch
tRequestToNeu
tReleasing_ToNeu_NoClutch
tError_ToNeu
tReleasing_ToNeu_Clutch
tRequestNoNeu
tError_Releasing_NoNeu
tReleasing_NoNeu_Clutch
tReleasing_NoNeu_NoClutch
tSetting_NoNeu_ReleaseClutch
tError_Setting_NoNeu
tSetting_NoNeu_Clutch
tSetting_NoNeu_NoClutch

INVARIANTS
Deadline4 : RequestFromNeu = TRUE ∧ Error_FromNeu = FALSE ∧ Setting_FromNeu_Clutch = FALSE ∧ Setting_FromNeu_NoClutch = FALSE ⇒ time ≤ tRequestFromNeu + S_FN
Error_FromNeuDurationDeadline4 : RequestFromNeu = TRUE ∧ Error_FromNeu = TRUE ⇒ tError_FromNeu ≤ tRequestFromNeu + S_FN
Setting_FromNeu_ClutchDurationDeadline4 : RequestFromNeu = TRUE ∧ Setting_FromNeu_Clutch = TRUE ⇒ tSetting_FromNeu_Clutch ≤ tRequestFromNeu + S_FN
Setting_FromNeu_NoClutchDurationDeadline4 : RequestFromNeu = TRUE ∧ Setting_FromNeu_NoClutch = TRUE ⇒ tSetting_FromNeu_NoClutch ≤ tRequestFromNeu + S_FN
Deadline5 : RequestToNeu = TRUE ∧ Releasing_ToNeu_NoClutch = FALSE ∧ Error_ToNeu = FALSE ∧ Releasing_ToNeu_Clutch = FALSE ⇒ time ≤ tRequestToNeu + R_TN
Releasing_ToNeu_NoClutchDurationDeadline5 : RequestToNeu = TRUE ∧ Releasing_ToNeu_NoClutch = TRUE ⇒ tReleasing_ToNeu_NoClutch ≤ tRequestToNeu + R_TN
Error_ToNeuDurationDeadline5 : RequestToNeu = TRUE ∧ Error_ToNeu = TRUE ⇒ tError_ToNeu ≤ tRequestToNeu + R_TN
Releasing_ToNeu_ClutchDurationDeadline5 : RequestToNeu = TRUE ∧ Releasing_ToNeu_Clutch = TRUE ⇒ tReleasing_ToNeu_Clutch ≤ tRequestToNeu + R_TN
tReleasing_NoNeu_Clutch : tReleasing_NoNeu_Clutch ∈ ℕ
tReleasing_NoNeu_NoClutch : tReleasing_NoNeu_NoClutch ∈ ℕ
Deadline6 : RequestNoNeu = TRUE ∧ Error_Releasing_NoNeu = FALSE ∧ Releasing_NoNeu_Clutch = FALSE ∧ Releasing_NoNeu_NoClutch = FALSE ⇒ time ≤ tRequestNoNeu + R_NN
Error_Releasing_NoNeuDurationDeadline6 : RequestNoNeu = TRUE ∧ Error_Releasing_NoNeu = TRUE ⇒ tError_Releasing_NoNeu ≤ tRequestNoNeu + R_NN
Releasing_NoNeu_ClutchDurationDeadline6 : RequestNoNeu = TRUE ∧ Releasing_NoNeu_Clutch = TRUE ⇒ tReleasing_NoNeu_Clutch ≤ tRequestNoNeu + R_NN
Releasing_NoNeu_NoClutchDurationDeadline6 : RequestNoNeu = TRUE ∧ Releasing_NoNeu_NoClutch = TRUE ⇒ tReleasing_NoNeu_NoClutch ≤ tRequestNoNeu + R_NN
Releasing_NoNeu_NoClutchDurationExpiry1 : RequestNoNeu = TRUE ∧ Releasing_NoNeu_NoClutch = TRUE ⇒ tReleasing_NoNeu_NoClutch ≤ tRequestNoNeu + R_NN_NC_EX
Deadline7 : Releasing_NoNeu_Clutch = TRUE ∧ Setting_NoNeu_ReleaseClutch = FALSE ∧ Error_Setting_NoNeu = FALSE ⇒ time ≤ tReleasing_NoNeu_Clutch + S_NN_RC
Setting_NoNeu_ReleaseClutchDurationDeadline7 : Releasing_NoNeu_Clutch = TRUE ∧ Setting_NoNeu_ReleaseClutch = TRUE ⇒ tSetting_NoNeu_ReleaseClutch ≤ tReleasing_NoNeu_Clutch + S_NN_RC
Error_Setting_NoNeuDurationDeadline7 : Releasing_NoNeu_Clutch = TRUE ∧ Error_Setting_NoNeu = TRUE ⇒ tError_Setting_NoNeu ≤ tReleasing_NoNeu_Clutch + S_NN_RC

Deadline8 : Releasing_NoNeu_NoClutch = TRUE ∧ Setting_NoNeu_Clutch = FALSE ∧ Error_Setting_NoNeu = FALSE ∧ Setting_NoNeu_NoClutch = FALSE ⇒ time ≤ tReleasing_NoNeu_NoClutch + S_NN

Setting_NoNeu_ClutchDurationDeadline8 : Releasing_NoNeu_NoClutch = TRUE ∧ Setting_NoNeu_Clutch = TRUE ⇒ tSetting_NoNeu_Clutch ≤ tReleasing_NoNeu_NoClutch + S_NN

Error_Setting_NoNeuDurationDeadline8 : Releasing_NoNeu_NoClutch = TRUE ∧ Error_Setting_NoNeu = TRUE ⇒ tError_Setting_NoNeu ≤ tReleasing_NoNeu_NoClutch + S_NN

Setting_NoNeu_NoClutchDurationDeadline8 : Releasing_NoNeu_NoClutch = TRUE ∧ Setting_NoNeu_NoClutch = TRUE ⇒ tSetting_NoNeu_NoClutch ≤ tReleasing_NoNeu_NoClutch + S_NN

TIMING

Deadline4 :Deadline (RequestFromNeu, Error_FromNeu ∨ Setting_FromNeu_Clutch ∨ Setting_FromNeu_NoClutch, S_FN)
Deadline5 :Deadline (RequestToNeu, Releasing_ToNeu_NoClutch ∨ Error_ToNeu ∨ Releasing_ToNeu_Clutch, R_TN)
Deadline6 :Deadline (RequestNoNeu, Error_Releasing_NoNeu ∨ Releasing_NoNeu_Clutch ∨ Releasing_NoNeu_NoClutch, R_NN)
Expiry1 :Expiry (RequestNoNeu, Releasing_NoNeu_NoClutch, R_NN_NC_EX)
Deadline7 :Deadline (Releasing_NoNeu_Clutch, Setting_NoNeu_ReleaseClutch ∨ Error_Setting_NoNeu, S_NN_RC)
Deadline8 :Deadline (Releasing_NoNeu_NoClutch, Setting_NoNeu_Clutch ∨ Error_Setting_NoNeu ∨ Setting_NoNeu_NoClutch, S_NN)

EVENTS

INITIALISATION ≙

STATUS

ordinary

BEGIN

act1 :isNeu ≔ TRUE
act2 :RequestNoNeu ≔ FALSE
act3 :RequestToNeu ≔ FALSE
act4 :RequestFromNeu ≔ FALSE
act5 :Releasing_ToNeu_NoClutch ≔ FALSE
act6 :Setting_FromNeu_NoClutch ≔ FALSE
act7 :Releasing_NoNeu_NoClutch ≔ FALSE
act8 :Setting_NoNeu_NoClutch ≔ FALSE
act9 :Releasing_ToNeu_Clutch ≔ FALSE
act10 :Setting_FromNeu_Clutch ≔ FALSE
act11 :Releasing_NoNeu_Clutch ≔ FALSE
act12 :Setting_NoNeu_Clutch ≔ FALSE
act13 :Setting_NoNeu_ReleaseClutch ≔ FALSE
act14 :Error_FromNeu ≔ FALSE
act15 :Error_Releasing_NoNeu≔ FALSE
act16 :Error_Setting_NoNeu≔ FALSE
act17 :Error_ToNeu≔ FALSE
time :time ≔ 0
tRequestFromNeu :tRequestFromNeu ≔ 0
tError_FromNeu :tError_FromNeu ≔ 0
tSetting_FromNeu_Clutch :tSetting_FromNeu_Clutch ≔ 0
tSetting_FromNeu_NoClutch :tSetting_FromNeu_NoClutch ≔ 0
tRequestToNeu :tRequestToNeu ≔ 0
tReleasing_ToNeu_NoClutch :tReleasing_ToNeu_NoClutch ≔ 0
tError_ToNeu :tError_ToNeu ≔ 0
tReleasing_ToNeu_Clutch :tReleasing_ToNeu_Clutch ≔ 0
tRequestNoNeu :tRequestNoNeu ≔ 0
tError_Releasing_NoNeu :tError_Releasing_NoNeu ≔ 0
tReleasing_NoNeu_Clutch :tReleasing_NoNeu_Clutch ≔ 0
tReleasing_NoNeu_NoClutch :tReleasing_NoNeu_NoClutch ≔ 0
tSetting_NoNeu_ReleaseClutch :tSetting_NoNeu_ReleaseClutch ≔ 0
tError_Setting_NoNeu :tError_Setting_NoNeu ≔ 0
tSetting_NoNeu_Clutch :tSetting_NoNeu_Clutch ≔ 0
tSetting_NoNeu_NoClutch :tSetting_NoNeu_NoClutch ≔ 0

END

RequestFromNeu ≙

STATUS

ordinary

REFINES

RequestFromNeu

WHEN

grd1 :RequestFromNeu = FALSE
grd2 :RequestNoNeu = FALSE
grd3 :RequestToNeu = FALSE
grd4 :isNeu = TRUE

THEN

act1 :RequestFromNeu ≔ TRUE
tRequestFromNeu :tRequestFromNeu ≔ time

END

RequestNoNeu ≙

STATUS

ordinary

REFINES

RequestNoNeu

WHEN

```
        grd1 :RequestFromNeu = FALSE
        grd2 :RequestNoNeu = FALSE
        grd3 :RequestToNeu = FALSE
        grd4 :isNeu = FALSE
THEN
        act1 :RequestNoNeu ≔ TRUE
        tRequestNoNeu :tRequestNoNeu ≔ time
END

    RequestToNeu ≙
        STATUS
        ordinary
REFINES
        RequestToNeu
WHEN
        grd1 :RequestFromNeu = FALSE
        grd2 :RequestNoNeu = FALSE
        grd3 :RequestToNeu = FALSE
        grd4 :isNeu = FALSE
THEN
        act1 :RequestToNeu ≔ TRUE
        tRequestToNeu :tRequestToNeu ≔ time
END

    Setting_FromNeu_NoClutch ≙
        STATUS
        ordinary
REFINES
        Setting_FromNeu_NoClutch
WHEN
        grd1 :RequestFromNeu = TRUE
        grd2 :Error_FromNeu = FALSE
        grd3 :Setting_FromNeu_NoClutch = FALSE
        grd4 :Setting_FromNeu_Clutch = FALSE
THEN
        act1 :Setting_FromNeu_NoClutch ≔ TRUE
        act2 :isNeu ≔ FALSE
        tSetting_FromNeu_NoClutch :tSetting_FromNeu_NoClutch ≔ time
END

    Setting_FromNeu_Clutch ≙
        STATUS
        ordinary
REFINES
        Setting_FromNeu_Clutch
WHEN
        grd1 :RequestFromNeu = TRUE
        grd2 :Error_FromNeu = FALSE
        grd3 :Setting_FromNeu_Clutch = FALSE
        grd4 :Setting_FromNeu_NoClutch = FALSE
THEN
        act1 :Setting_FromNeu_Clutch ≔ TRUE
        act2 :isNeu ≔ FALSE
        tSetting_FromNeu_Clutch :tSetting_FromNeu_Clutch ≔ time
END

    Releasing_NoNeu_NoClutch ≙
      extended
        STATUS
        ordinary
REFINES
        Releasing_NoNeu_NoClutch
WHEN
        grd1 :RequestNoNeu = TRUE
        grd2 :Error_Releasing_NoNeu = FALSE
        grd3 :Releasing_NoNeu_NoClutch = FALSE
        grd4 :Releasing_NoNeu_Clutch = FALSE
        Expiry1 :time ≤ tRequestNoNeu + R_NN_NC_EX
THEN
        act1 :Releasing_NoNeu_NoClutch ≔ TRUE
        tReleasing_NoNeu_NoClutch :tReleasing_NoNeu_NoClutch ≔ time
END

    Releasing_NoNeu_Clutch ≙
      extended
        STATUS
        ordinary
REFINES
        Releasing_NoNeu_Clutch
```

WHEN
grd1 :RequestNoNeu = TRUE
grd2 :Error_Releasing_NoNeu = FALSE
grd3 :Releasing_NoNeu_Clutch = FALSE
grd4 :Releasing_NoNeu_NoClutch = FALSE
THEN
act1 :Releasing_NoNeu_Clutch ≔ TRUE
tReleasing_NoNeu_Clutch :tReleasing_NoNeu_Clutch ≔ time
END

Setting_NoNeu_NoClutch ≙
STATUS
ordinary
REFINES
Setting_NoNeu_NoClutch
WHEN
grd1 :Releasing_NoNeu_NoClutch = TRUE
grd2 :Error_Setting_NoNeu = FALSE
grd3 :Setting_NoNeu_NoClutch = FALSE
grd4 :Setting_NoNeu_Clutch = FALSE
THEN
act1 :Setting_NoNeu_NoClutch ≔ TRUE
tSetting_NoNeu_NoClutch :tSetting_NoNeu_NoClutch ≔ time
END

Setting_NoNeu_Clutch ≙
STATUS
ordinary
REFINES
Setting_NoNeu_Clutch
WHEN
grd1 :Releasing_NoNeu_NoClutch = TRUE
grd2 :Error_Setting_NoNeu = FALSE
grd3 :Setting_NoNeu_Clutch = FALSE
grd4 :Setting_NoNeu_NoClutch = FALSE
THEN
act1 :Setting_NoNeu_Clutch ≔ TRUE
tSetting_NoNeu_Clutch :tSetting_NoNeu_Clutch ≔ time
END

Setting_NoNeu_ReleaseClutch ≙
STATUS
ordinary
REFINES
Setting_NoNeu_ReleaseClutch
WHEN
grd1 :Releasing_NoNeu_Clutch = TRUE
grd2 :Error_Setting_NoNeu = FALSE
grd3 :Setting_NoNeu_ReleaseClutch = FALSE
THEN
act1 :Setting_NoNeu_ReleaseClutch ≔ TRUE
tSetting_NoNeu_ReleaseClutch :tSetting_NoNeu_ReleaseClutch ≔ time
END

Releasing_ToNeu_NoClutch ≙
STATUS
ordinary
REFINES
Releasing_ToNeu_NoClutch
WHEN
grd1 :RequestToNeu = TRUE
grd2 :Error_ToNeu = FALSE
grd3 :Releasing_ToNeu_NoClutch = FALSE
grd4 :Releasing_ToNeu_Clutch = FALSE
THEN
act1 :Releasing_ToNeu_NoClutch ≔ TRUE
act2 :isNeu ≔ TRUE
tReleasing_ToNeu_NoClutch :tReleasing_ToNeu_NoClutch ≔ time
END

Releasing_ToNeu_Clutch ≙
STATUS
ordinary
REFINES
Releasing_ToNeu_Clutch
WHEN
grd1 :RequestToNeu = TRUE
grd2 :Error_ToNeu = FALSE
grd3 :Releasing_ToNeu_Clutch = FALSE

grd4 :Releasing_ToNeu_NoClutch = FALSE
THEN
act1 :Releasing_ToNeu_Clutch ≔ TRUE
act2 :isNeu ≔ TRUE
tReleasing_ToNeu_Clutch :tReleasing_ToNeu_Clutch ≔ time
END

Error_ToNeu ≙
STATUS
ordinary
REFINES
Error_ToNeu
WHEN
grd1 :Error_ToNeu = FALSE
grd2 :RequestToNeu = TRUE
grd3 :Releasing_ToNeu_NoClutch = FALSE
grd4 :Releasing_ToNeu_Clutch = FALSE
THEN
act1 :Error_ToNeu ≔ TRUE
tError_ToNeu :tError_ToNeu ≔ time
END

Error_Releasing_NoNeu ≙
STATUS
ordinary
REFINES
Error_Releasing_NoNeu
WHEN
grd1 :Error_Releasing_NoNeu = FALSE
grd2 :RequestNoNeu = TRUE
grd3 :Releasing_NoNeu_Clutch = FALSE
grd4 :Releasing_NoNeu_NoClutch = FALSE
THEN
act1 :Error_Releasing_NoNeu ≔ TRUE
tError_Releasing_NoNeu :tError_Releasing_NoNeu ≔ time
END

Error_Setting_NoNeu ≙
STATUS
ordinary
REFINES
Error_Setting_NoNeu
WHEN
grd1 :Error_Setting_NoNeu = FALSE
grd2 :Releasing_NoNeu_Clutch = TRUE ∨ Releasing_NoNeu_NoClutch = TRUE
grd3 :Setting_NoNeu_NoClutch = FALSE
grd4 :Setting_NoNeu_Clutch = FALSE
grd5 :Setting_NoNeu_ReleaseClutch = FALSE
THEN
act1 :Error_Setting_NoNeu ≔ TRUE
tError_Setting_NoNeu :tError_Setting_NoNeu ≔ time
END

Error_FromNeu ≙
STATUS
ordinary
REFINES
Error_FromNeu
WHEN
grd1 :Error_FromNeu = FALSE
grd2 :RequestFromNeu = TRUE
grd3 :Setting_FromNeu_NoClutch = FALSE
grd4 :Setting_FromNeu_Clutch = FALSE
THEN
act1 :Error_FromNeu ≔ TRUE
tError_FromNeu :tError_FromNeu ≔ time
END

FINAL ≙
extended
STATUS
ordinary
REFINES
FINAL
WHEN
grd1 : $Setting\_FromNeu\_NoClutch = TRUE \lor Setting\_NoNeu\_NoClutch = TRUE \lor Releasing\_ToNeu\_NoClutch = TRUE \lor Setting\_FromNeu\_Clutch = TRUE \lor Setting\_NoNeu\_Clutch = TRUE \lor Setting\_NoNeu\_ReleaseClutch = TRUE \lor Releasing\_ToNeu\_Clutch = TRUE$
THEN

```
        act1 :RequestFromNeu ≔ FALSE
        act2 :RequestNoNeu ≔ FALSE
        act3 :RequestToNeu ≔ FALSE
        act4 :Releasing_ToNeu_NoClutch ≔ FALSE
        act5 :Setting_NoNeu_NoClutch ≔ FALSE
        act6 :Setting_FromNeu_NoClutch ≔ FALSE
        act7 :Releasing_NoNeu_NoClutch ≔ FALSE
        act8 :Releasing_ToNeu_Clutch ≔ FALSE
        act9 :Setting_NoNeu_Clutch ≔ FALSE
        act10 :Setting_NoNeu_ReleaseClutch ≔ FALSE
        act11 :Setting_FromNeu_Clutch ≔ FALSE
        act12 :Releasing_NoNeu_Clutch ≔ FALSE
END

    Tick_Tock ≙
        STATUS
        ordinary
REFINES
        Tick_Tock
ANY
        tick
WHERE
        tick :tick > 0
        Deadline4 RequestFromNeu = TRUE ∧ Error_FromNeu = FALSE ∧ Setting_FromNeu_Clutch = FALSE ∧ Setting_FromNeu_NoClutch =
        :         FALSE ⇒ time + tick ≤ tRequestFromNeu + S_FN
        Deadline5 RequestToNeu = TRUE ∧ Releasing_ToNeu_NoClutch = FALSE ∧ Error_ToNeu = FALSE ∧ Releasing_ToNeu_Clutch = FALSE
        :         ⇒ time + tick ≤ tRequestToNeu + R_TN
        Deadline6 RequestNoNeu = TRUE ∧ Error_Releasing_NoNeu = FALSE ∧ Releasing_NoNeu_Clutch = FALSE ∧
        :         Releasing_NoNeu_NoClutch = FALSE ⇒ time + tick ≤ tRequestNoNeu + R_NN
        Deadline7 Releasing_NoNeu_Clutch = TRUE ∧ Setting_NoNeu_ReleaseClutch = FALSE ∧ Error_Setting_NoNeu = FALSE ⇒ time + tick ≤
        :         tReleasing_NoNeu_Clutch + S_NN_RC
        Deadline8 Releasing_NoNeu_NoClutch = TRUE ∧ Setting_NoNeu_Clutch = FALSE ∧ Error_Setting_NoNeu = FALSE ∧
        :         Setting_NoNeu_NoClutch = FALSE ⇒ time + tick ≤ tReleasing_NoNeu_NoClutch + S_NN
THEN
        act1 :time ≔ time+tick
END

END
```

Machine m5

MACHINE
m5
REFINES
m4
SEES
c2
VARIABLES
isNeu *// Gear Status*
Releasing_ToNeu_NoClutch
Releasing_NoNeu_NoClutch *// Flags*
Setting_NoNeu_NoClutch
RequestFromNeu *// Flags*
RequestNoNeu *// Flags*
RequestToNeu *// Flags*
Releasing_ToNeu_Clutch *// Flags*
Releasing_NoNeu_Clutch *// Flags*
Setting_NoNeu_Clutch *// Flags*
Setting_NoNeu_ReleaseClutch *// Flags*
Error_Releasing_NoNeu *// Flage*
Error_Setting_NoNeu *// Flage*
Error_ToNeu *// Flags*
FromNeu_SyncSpeed *// Senario1*
FromNeu_OpenClutch *// Flage*
FromNeu_SetGear_NoClutch *// Flage*
FromNeu_SetGear_Clutch *// Flage*
FromNeu_CloseClutch *// Flage*
Error_FromNeu_OpenClutch *// Flage*
Error_FromNeu_SetGear_NoClutch *// Flage*
Error_FromNeu_SetGear_Clutch *// Flage*
Error_FromNeu_CloseClutch *// Senario1*
time
tRequestToNeu
tReleasing_ToNeu_NoClutch
tError_ToNeu
tReleasing_ToNeu_Clutch
tRequestNoNeu
tError_Releasing_NoNeu
tReleasing_NoNeu_Clutch
tReleasing_NoNeu_NoClutch
tSetting_NoNeu_ReleaseClutch
tError_Setting_NoNeu
tSetting_NoNeu_Clutch
tSetting_NoNeu_NoClutch
tRequestFromNeu
tFromNeu_OpenClutch
tError_FromNeu_OpenClutch
tFromNeu_SyncSpeed
tFromNeu_SetGear_NoClutch
tError_FromNeu_SetGear_NoClutch
tError_FromNeu_SetGear_Clutch
tFromNeu_SetGear_Clutch
tError_FromNeu_CloseClutch
tFromNeu_CloseClutch
INVARIANTS
inv1 : {FromNeu_SyncSpeed, FromNeu_OpenClutch, FromNeu_SetGear_NoClutch, FromNeu_SetGear_Clutch, FromNeu_CloseClutch, Error_FromNeu_OpenClutch, Error_FromNeu_SetGear_NoClutch, Error_FromNeu_SetGear_Clutch, Error_FromNeu_CloseClutch} ∈ ℙ(BOOL)
inv2 : FromNeu_SetGear_NoClutch = Setting_FromNeu_NoClutch
inv3 : FromNeu_CloseClutch = Setting_FromNeu_Clutch
inv4 : FromNeu_SyncSpeed = TRUE ∨ FromNeu_OpenClutch = TRUE ⇒ RequestFromNeu = TRUE
inv5 : FromNeu_SetGear_Clutch = TRUE ⇒ FromNeu_OpenClutch = TRUE
inv6 : FromNeu_SetGear_NoClutch = TRUE ⇒ FromNeu_SyncSpeed = TRUE
inv7 : FromNeu_SyncSpeed = TRUE ⇒ FromNeu_OpenClutch = FALSE ∧ Error_FromNeu_OpenClutch = FALSE
inv8 : FromNeu_CloseClutch = TRUE ⇒ FromNeu_SetGear_Clutch = TRUE
inv9 : FromNeu_OpenClutch=FALSE ⇒ FromNeu_CloseClutch = FALSE
inv10 : Error_FromNeu_OpenClutch = FALSE ∧ Error_FromNeu_SetGear_NoClutch = FALSE ∧ Error_FromNeu_SetGear_Clutch = FALSE ∧ Error_FromNeu_CloseClutch= FALSE ⇒ Error_FromNeu = FALSE
inv11 : Error_FromNeu_OpenClutch = TRUE ∨ Error_FromNeu_SetGear_NoClutch = TRUE ∨ Error_FromNeu_SetGear_Clutch = TRUE ∨ Error_FromNeu_CloseClutch= TRUE ⇒ Error_FromNeu = TRUE

inv12 :FromNeu_SetGear_Clutch = TRUE ⇒ Error_FromNeu_SetGear_Clutch = FALSE
inv13 :FromNeu_SetGear_NoClutch = TRUE ⇒ Error_FromNeu_SetGear_NoClutch = FALSE
inv14 :FromNeu_CloseClutch = TRUE ⇒ Error_FromNeu_CloseClutch = FALSE
inv15 :FromNeu_OpenClutch = TRUE ⇒ Error_FromNeu_OpenClutch = FALSE
inv16 :RequestFromNeu = TRUE ∧ Error_FromNeu_SetGear_Clutch = TRUE ⇒ FromNeu_OpenClutch = TRUE
inv17 :RequestFromNeu = TRUE ∧ Error_FromNeu_SetGear_NoClutch = TRUE ⇒ FromNeu_SyncSpeed = TRUE
inv18 :RequestFromNeu = TRUE ∧ Error_FromNeu_CloseClutch = TRUE ⇒ FromNeu_SetGear_Clutch = TRUE
tFromNeu_OpenClutch :tFromNeu_OpenClutch ∈ ℕ
tError_FromNeu_OpenClutch :tError_FromNeu_OpenClutch ∈ ℕ
tFromNeu_SyncSpeed :tFromNeu_SyncSpeed ∈ ℕ
Deadline9 RequestFromNeu = TRUE ∧ FromNeu_OpenClutch = FALSE ∧ Error_FromNeu_OpenClutch = FALSE ∧ FromNeu_SyncSpeed =
: FALSE ⇒ time ≤ tRequestFromNeu + SyncOpen_DL
FromNeu_OpenClutchDurationDeadline9 RequestFromNeu = TRUE ∧ FromNeu_OpenClutch = TRUE ⇒ tFromNeu_OpenClutch ≤
: tRequestFromNeu + SyncOpen_DL
Error_FromNeu_OpenClutchDurationDeadline9 RequestFromNeu = TRUE ∧ Error_FromNeu_OpenClutch = TRUE ⇒
: tError_FromNeu_OpenClutch ≤ tRequestFromNeu + SyncOpen_DL
FromNeu_SyncSpeedDurationDeadline9 RequestFromNeu = TRUE ∧ FromNeu_SyncSpeed = TRUE ⇒ tFromNeu_SyncSpeed ≤
: tRequestFromNeu + SyncOpen_DL
FromNeu_SyncSpeedDurationExpiry2 RequestFromNeu = TRUE ∧ FromNeu_SyncSpeed = TRUE ⇒ tFromNeu_SyncSpeed ≤
: tRequestFromNeu + Sync_EX
tFromNeu_SetGear_NoClutch :tFromNeu_SetGear_NoClutch ∈ ℕ
tError_FromNeu_SetGear_NoClutch :tError_FromNeu_SetGear_NoClutch ∈ ℕ
Deadline10 FromNeu_SyncSpeed = TRUE ∧ FromNeu_SetGear_NoClutch = FALSE ∧ Error_FromNeu_SetGear_NoClutch = FALSE ⇒ time
: ≤ tFromNeu_SyncSpeed + SetGear_DL
FromNeu_SetGear_NoClutchDurationDeadline10 FromNeu_SyncSpeed = TRUE ∧ FromNeu_SetGear_NoClutch = TRUE ⇒
: tFromNeu_SetGear_NoClutch ≤ tFromNeu_SyncSpeed + SetGear_DL
Error_FromNeu_SetGear_NoClutchDurationDeadline10 FromNeu_SyncSpeed = TRUE ∧ Error_FromNeu_SetGear_NoClutch = TRUE ⇒
: tError_FromNeu_SetGear_NoClutch ≤ tFromNeu_SyncSpeed + SetGear_DL
tError_FromNeu_SetGear_Clutch :tError_FromNeu_SetGear_Clutch ∈ ℕ
tFromNeu_SetGear_Clutch :tFromNeu_SetGear_Clutch ∈ ℕ
Deadline11 FromNeu_OpenClutch = TRUE ∧ Error_FromNeu_SetGear_Clutch = FALSE ∧ FromNeu_SetGear_Clutch = FALSE ⇒ time ≤
: tFromNeu_OpenClutch + SetGear_DL
Error_FromNeu_SetGear_ClutchDurationDeadline11 FromNeu_OpenClutch = TRUE ∧ Error_FromNeu_SetGear_Clutch = TRUE ⇒
: tError_FromNeu_SetGear_Clutch ≤ tFromNeu_OpenClutch + SetGear_DL
FromNeu_SetGear_ClutchDurationDeadline11 FromNeu_OpenClutch = TRUE ∧ FromNeu_SetGear_Clutch = TRUE ⇒
: tFromNeu_SetGear_Clutch ≤ tFromNeu_OpenClutch + SetGear_DL
tError_FromNeu_CloseClutch :tError_FromNeu_CloseClutch ∈ ℕ
tFromNeu_CloseClutch :tFromNeu_CloseClutch ∈ ℕ
Deadline12 FromNeu_SetGear_Clutch = TRUE ∧ Error_FromNeu_CloseClutch = FALSE ∧ FromNeu_CloseClutch = FALSE ⇒ time ≤
: tFromNeu_SetGear_Clutch + CloseClutch_DL
Error_FromNeu_CloseClutchDurationDeadline12 FromNeu_SetGear_Clutch = TRUE ∧ Error_FromNeu_CloseClutch = TRUE ⇒
: tError_FromNeu_CloseClutch ≤ tFromNeu_SetGear_Clutch + CloseClutch_DL
FromNeu_CloseClutchDurationDeadline12 FromNeu_SetGear_Clutch = TRUE ∧ FromNeu_CloseClutch = TRUE ⇒ tFromNeu_CloseClutch ≤
: tFromNeu_SetGear_Clutch + CloseClutch_DL
Releasing_NoNeu_NoClutchDurationExpiry3 RequestNoNeu = TRUE ∧ Releasing_NoNeu_NoClutch = TRUE ⇒
: tReleasing_NoNeu_NoClutch ≤ tRequestNoNeu + R_NN_NC_EX

TIMING

Deadline5 :Deadline (RequestToNeu, Releasing_ToNeu_NoClutch ∨ Error_ToNeu ∨ Releasing_ToNeu_Clutch, R_TN)
Deadline6 :Deadline (RequestNoNeu, Error_Releasing_NoNeu ∨ Releasing_NoNeu_Clutch ∨ Releasing_NoNeu_NoClutch, R_NN)
Deadline7 :Deadline (Releasing_NoNeu_Clutch, Setting_NoNeu_ReleaseClutch ∨ Error_Setting_NoNeu, S_NN_RC)
Deadline8 :Deadline (Releasing_NoNeu_NoClutch, Setting_NoNeu_Clutch ∨ Error_Setting_NoNeu ∨ Setting_NoNeu_NoClutch, S_NN)
Deadline9 :Deadline (RequestFromNeu, FromNeu_OpenClutch ∨ Error_FromNeu_OpenClutch ∨ FromNeu_SyncSpeed, SyncOpen_DL)
Expiry2 :Expiry (RequestFromNeu, FromNeu_SyncSpeed, Sync_EX)
Deadline10 :Deadline (FromNeu_SyncSpeed, FromNeu_SetGear_NoClutch ∨ Error_FromNeu_SetGear_NoClutch, SetGear_DL)
Deadline11 :Deadline (FromNeu_OpenClutch, Error_FromNeu_SetGear_Clutch ∨ FromNeu_SetGear_Clutch, SetGear_DL)
Deadline12 :Deadline (FromNeu_SetGear_Clutch, Error_FromNeu_CloseClutch ∨ FromNeu_CloseClutch, CloseClutch_DL)
Expiry3 :Expiry (RequestNoNeu, Releasing_NoNeu_NoClutch, R_NN_NC_EX)

EVENTS

INITIALISATION ≙

STATUS

ordinary

BEGIN

act1 :isNeu ≔ TRUE
act2 :RequestNoNeu ≔ FALSE
act3 :RequestToNeu ≔ FALSE
act4 :RequestFromNeu ≔ FALSE
act5 :Releasing_ToNeu_NoClutch ≔ FALSE
act6 :Releasing_NoNeu_NoClutch ≔ FALSE
act7 :Setting_NoNeu_NoClutch ≔ FALSE
act8 :Releasing_ToNeu_Clutch ≔ FALSE
act9 :Releasing_NoNeu_Clutch ≔ FALSE
act10 :Setting_NoNeu_Clutch ≔ FALSE
act11 :Setting_NoNeu_ReleaseClutch ≔ FALSE
act12 :Error_Releasing_NoNeu:≔ FALSE
act13 :Error_Setting_NoNeu:≔ FALSE
act14 :Error_ToNeu:≔ FALSE
act15 :FromNeu_SyncSpeed ≔ FALSE

```
        act16 :FromNeu_OpenClutch ≔ FALSE
        act17 :FromNeu_SetGear_NoClutch ≔ FALSE
        act18 :FromNeu_SetGear_Clutch ≔ FALSE
        act19 :FromNeu_CloseClutch ≔ FALSE
        act20 :Error_FromNeu_OpenClutch ≔ FALSE
        act21 :Error_FromNeu_SetGear_NoClutch ≔ FALSE
        act22 :Error_FromNeu_SetGear_Clutch ≔ FALSE
        act23 :Error_FromNeu_CloseClutch ≔ FALSE
        time :time ≔ 0
        tRequestToNeu :tRequestToNeu ≔ 0
        tReleasing_ToNeu_NoClutch :tReleasing_ToNeu_NoClutch ≔ 0
        tError_ToNeu :tError_ToNeu ≔ 0
        tReleasing_ToNeu_Clutch :tReleasing_ToNeu_Clutch ≔ 0
        tRequestNoNeu :tRequestNoNeu ≔ 0
        tError_Releasing_NoNeu :tError_Releasing_NoNeu ≔ 0
        tReleasing_NoNeu_Clutch :tReleasing_NoNeu_Clutch ≔ 0
        tReleasing_NoNeu_NoClutch :tReleasing_NoNeu_NoClutch ≔ 0
        tSetting_NoNeu_ReleaseClutch :tSetting_NoNeu_ReleaseClutch ≔ 0
        tError_Setting_NoNeu :tError_Setting_NoNeu ≔ 0
        tSetting_NoNeu_Clutch :tSetting_NoNeu_Clutch ≔ 0
        tSetting_NoNeu_NoClutch :tSetting_NoNeu_NoClutch ≔ 0
        tRequestFromNeu :tRequestFromNeu ≔ 0
        tFromNeu_OpenClutch :tFromNeu_OpenClutch ≔ 0
        tError_FromNeu_OpenClutch :tError_FromNeu_OpenClutch ≔ 0
        tFromNeu_SyncSpeed :tFromNeu_SyncSpeed ≔ 0
        tFromNeu_SetGear_NoClutch :tFromNeu_SetGear_NoClutch ≔ 0
        tError_FromNeu_SetGear_NoClutch :tError_FromNeu_SetGear_NoClutch ≔ 0
        tError_FromNeu_SetGear_Clutch :tError_FromNeu_SetGear_Clutch ≔ 0
        tFromNeu_SetGear_Clutch :tFromNeu_SetGear_Clutch ≔ 0
        tError_FromNeu_CloseClutch :tError_FromNeu_CloseClutch ≔ 0
        tFromNeu_CloseClutch :tFromNeu_CloseClutch ≔ 0
END

    RequestFromNeu ≜
        STATUS
        ordinary
REFINES
        RequestFromNeu
WHEN
        grd1 :RequestFromNeu = FALSE
        grd2 :RequestNoNeu = FALSE
        grd3 :RequestToNeu = FALSE
        grd4 :isNeu = TRUE
THEN
        act1 :RequestFromNeu ≔ TRUE
        tRequestFromNeu :tRequestFromNeu ≔ time
END

    RequestNoNeu ≜
        STATUS
        ordinary
REFINES
        RequestNoNeu
WHEN
        grd1 :RequestFromNeu = FALSE
        grd2 :RequestNoNeu = FALSE
        grd3 :RequestToNeu = FALSE
        grd4 :isNeu = FALSE
THEN
        act1 :RequestNoNeu ≔ TRUE
        tRequestNoNeu :tRequestNoNeu ≔ time
END

    RequestToNeu ≜
        STATUS
        ordinary
REFINES
        RequestToNeu
WHEN
        grd1 :RequestFromNeu = FALSE
        grd2 :RequestNoNeu = FALSE
        grd3 :RequestToNeu = FALSE
        grd4 :isNeu = FALSE
THEN
        act1 :RequestToNeu ≔ TRUE
        tRequestToNeu :tRequestToNeu ≔ time
END

    FromNeu_SyncSpeed ≜
```

```
        STATUS
    ordinary
WHEN
    grd1 :RequestFromNeu = TRUE
    grd2 :FromNeu_SyncSpeed = FALSE
    grd3 :FromNeu_OpenClutch = FALSE
    grd4 :Error_FromNeu_OpenClutch = FALSE
    Expiry2 :time ≤ tRequestFromNeu + Sync_EX
THEN
    act1 :FromNeu_SyncSpeed ≔ TRUE
    tFromNeu_SyncSpeed :tFromNeu_SyncSpeed ≔ time
END

  FromNeu_OpenClutch ≜
        STATUS
    ordinary
WHEN
    grd1 :RequestFromNeu = TRUE
    grd2 :Error_FromNeu_OpenClutch = FALSE
    grd3 :FromNeu_SyncSpeed = FALSE
    grd4 :FromNeu_OpenClutch = FALSE
THEN
    act1 :FromNeu_OpenClutch ≔ TRUE
    tFromNeu_OpenClutch :tFromNeu_OpenClutch ≔ time
END

  Error_FromNeu_OpenClutch ≜
        STATUS
    ordinary
REFINES
    Error_FromNeu
WHEN
    grd1 :RequestFromNeu = TRUE
    grd2 :Error_FromNeu_OpenClutch = FALSE
    grd3 :FromNeu_SyncSpeed = FALSE
    grd4 :FromNeu_OpenClutch = FALSE
THEN
    act1 :Error_FromNeu_OpenClutch ≔ TRUE
    tError_FromNeu_OpenClutch :tError_FromNeu_OpenClutch ≔ time
END

  FromNeu_SetGear_NoClutch ≜
        STATUS
    ordinary
REFINES
    Setting_FromNeu_NoClutch
WHEN
    grd1 :FromNeu_SyncSpeed = TRUE
    grd2 :Error_FromNeu_SetGear_NoClutch = FALSE
    grd3 :FromNeu_SetGear_NoClutch = FALSE
THEN
    act1 :FromNeu_SetGear_NoClutch ≔ TRUE
    act2 :isNeu ≔ FALSE
    tFromNeu_SetGear_NoClutch :tFromNeu_SetGear_NoClutch ≔ time
END

  Error_FromNeu_SetGear_NoClutch ≜
        STATUS
    ordinary
REFINES
    Error_FromNeu
WHEN
    grd1 :FromNeu_SyncSpeed = TRUE
    grd2 :Error_FromNeu_SetGear_NoClutch = FALSE
    grd3 :FromNeu_SetGear_NoClutch = FALSE
THEN
    act1 :Error_FromNeu_SetGear_NoClutch ≔ TRUE
    tError_FromNeu_SetGear_NoClutch :tError_FromNeu_SetGear_NoClutch ≔ time
END

  FromNeu_SetGear_Clutch ≜
        STATUS
    ordinary
WHEN
    grd1 :FromNeu_OpenClutch = TRUE
    grd2 :Error_FromNeu_SetGear_Clutch = FALSE
    grd3 :FromNeu_SetGear_Clutch = FALSE
THEN
    act1 :FromNeu_SetGear_Clutch ≔ TRUE
```

```
        tFromNeu_SetGear_Clutch :tFromNeu_SetGear_Clutch ≔ time
END

    Error_FromNeu_SetGear_Clutch ≙
        STATUS
        ordinary
REFINES
        Error_FromNeu
WHEN
        grd1 :FromNeu_OpenClutch = TRUE
        grd2 :Error_FromNeu_SetGear_Clutch = FALSE
        grd3 :FromNeu_SetGear_Clutch = FALSE
THEN
        act1 :Error_FromNeu_SetGear_Clutch ≔ TRUE
        tError_FromNeu_SetGear_Clutch :tError_FromNeu_SetGear_Clutch ≔ time
END

    FromNeu_CloseClutch ≙
        STATUS
        ordinary
REFINES
        Setting_FromNeu_Clutch
WHEN
        grd1 :FromNeu_SetGear_Clutch = TRUE
        grd2 :Error_FromNeu_CloseClutch = FALSE
        grd3 :FromNeu_CloseClutch = FALSE
THEN
        act1 :FromNeu_CloseClutch ≔ TRUE
        act2 :isNeu ≔ FALSE
        tFromNeu_CloseClutch :tFromNeu_CloseClutch ≔ time
END

    Error_FromNeu_CloseClutch ≙
        STATUS
        ordinary
REFINES
        Error_FromNeu
WHEN
        grd1 :FromNeu_SetGear_Clutch = TRUE
        grd2 :Error_FromNeu_CloseClutch = FALSE
        grd3 :FromNeu_CloseClutch = FALSE
THEN
        act1 :Error_FromNeu_CloseClutch ≔ TRUE
        tError_FromNeu_CloseClutch :tError_FromNeu_CloseClutch ≔ time
END

    Releasing_NoNeu_NoClutch ≙
        STATUS
        ordinary
REFINES
        Releasing_NoNeu_NoClutch
WHEN
        grd1 :RequestNoNeu = TRUE
        grd2 :Error_Releasing_NoNeu = FALSE
        grd3 :Releasing_NoNeu_NoClutch = FALSE
        grd4 :Releasing_NoNeu_Clutch = FALSE
        Expiry3 :time ≤ tRequestNoNeu + R_NN_NC_EX
THEN
        act1 :Releasing_NoNeu_NoClutch ≔ TRUE
        tReleasing_NoNeu_NoClutch :tReleasing_NoNeu_NoClutch ≔ time
END

    Releasing_NoNeu_Clutch ≙
        STATUS
        ordinary
REFINES
        Releasing_NoNeu_Clutch
WHEN
        grd1 :RequestNoNeu = TRUE
        grd2 :Error_Releasing_NoNeu = FALSE
        grd3 :Releasing_NoNeu_Clutch = FALSE
        grd4 :Releasing_NoNeu_NoClutch = FALSE
THEN
        act1 :Releasing_NoNeu_Clutch ≔ TRUE
        tReleasing_NoNeu_Clutch :tReleasing_NoNeu_Clutch ≔ time
END

    Setting_NoNeu_NoClutch ≙
        STATUS
```

```
        ordinary
REFINES
        Setting_NoNeu_NoClutch
WHEN
        grd1 :Releasing_NoNeu_NoClutch = TRUE
        grd2 :Error_Setting_NoNeu = FALSE
        grd3 :Setting_NoNeu_NoClutch = FALSE
        grd4 :Setting_NoNeu_Clutch = FALSE
THEN
        act1 :Setting_NoNeu_NoClutch ≔ TRUE
        tSetting_NoNeu_NoClutch :tSetting_NoNeu_NoClutch ≔ time
END

    Setting_NoNeu_Clutch ≙
        STATUS
        ordinary
REFINES
        Setting_NoNeu_Clutch
WHEN
        grd1 :Releasing_NoNeu_NoClutch = TRUE
        grd2 :Error_Setting_NoNeu = FALSE
        grd3 :Setting_NoNeu_Clutch = FALSE
        grd4 :Setting_NoNeu_NoClutch = FALSE
THEN
        act1 :Setting_NoNeu_Clutch ≔ TRUE
        tSetting_NoNeu_Clutch :tSetting_NoNeu_Clutch ≔ time
END

    Setting_NoNeu_ReleaseClutch ≙
        STATUS
        ordinary
REFINES
        Setting_NoNeu_ReleaseClutch
WHEN
        grd1 :Releasing_NoNeu_Clutch = TRUE
        grd2 :Error_Setting_NoNeu = FALSE
        grd3 :Setting_NoNeu_ReleaseClutch = FALSE
THEN
        act1 :Setting_NoNeu_ReleaseClutch ≔ TRUE
        tSetting_NoNeu_ReleaseClutch :tSetting_NoNeu_ReleaseClutch ≔ time
END

    Releasing_ToNeu_NoClutch ≙
        STATUS
        ordinary
REFINES
        Releasing_ToNeu_NoClutch
WHEN
        grd1 :RequestToNeu = TRUE
        grd2 :Error_ToNeu = FALSE
        grd3 :Releasing_ToNeu_NoClutch = FALSE
        grd4 :Releasing_ToNeu_Clutch = FALSE
THEN
        act1 :Releasing_ToNeu_NoClutch ≔ TRUE
        act2 :isNeu ≔ TRUE
        tReleasing_ToNeu_NoClutch :tReleasing_ToNeu_NoClutch ≔ time
END

    Releasing_ToNeu_Clutch ≙
        STATUS
        ordinary
REFINES
        Releasing_ToNeu_Clutch
WHEN
        grd1 :RequestToNeu = TRUE
        grd2 :Error_ToNeu = FALSE
        grd3 :Releasing_ToNeu_Clutch = FALSE
        grd4 :Releasing_ToNeu_NoClutch = FALSE
THEN
        act1 :Releasing_ToNeu_Clutch ≔ TRUE
        act2 :isNeu ≔ TRUE
        tReleasing_ToNeu_Clutch :tReleasing_ToNeu_Clutch ≔ time
END

    Error_Releasing_NoNeu ≙
        STATUS
        ordinary
REFINES
        Error_Releasing_NoNeu
```

```
WHEN
        grd1 :Error_Releasing_NoNeu = FALSE
        grd2 :RequestNoNeu = TRUE
        grd3 :Releasing_NoNeu_Clutch = FALSE
        grd4 :Releasing_NoNeu_NoClutch = FALSE
THEN
        act1 :Error_Releasing_NoNeu ≔ TRUE
        tError_Releasing_NoNeu :tError_Releasing_NoNeu ≔ time
END

    Error_Setting_NoNeu ≙
        STATUS
        ordinary
REFINES
        Error_Setting_NoNeu
WHEN
        grd1 :Error_Setting_NoNeu = FALSE
        grd2 :Releasing_NoNeu_Clutch = TRUE ∨ Releasing_NoNeu_NoClutch = TRUE
        grd3 :Setting_NoNeu_NoClutch = FALSE
        grd4 :Setting_NoNeu_Clutch = FALSE
        grd5 :Setting_NoNeu_ReleaseClutch = FALSE
THEN
        act1 :Error_Setting_NoNeu ≔ TRUE
        tError_Setting_NoNeu :tError_Setting_NoNeu ≔ time
END

    Error_ToNeu ≙
        STATUS
        ordinary
REFINES
        Error_ToNeu
WHEN
        grd1 :Error_ToNeu = FALSE
        grd2 :RequestToNeu = TRUE
        grd3 :Releasing_ToNeu_NoClutch = FALSE
        grd4 :Releasing_ToNeu_Clutch = FALSE
THEN
        act1 :Error_ToNeu ≔ TRUE
        tError_ToNeu :tError_ToNeu ≔ time
END

    FINAL ≙
        STATUS
        ordinary
REFINES
        FINAL
WHEN
        grd1 FromNeu_SetGear_NoClutch = TRUE ∨ Setting_NoNeu_NoClutch = TRUE ∨ Releasing_ToNeu_NoClutch = TRUE ∨
        :    FromNeu_CloseClutch = TRUE ∨ Setting_NoNeu_Clutch = TRUE ∨ Setting_NoNeu_ReleaseClutch = TRUE ∨
             Releasing_ToNeu_Clutch = TRUE
THEN
        act1 :RequestFromNeu ≔ FALSE
        act2 :RequestNoNeu ≔ FALSE
        act3 :RequestToNeu ≔ FALSE
        act4 :Releasing_ToNeu_NoClutch ≔ FALSE
        act5 :Setting_NoNeu_NoClutch ≔ FALSE
        act6 :Releasing_NoNeu_NoClutch ≔ FALSE
        act7 :Releasing_ToNeu_Clutch ≔ FALSE
        act8 :Setting_NoNeu_Clutch ≔ FALSE
        act9 :Setting_NoNeu_ReleaseClutch ≔ FALSE
        act10 :Releasing_NoNeu_Clutch ≔ FALSE
        act11 :FromNeu_SyncSpeed ≔ FALSE
        act12 :FromNeu_OpenClutch ≔ FALSE
        act13 :FromNeu_SetGear_NoClutch ≔ FALSE
        act14 :FromNeu_SetGear_Clutch ≔ FALSE
        act15 :FromNeu_CloseClutch ≔ FALSE
END

    Tick_Tock ≙
        STATUS
        ordinary
REFINES
        Tick_Tock
ANY
        tick
WHERE
        tick :tick > 0
        Deadline5 RequestToNeu = TRUE ∧ Releasing_ToNeu_NoClutch = FALSE ∧ Error_ToNeu = FALSE ∧ Releasing_ToNeu_Clutch = FALSE
        :             ⇒ time + tick ≤ tRequestToNeu + R_TN
```

```
        Deadline6 RequestNoNeu = TRUE ∧ Error_Releasing_NoNeu = FALSE ∧ Releasing_NoNeu_Clutch = FALSE ∧
        :         Releasing_NoNeu_NoClutch = FALSE ⇒ time + tick ≤ tRequestNoNeu + R_NN
        Deadline7 Releasing_NoNeu_Clutch = TRUE ∧ Setting_NoNeu_ReleaseClutch = FALSE ∧ Error_Setting_NoNeu = FALSE ⇒ time + tick ≤
        :         tReleasing_NoNeu_Clutch + S_NN_RC
        Deadline8 Releasing_NoNeu_NoClutch = TRUE ∧ Setting_NoNeu_Clutch = FALSE ∧ Error_Setting_NoNeu = FALSE ∧
        :         Setting_NoNeu_NoClutch = FALSE ⇒ time + tick ≤ tReleasing_NoNeu_NoClutch + S_NN
        Deadline9 RequestFromNeu = TRUE ∧ FromNeu_OpenClutch = FALSE ∧ Error_FromNeu_OpenClutch = FALSE ∧ FromNeu_SyncSpeed =
        :         FALSE ⇒ time + tick ≤ tRequestFromNeu + SyncOpen_DL
        Deadline10 FromNeu_SyncSpeed = TRUE ∧ FromNeu_SetGear_NoClutch = FALSE ∧ Error_FromNeu_SetGear_NoClutch = FALSE ⇒
        :          time + tick ≤ tFromNeu_SyncSpeed + SetGear_DL
        Deadline11 FromNeu_OpenClutch = TRUE ∧ Error_FromNeu_SetGear_Clutch = FALSE ∧ FromNeu_SetGear_Clutch = FALSE ⇒ time +
        :          tick ≤ tFromNeu_OpenClutch + SetGear_DL
        Deadline12 FromNeu_SetGear_Clutch = TRUE ∧ Error_FromNeu_CloseClutch = FALSE ∧ FromNeu_CloseClutch = FALSE ⇒ time + tick
        :          ≤ tFromNeu_SetGear_Clutch + CloseClutch_DL
THEN
        act1 :time ≔ time+tick
END

END
```

Machine m6

MACHINE
m6
REFINES
m5
SEES
c3
VARIABLES
isNeu *// Gear Status*
Releasing_NoNeu_NoClutch *// Flags*
Setting_NoNeu_NoClutch
RequestFromNeu *// Flags*
RequestNoNeu *// Flags*
RequestToNeu *// Flags*
Releasing_NoNeu_Clutch *// Flags*
Setting_NoNeu_Clutch *// Flags*
Setting_NoNeu_ReleaseClutch *// Flags*
Error_Releasing_NoNeu *// Flage*
Error_Setting_NoNeu *// Flage*
FromNeu_SyncSpeed *// Senario1*
FromNeu_OpenClutch *// Flage*
FromNeu_SetGear_NoClutch *// Flage*
FromNeu_SetGear_Clutch *// Flage*
FromNeu_CloseClutch *// Flage*
Error_FromNeu_OpenClutch *// Flage*
Error_FromNeu_SetGear_NoClutch *// Flage*
Error_FromNeu_SetGear_Clutch *// Flage*
Error_FromNeu_CloseClutch *// Senario1*
ToNeu_ZeroTorque *// Senario3 Flage*
ToNeu_OpenClutch *// Senario3 Flage*
Error_ToNeu_OpenClutch *// Senario3 Flage*
ToNeu_Release_NoClutch *// Senario3 Flage*
Error_ToNeu_Release_NoClutch *// Senario3 Flage*
ToNeu_Release_Clutch *// Senario3 Flage*
Error_ToNeu_Release_Clutch *// Senario3 Flage*
ToNeu_CloseClutch *// Senario3 Flage*
Error_ToNeu_CloseClutch *// Senario3 Flage*
time
tRequestNoNeu
tError_Releasing_NoNeu
tReleasing_NoNeu_Clutch
tReleasing_NoNeu_NoClutch
tSetting_NoNeu_ReleaseClutch
tError_Setting_NoNeu
tSetting_NoNeu_Clutch
tSetting_NoNeu_NoClutch
tRequestFromNeu
tFromNeu_OpenClutch
tError_FromNeu_OpenClutch
tFromNeu_SyncSpeed
tFromNeu_SetGear_NoClutch
tError_FromNeu_SetGear_NoClutch
tError_FromNeu_SetGear_Clutch
tFromNeu_SetGear_Clutch
tError_FromNeu_CloseClutch
tFromNeu_CloseClutch
tRequestToNeu
tToNeu_ZeroTorque
tError_ToNeu_OpenClutch
tToNeu_OpenClutch
tToNeu_Release_NoClutch
tError_ToNeu_Release_NoClutch
tToNeu_Release_Clutch
tError_ToNeu_Release_Clutch
tError_ToNeu_CloseClutch
tToNeu_CloseClutch
INVARIANTS
inv1 :{ToNeu_ZeroTorque, ToNeu_OpenClutch, Error_ToNeu_OpenClutch, ToNeu_Release_NoClutch, Error_ToNeu_Release_NoClutch, ToNeu_Release_Clutch, Error_ToNeu_Release_Clutch, ToNeu_CloseClutch, Error_ToNeu_CloseClutch} ∈ ℙ(BOOL)
inv2 :ToNeu_Release_NoClutch = Releasing_ToNeu_NoClutch
inv3 :ToNeu_CloseClutch = Releasing_ToNeu_Clutch
inv4 :ToNeu_ZeroTorque = TRUE ∨ ToNeu_OpenClutch = TRUE ⇒ RequestToNeu = TRUE
inv5 :ToNeu_Release_NoClutch = TRUE ⇒ ToNeu_ZeroTorque = TRUE
inv6 :ToNeu_Release_Clutch = TRUE ⇒ ToNeu_OpenClutch = TRUE
inv7 :ToNeu_ZeroTorque = TRUE ⇒ ToNeu_OpenClutch = FALSE ∧ Error_ToNeu_OpenClutch = FALSE
inv8 :ToNeu_CloseClutch = TRUE ⇒ ToNeu_Release_Clutch = TRUE

inv9 :ToNeu_OpenClutch=FALSE ⇒ ToNeu_CloseClutch = FALSE
inv10 :Error_ToNeu_OpenClutch = FALSE ∧ Error_ToNeu_Release_NoClutch = FALSE ∧ Error_ToNeu_Release_Clutch = FALSE ∧ Error_ToNeu_CloseClutch= FALSE ⇒ Error_ToNeu = FALSE
inv11 :Error_ToNeu_OpenClutch = TRUE ∨ Error_ToNeu_Release_NoClutch = TRUE ∨ Error_ToNeu_Release_Clutch = TRUE ∨ Error_ToNeu_CloseClutch= TRUE ⇒ Error_ToNeu = TRUE
inv12 :ToNeu_Release_Clutch = TRUE ⇒ Error_ToNeu_Release_Clutch = FALSE
inv13 :ToNeu_Release_NoClutch = TRUE ⇒ Error_ToNeu_Release_NoClutch = FALSE
inv14 :ToNeu_CloseClutch = TRUE ⇒ Error_ToNeu_CloseClutch = FALSE
inv15 :ToNeu_OpenClutch = TRUE ⇒ Error_ToNeu_OpenClutch = FALSE
inv16 :RequestToNeu = TRUE ∧ Error_ToNeu_Release_Clutch = TRUE ⇒ ToNeu_OpenClutch = TRUE
inv17 :RequestToNeu = TRUE ∧ Error_ToNeu_Release_NoClutch = TRUE ⇒ ToNeu_ZeroTorque = TRUE
inv18 :RequestToNeu = TRUE ∧ Error_ToNeu_CloseClutch = TRUE ⇒ ToNeu_Release_Clutch = TRUE
tToNeu_ZeroTorque :tToNeu_ZeroTorque ∈ ℕ
tError_ToNeu_OpenClutch :tError_ToNeu_OpenClutch ∈ ℕ
tToNeu_OpenClutch :tToNeu_OpenClutch ∈ ℕ
Deadline13 : RequestToNeu = TRUE ∧ ToNeu_ZeroTorque = FALSE ∧ Error_ToNeu_OpenClutch = FALSE ∧ ToNeu_OpenClutch = FALSE ⇒ time ≤ tRequestToNeu + ZeroOpen_DL
ToNeu_ZeroTorqueDurationDeadline13 : RequestToNeu = TRUE ∧ ToNeu_ZeroTorque = TRUE ⇒ tToNeu_ZeroTorque ≤ tRequestToNeu + ZeroOpen_DL
Error_ToNeu_OpenClutchDurationDeadline13 : RequestToNeu = TRUE ∧ Error_ToNeu_OpenClutch = TRUE ⇒ tError_ToNeu_OpenClutch ≤ tRequestToNeu + ZeroOpen_DL
ToNeu_OpenClutchDurationDeadline13 : RequestToNeu = TRUE ∧ ToNeu_OpenClutch = TRUE ⇒ tToNeu_OpenClutch ≤ tRequestToNeu + ZeroOpen_DL
ToNeu_ZeroTorqueDurationExpiry3 : RequestToNeu = TRUE ∧ ToNeu_ZeroTorque = TRUE ⇒ tToNeu_ZeroTorque ≤ tRequestToNeu + Zero_EX
tToNeu_Release_NoClutch :tToNeu_Release_NoClutch ∈ ℕ
tError_ToNeu_Release_NoClutch :tError_ToNeu_Release_NoClutch ∈ ℕ
Deadline14 : ToNeu_ZeroTorque = TRUE ∧ ToNeu_Release_NoClutch = FALSE ∧ Error_ToNeu_Release_NoClutch = FALSE ⇒ time ≤ tToNeu_ZeroTorque + Release_DL
ToNeu_Release_NoClutchDurationDeadline14 : ToNeu_ZeroTorque = TRUE ∧ ToNeu_Release_NoClutch = TRUE ⇒ tToNeu_Release_NoClutch ≤ tToNeu_ZeroTorque + Release_DL
Error_ToNeu_Release_NoClutchDurationDeadline14 : ToNeu_ZeroTorque = TRUE ∧ Error_ToNeu_Release_NoClutch = TRUE ⇒ tError_ToNeu_Release_NoClutch ≤ tToNeu_ZeroTorque + Release_DL
tToNeu_Release_Clutch :tToNeu_Release_Clutch ∈ ℕ
tError_ToNeu_Release_Clutch :tError_ToNeu_Release_Clutch ∈ ℕ
Deadline15 : ToNeu_OpenClutch = TRUE ∧ ToNeu_Release_Clutch = FALSE ∧ Error_ToNeu_Release_Clutch = FALSE ⇒ time ≤ tToNeu_OpenClutch + Release_DL
ToNeu_Release_ClutchDurationDeadline15 : ToNeu_OpenClutch = TRUE ∧ ToNeu_Release_Clutch = TRUE ⇒ tToNeu_Release_Clutch ≤ tToNeu_OpenClutch + Release_DL
Error_ToNeu_Release_ClutchDurationDeadline15 : ToNeu_OpenClutch = TRUE ∧ Error_ToNeu_Release_Clutch = TRUE ⇒ tError_ToNeu_Release_Clutch ≤ tToNeu_OpenClutch + Release_DL
tError_ToNeu_CloseClutch :tError_ToNeu_CloseClutch ∈ ℕ
tToNeu_CloseClutch :tToNeu_CloseClutch ∈ ℕ
Deadline16 : ToNeu_Release_Clutch = TRUE ∧ Error_ToNeu_CloseClutch = FALSE ∧ ToNeu_CloseClutch = FALSE ⇒ time ≤ tToNeu_Release_Clutch + CloseClutch_DL
Error_ToNeu_CloseClutchDurationDeadline16 : ToNeu_Release_Clutch = TRUE ∧ Error_ToNeu_CloseClutch = TRUE ⇒ tError_ToNeu_CloseClutch ≤ tToNeu_Release_Clutch + CloseClutch_DL
ToNeu_CloseClutchDurationDeadline16 : ToNeu_Release_Clutch = TRUE ∧ ToNeu_CloseClutch = TRUE ⇒ tToNeu_CloseClutch ≤ tToNeu_Release_Clutch + CloseClutch_DL

TIMING

Deadline6 :Deadline (RequestNoNeu, Error_Releasing_NoNeu ∨ Releasing_NoNeu_Clutch ∨ Releasing_NoNeu_NoClutch, R_NN)
Expiry1 :Expiry (RequestNoNeu, Releasing_NoNeu_NoClutch, R_NN_NC_EX)
Deadline7 :Deadline (Releasing_NoNeu_Clutch, Setting_NoNeu_ReleaseClutch ∨ Error_Setting_NoNeu, S_NN_RC)
Deadline8 :Deadline (Releasing_NoNeu_NoClutch, Setting_NoNeu_Clutch ∨ Error_Setting_NoNeu ∨ Setting_NoNeu_NoClutch, S_NN)
Deadline9 :Deadline (RequestFromNeu, FromNeu_OpenClutch ∨ Error_FromNeu_OpenClutch ∨ FromNeu_SyncSpeed, SyncOpen_DL)
Expiry2 :Expiry (RequestFromNeu, FromNeu_SyncSpeed, Sync_EX)
Deadline10 :Deadline (FromNeu_SyncSpeed, FromNeu_SetGear_NoClutch ∨ Error_FromNeu_SetGear_NoClutch, SetGear_DL)
Deadline11 :Deadline (FromNeu_OpenClutch, Error_FromNeu_SetGear_Clutch ∨ FromNeu_SetGear_Clutch, SetGear_DL)
Deadline12 :Deadline (FromNeu_SetGear_Clutch, Error_FromNeu_CloseClutch ∨ FromNeu_CloseClutch, CloseClutch_DL)
Deadline13 :Deadline (RequestToNeu, ToNeu_ZeroTorque ∨ Error_ToNeu_OpenClutch ∨ ToNeu_OpenClutch, ZeroOpen_DL)
Expiry3 :Expiry (RequestToNeu, ToNeu_ZeroTorque, Zero_EX)
Deadline14 :Deadline (ToNeu_ZeroTorque, ToNeu_Release_NoClutch ∨ Error_ToNeu_Release_NoClutch, Release_DL)
Deadline15 :Deadline (ToNeu_OpenClutch, ToNeu_Release_Clutch ∨ Error_ToNeu_Release_Clutch, Release_DL)
Deadline16 :Deadline (ToNeu_Release_Clutch, Error_ToNeu_CloseClutch ∨ ToNeu_CloseClutch, CloseClutch_DL)

EVENTS

INITIALISATION ≙
STATUS
ordinary
BEGIN
act1 :isNeu ≔ TRUE
act2 :RequestNoNeu ≔ FALSE
act3 :RequestToNeu ≔ FALSE

```
        act4 :RequestFromNeu ≔ FALSE
        act5 :Releasing_NoNeu_NoClutch ≔ FALSE
        act6 :Setting_NoNeu_NoClutch ≔ FALSE
        act7 :Releasing_NoNeu_Clutch ≔ FALSE
        act8 :Setting_NoNeu_Clutch ≔ FALSE
        act9 :Setting_NoNeu_ReleaseClutch ≔ FALSE
        act10 :Error_Releasing_NoNeu:≔ FALSE
        act11 :Error_Setting_NoNeu:≔ FALSE
        act12 :FromNeu_SyncSpeed ≔ FALSE
        act13 :FromNeu_OpenClutch ≔ FALSE
        act14 :FromNeu_SetGear_NoClutch ≔ FALSE
        act15 :FromNeu_SetGear_Clutch ≔ FALSE
        act16 :FromNeu_CloseClutch ≔ FALSE
        act17 :Error_FromNeu_OpenClutch ≔ FALSE
        act18 :Error_FromNeu_SetGear_NoClutch ≔ FALSE
        act19 :Error_FromNeu_SetGear_Clutch ≔ FALSE
        act20 :Error_FromNeu_CloseClutch ≔ FALSE
        act21 :ToNeu_ZeroTorque:≔ FALSE      // Senario3 Flage
        act22 :ToNeu_OpenClutch ≔ FALSE      // Senario3 Flage
        act23 :Error_ToNeu_OpenClutch ≔ FALSE      // Senario3 Flage
        act24 :ToNeu_Release_NoClutch:≔ FALSE      // Senario3 Flage
        act25 :Error_ToNeu_Release_NoClutch:≔ FALSE      // Senario3 Flage
        act26 :ToNeu_Release_Clutch:≔ FALSE      // Senario3 Flage
        act27 :Error_ToNeu_Release_Clutch ≔ FALSE      // Senario3 Flage
        act28 :ToNeu_CloseClutch:≔ FALSE      // Senario3 Flage
        act29 :Error_ToNeu_CloseClutch:≔ FALSE      // Senario3 Flage
        time :time ≔ 0
        tRequestNoNeu :tRequestNoNeu ≔ 0
        tError_Releasing_NoNeu :tError_Releasing_NoNeu ≔ 0
        tReleasing_NoNeu_Clutch :tReleasing_NoNeu_Clutch ≔ 0
        tReleasing_NoNeu_NoClutch :tReleasing_NoNeu_NoClutch ≔ 0
        tSetting_NoNeu_ReleaseClutch :tSetting_NoNeu_ReleaseClutch ≔ 0
        tError_Setting_NoNeu :tError_Setting_NoNeu ≔ 0
        tSetting_NoNeu_Clutch :tSetting_NoNeu_Clutch ≔ 0
        tSetting_NoNeu_NoClutch :tSetting_NoNeu_NoClutch ≔ 0
        tRequestFromNeu :tRequestFromNeu ≔ 0
        tFromNeu_OpenClutch :tFromNeu_OpenClutch ≔ 0
        tError_FromNeu_OpenClutch :tError_FromNeu_OpenClutch ≔ 0
        tFromNeu_SyncSpeed :tFromNeu_SyncSpeed ≔ 0
        tFromNeu_SetGear_NoClutch :tFromNeu_SetGear_NoClutch ≔ 0
        tError_FromNeu_SetGear_NoClutch :tError_FromNeu_SetGear_NoClutch ≔ 0
        tError_FromNeu_SetGear_Clutch :tError_FromNeu_SetGear_Clutch ≔ 0
        tFromNeu_SetGear_Clutch :tFromNeu_SetGear_Clutch ≔ 0
        tError_FromNeu_CloseClutch :tError_FromNeu_CloseClutch ≔ 0
        tFromNeu_CloseClutch :tFromNeu_CloseClutch ≔ 0
        tRequestToNeu :tRequestToNeu ≔ 0
        tToNeu_ZeroTorque :tToNeu_ZeroTorque ≔ 0
        tError_ToNeu_OpenClutch :tError_ToNeu_OpenClutch ≔ 0
        tToNeu_OpenClutch :tToNeu_OpenClutch ≔ 0
        tToNeu_Release_NoClutch :tToNeu_Release_NoClutch ≔ 0
        tError_ToNeu_Release_NoClutch :tError_ToNeu_Release_NoClutch ≔ 0
        tToNeu_Release_Clutch :tToNeu_Release_Clutch ≔ 0
        tError_ToNeu_Release_Clutch :tError_ToNeu_Release_Clutch ≔ 0
        tError_ToNeu_CloseClutch :tError_ToNeu_CloseClutch ≔ 0
        tToNeu_CloseClutch :tToNeu_CloseClutch ≔ 0
END

    RequestFromNeu ≙
      extended
          STATUS
      ordinary
REFINES
      RequestFromNeu
WHEN
      grd1 :RequestFromNeu = FALSE
      grd2 :RequestNoNeu = FALSE
      grd3 :RequestToNeu = FALSE
      grd4 :isNeu = TRUE
THEN
      act1 :RequestFromNeu ≔ TRUE
      tRequestFromNeu :tRequestFromNeu ≔ time
END

    RequestNoNeu ≙
      extended
          STATUS
      ordinary
REFINES
      RequestNoNeu
```

WHEN
grd1 :RequestFromNeu = FALSE
grd2 :RequestNoNeu = FALSE
grd3 :RequestToNeu = FALSE
grd4 :isNeu = FALSE
THEN
act1 :RequestNoNeu ≔ TRUE
tRequestNoNeu :tRequestNoNeu ≔ time
END

RequestToNeu ≙
STATUS
ordinary
REFINES
RequestToNeu
WHEN
grd1 :RequestFromNeu = FALSE
grd2 :RequestNoNeu = FALSE
grd3 :RequestToNeu = FALSE
grd4 :isNeu = FALSE
THEN
act1 :RequestToNeu ≔ TRUE
tRequestToNeu :tRequestToNeu ≔ time
END

FromNeu_SyncSpeed ≙
extended
STATUS
ordinary
REFINES
FromNeu_SyncSpeed
WHEN
grd1 :RequestFromNeu = TRUE
grd2 :FromNeu_SyncSpeed = FALSE
grd3 :FromNeu_OpenClutch = FALSE
grd4 :Error_FromNeu_OpenClutch = FALSE
Expiry2 :time ≤ tRequestFromNeu + Sync_EX
THEN
act1 :FromNeu_SyncSpeed ≔ TRUE
tFromNeu_SyncSpeed :tFromNeu_SyncSpeed ≔ time
END

FromNeu_OpenClutch ≙
extended
STATUS
ordinary
REFINES
FromNeu_OpenClutch
WHEN
grd1 :RequestFromNeu = TRUE
grd2 :Error_FromNeu_OpenClutch = FALSE
grd3 :FromNeu_SyncSpeed = FALSE
grd4 :FromNeu_OpenClutch = FALSE
THEN
act1 :FromNeu_OpenClutch ≔ TRUE
tFromNeu_OpenClutch :tFromNeu_OpenClutch ≔ time
END

Error_FromNeu_OpenClutch ≙
extended
STATUS
ordinary
REFINES
Error_FromNeu_OpenClutch
WHEN
grd1 :RequestFromNeu = TRUE
grd2 :Error_FromNeu_OpenClutch = FALSE
grd3 :FromNeu_SyncSpeed = FALSE
grd4 :FromNeu_OpenClutch = FALSE
THEN
act1 :Error_FromNeu_OpenClutch ≔ TRUE
tError_FromNeu_OpenClutch :tError_FromNeu_OpenClutch ≔ time
END

FromNeu_SetGear_NoClutch ≙
extended
STATUS
ordinary
REFINES

FromNeu_SetGear_NoClutch
WHEN
grd1 :FromNeu_SyncSpeed = TRUE
grd2 :Error_FromNeu_SetGear_NoClutch = FALSE
grd3 :FromNeu_SetGear_NoClutch = FALSE
THEN
act1 :FromNeu_SetGear_NoClutch ≔ TRUE
act2 :isNeu ≔ FALSE
tFromNeu_SetGear_NoClutch :tFromNeu_SetGear_NoClutch ≔ time
END

Error_FromNeu_SetGear_NoClutch ≙
extended
STATUS
ordinary
REFINES
Error_FromNeu_SetGear_NoClutch
WHEN
grd1 :FromNeu_SyncSpeed = TRUE
grd2 :Error_FromNeu_SetGear_NoClutch = FALSE
grd3 :FromNeu_SetGear_NoClutch = FALSE
THEN
act1 :Error_FromNeu_SetGear_NoClutch ≔ TRUE
tError_FromNeu_SetGear_NoClutch :tError_FromNeu_SetGear_NoClutch ≔ time
END

FromNeu_SetGear_Clutch ≙
extended
STATUS
ordinary
REFINES
FromNeu_SetGear_Clutch
WHEN
grd1 :FromNeu_OpenClutch = TRUE
grd2 :Error_FromNeu_SetGear_Clutch = FALSE
grd3 :FromNeu_SetGear_Clutch = FALSE
THEN
act1 :FromNeu_SetGear_Clutch ≔ TRUE
tFromNeu_SetGear_Clutch :tFromNeu_SetGear_Clutch ≔ time
END

Error_FromNeu_SetGear_Clutch ≙
extended
STATUS
ordinary
REFINES
Error_FromNeu_SetGear_Clutch
WHEN
grd1 :FromNeu_OpenClutch = TRUE
grd2 :Error_FromNeu_SetGear_Clutch = FALSE
grd3 :FromNeu_SetGear_Clutch = FALSE
THEN
act1 :Error_FromNeu_SetGear_Clutch ≔ TRUE
tError_FromNeu_SetGear_Clutch :tError_FromNeu_SetGear_Clutch ≔ time
END

FromNeu_CloseClutch ≙
extended
STATUS
ordinary
REFINES
FromNeu_CloseClutch
WHEN
grd1 :FromNeu_SetGear_Clutch = TRUE
grd2 :Error_FromNeu_CloseClutch = FALSE
grd3 :FromNeu_CloseClutch = FALSE
THEN
act1 :FromNeu_CloseClutch ≔ TRUE
act2 :isNeu ≔ FALSE
tFromNeu_CloseClutch :tFromNeu_CloseClutch ≔ time
END

Error_FromNeu_CloseClutch ≙
extended
STATUS
ordinary
REFINES
Error_FromNeu_CloseClutch
WHEN

grd1 :FromNeu_SetGear_Clutch = TRUE
grd2 :Error_FromNeu_CloseClutch = FALSE
grd3 :FromNeu_CloseClutch = FALSE
THEN
act1 :Error_FromNeu_CloseClutch ≔ TRUE
tError_FromNeu_CloseClutch :tError_FromNeu_CloseClutch ≔ time
END

Releasing_NoNeu_NoClutch ≙
extended
STATUS
ordinary
REFINES
Releasing_NoNeu_NoClutch
WHEN
grd1 :RequestNoNeu = TRUE
grd2 :Error_Releasing_NoNeu = FALSE
grd3 :Releasing_NoNeu_NoClutch = FALSE
grd4 :Releasing_NoNeu_Clutch = FALSE
Expiry3 :time ≤ tRequestNoNeu + R_NN_NC_EX
THEN
act1 :Releasing_NoNeu_NoClutch ≔ TRUE
tReleasing_NoNeu_NoClutch :tReleasing_NoNeu_NoClutch ≔ time
END

Releasing_NoNeu_Clutch ≙
extended
STATUS
ordinary
REFINES
Releasing_NoNeu_Clutch
WHEN
grd1 :RequestNoNeu = TRUE
grd2 :Error_Releasing_NoNeu = FALSE
grd3 :Releasing_NoNeu_Clutch = FALSE
grd4 :Releasing_NoNeu_NoClutch = FALSE
THEN
act1 :Releasing_NoNeu_Clutch ≔ TRUE
tReleasing_NoNeu_Clutch :tReleasing_NoNeu_Clutch ≔ time
END

Setting_NoNeu_NoClutch ≙
extended
STATUS
ordinary
REFINES
Setting_NoNeu_NoClutch
WHEN
grd1 :Releasing_NoNeu_NoClutch = TRUE
grd2 :Error_Setting_NoNeu = FALSE
grd3 :Setting_NoNeu_NoClutch = FALSE
grd4 :Setting_NoNeu_Clutch = FALSE
THEN
act1 :Setting_NoNeu_NoClutch ≔ TRUE
tSetting_NoNeu_NoClutch :tSetting_NoNeu_NoClutch ≔ time
END

Setting_NoNeu_Clutch ≙
extended
STATUS
ordinary
REFINES
Setting_NoNeu_Clutch
WHEN
grd1 :Releasing_NoNeu_NoClutch = TRUE
grd2 :Error_Setting_NoNeu = FALSE
grd3 :Setting_NoNeu_Clutch = FALSE
grd4 :Setting_NoNeu_NoClutch = FALSE
THEN
act1 :Setting_NoNeu_Clutch ≔ TRUE
tSetting_NoNeu_Clutch :tSetting_NoNeu_Clutch ≔ time
END

Setting_NoNeu_ReleaseClutch ≙
extended
STATUS
ordinary
REFINES
Setting_NoNeu_ReleaseClutch

```
WHEN
        grd1 :Releasing_NoNeu_Clutch = TRUE
        grd2 :Error_Setting_NoNeu = FALSE
        grd3 :Setting_NoNeu_ReleaseClutch = FALSE
THEN
        act1 :Setting_NoNeu_ReleaseClutch ≔ TRUE
        tSetting_NoNeu_ReleaseClutch :tSetting_NoNeu_ReleaseClutch ≔ time
END

    ToNeu_ZeroTorque ≙      // First Event of Senarion3
        STATUS
        ordinary
WHEN
        grd1 :RequestToNeu = TRUE
        grd2 :ToNeu_ZeroTorque = FALSE
        grd3 :ToNeu_OpenClutch = FALSE
        grd4 :Error_ToNeu_OpenClutch = FALSE
        Expiry3 :time ≤ tRequestToNeu + Zero_EX
THEN
        act1 :ToNeu_ZeroTorque ≔ TRUE
        tToNeu_ZeroTorque :tToNeu_ZeroTorque ≔ time
END

    ToNeu_OpenClutch ≙
        STATUS
        ordinary
WHEN
        grd1 :RequestToNeu = TRUE
        grd2 :ToNeu_ZeroTorque = FALSE
        grd3 :ToNeu_OpenClutch = FALSE
        grd4 :Error_ToNeu_OpenClutch = FALSE
THEN
        act1 :ToNeu_OpenClutch ≔ TRUE
        tToNeu_OpenClutch :tToNeu_OpenClutch ≔ time
END

    Error_ToNeu_OpenClutch ≙
        STATUS
        ordinary
REFINES
        Error_ToNeu
WHEN
        grd1 :RequestToNeu = TRUE
        grd2 :ToNeu_ZeroTorque = FALSE
        grd3 :ToNeu_OpenClutch = FALSE
        grd4 :Error_ToNeu_OpenClutch = FALSE
THEN
        act1 :Error_ToNeu_OpenClutch ≔ TRUE
        tError_ToNeu_OpenClutch :tError_ToNeu_OpenClutch ≔ time
END

    ToNeu_Release_NoClutch ≙
        STATUS
        ordinary
REFINES
        Releasing_ToNeu_NoClutch
WHEN
        grd1 :ToNeu_ZeroTorque = TRUE
        grd2 :ToNeu_Release_NoClutch = FALSE
        grd3 :Error_ToNeu_Release_NoClutch = FALSE
THEN
        act1 :ToNeu_Release_NoClutch ≔ TRUE
        act2 :isNeu ≔ TRUE
        tToNeu_Release_NoClutch :tToNeu_Release_NoClutch ≔ time
END

    Error_ToNeu_Release_NoClutch ≙
        STATUS
        ordinary
REFINES
        Error_ToNeu
WHEN
        grd1 :ToNeu_ZeroTorque = TRUE
        grd2 :ToNeu_Release_NoClutch = FALSE
        grd3 :Error_ToNeu_Release_NoClutch = FALSE
THEN
        act1 :Error_ToNeu_Release_NoClutch ≔ TRUE
        tError_ToNeu_Release_NoClutch :tError_ToNeu_Release_NoClutch ≔ time
END
```

```
    ToNeu_Release_Clutch ≙
        STATUS
      ordinary
WHEN
      grd1 :ToNeu_OpenClutch = TRUE
      grd2 :ToNeu_Release_Clutch = FALSE
      grd3 :Error_ToNeu_Release_Clutch = FALSE
THEN
      act1 :ToNeu_Release_Clutch ≔ TRUE
      tToNeu_Release_Clutch :tToNeu_Release_Clutch ≔ time
END

    Error_ToNeu_Release_Clutch ≙
        STATUS
      ordinary
REFINES
      Error_ToNeu
WHEN
      grd1 :ToNeu_OpenClutch = TRUE
      grd2 :ToNeu_Release_Clutch = FALSE
      grd3 :Error_ToNeu_Release_Clutch = FALSE
THEN
      act1 :Error_ToNeu_Release_Clutch ≔ TRUE
      tError_ToNeu_Release_Clutch :tError_ToNeu_Release_Clutch ≔ time
END

    ToNeu_CloseClutch ≙
        STATUS
      ordinary
REFINES
      Releasing_ToNeu_Clutch
WHEN
      grd1 :ToNeu_Release_Clutch = TRUE
      grd2 :ToNeu_CloseClutch = FALSE
      grd3 :Error_ToNeu_CloseClutch = FALSE
THEN
      act1 :ToNeu_CloseClutch ≔ TRUE
      act2 :isNeu ≔ TRUE
      tToNeu_CloseClutch :tToNeu_CloseClutch ≔ time
END

    Error_ToNeu_CloseClutch ≙      // Last Event of Senarion3
        STATUS
      ordinary
REFINES
      Error_ToNeu
WHEN
      grd1 :ToNeu_Release_Clutch = TRUE
      grd2 :ToNeu_CloseClutch = FALSE
      grd3 :Error_ToNeu_CloseClutch = FALSE
THEN
      act1 :Error_ToNeu_CloseClutch ≔ TRUE
      tError_ToNeu_CloseClutch :tError_ToNeu_CloseClutch ≔ time
END

    Error_Releasing_NoNeu ≙
      extended
        STATUS
      ordinary
REFINES
      Error_Releasing_NoNeu
WHEN
      grd1 :Error_Releasing_NoNeu = FALSE
      grd2 :RequestNoNeu = TRUE
      grd3 :Releasing_NoNeu_Clutch = FALSE
      grd4 :Releasing_NoNeu_NoClutch = FALSE
THEN
      act1 :Error_Releasing_NoNeu ≔ TRUE
      tError_Releasing_NoNeu :tError_Releasing_NoNeu ≔ time
END

    Error_Setting_NoNeu ≙
      extended
        STATUS
      ordinary
REFINES
      Error_Setting_NoNeu
WHEN
```

```
        grd1 :Error_Setting_NoNeu = FALSE
        grd2 :Releasing_NoNeu_Clutch = TRUE ∨ Releasing_NoNeu_NoClutch = TRUE
        grd3 :Setting_NoNeu_NoClutch = FALSE
        grd4 :Setting_NoNeu_Clutch = FALSE
        grd5 :Setting_NoNeu_ReleaseClutch = FALSE
THEN
        act1 :Error_Setting_NoNeu ≔ TRUE
        tError_Setting_NoNeu :tError_Setting_NoNeu ≔ time
END

    FINAL ≙
        STATUS
        ordinary
REFINES
        FINAL
WHEN
        grd1 : FromNeu_SetGear_NoClutch = TRUE ∨ Setting_NoNeu_NoClutch = TRUE ∨
               ToNeu_Release_NoClutch = TRUE ∨ FromNeu_CloseClutch = TRUE ∨
               Setting_NoNeu_Clutch = TRUE ∨ Setting_NoNeu_ReleaseClutch = TRUE ∨
               ToNeu_CloseClutch = TRUE
THEN
        act1 :RequestFromNeu ≔ FALSE
        act2 :RequestNoNeu ≔ FALSE
        act3 :RequestToNeu ≔ FALSE
        act4 :Setting_NoNeu_NoClutch ≔ FALSE
        act5 :Releasing_NoNeu_NoClutch ≔ FALSE
        act6 :Setting_NoNeu_Clutch ≔ FALSE
        act7 :Setting_NoNeu_ReleaseClutch ≔ FALSE
        act8 :Releasing_NoNeu_Clutch ≔ FALSE
        act9 :FromNeu_SyncSpeed ≔ FALSE
        act10 :FromNeu_OpenClutch ≔ FALSE
        act11 :FromNeu_SetGear_NoClutch ≔ FALSE
        act12 :FromNeu_SetGear_Clutch ≔ FALSE
        act13 :FromNeu_CloseClutch ≔ FALSE
        act14 :ToNeu_Release_NoClutch ≔ FALSE
        act15 :ToNeu_CloseClutch ≔ FALSE
        act16 :ToNeu_ZeroTorque≔ FALSE      // Senario3 Flage
        act17 :ToNeu_OpenClutch ≔ FALSE      // Senario3 Flage
        act18 :ToNeu_Release_Clutch≔ FALSE      // Senario3 Flage
END

    Tick_Tock ≙
        STATUS
        ordinary
REFINES
        Tick_Tock
ANY
        tick
WHERE
        tick :tick > 0
        Deadline6 : RequestNoNeu = TRUE ∧ Error_Releasing_NoNeu = FALSE ∧ Releasing_NoNeu_Clutch = FALSE ∧
                    Releasing_NoNeu_NoClutch = FALSE ⇒ time + tick ≤ tRequestNoNeu + R_NN
        Deadline7 : Releasing_NoNeu_Clutch = TRUE ∧ Setting_NoNeu_ReleaseClutch = FALSE ∧ Error_Setting_NoNeu = FALSE ⇒ time + tick ≤
                    tReleasing_NoNeu_Clutch + S_NN_RC
        Deadline8 : Releasing_NoNeu_NoClutch = TRUE ∧ Setting_NoNeu_Clutch = FALSE ∧ Error_Setting_NoNeu = FALSE ∧
                    Setting_NoNeu_NoClutch = FALSE ⇒ time + tick ≤ tReleasing_NoNeu_NoClutch + S_NN
        Deadline9 : RequestFromNeu = TRUE ∧ FromNeu_OpenClutch = FALSE ∧ Error_FromNeu_OpenClutch = FALSE ∧ FromNeu_SyncSpeed =
                    FALSE ⇒ time + tick ≤ tRequestFromNeu + SyncOpen_DL
        Deadline10 : FromNeu_SyncSpeed = TRUE ∧ FromNeu_SetGear_NoClutch = FALSE ∧ Error_FromNeu_SetGear_NoClutch = FALSE ⇒
                     time + tick ≤ tFromNeu_SyncSpeed + SetGear_DL
        Deadline11 : FromNeu_OpenClutch = TRUE ∧ Error_FromNeu_SetGear_Clutch = FALSE ∧ FromNeu_SetGear_Clutch = FALSE ⇒ time +
                     tick ≤ tFromNeu_OpenClutch + SetGear_DL
        Deadline12 : FromNeu_SetGear_Clutch = TRUE ∧ Error_FromNeu_CloseClutch = FALSE ∧ FromNeu_CloseClutch = FALSE ⇒ time + tick
                     ≤ tFromNeu_SetGear_Clutch + CloseClutch_DL
        Deadline13 : RequestToNeu = TRUE ∧ ToNeu_ZeroTorque = FALSE ∧ Error_ToNeu_OpenClutch = FALSE ∧ ToNeu_OpenClutch = FALSE
                     ⇒ time + tick ≤ tRequestToNeu + ZeroOpen_DL
        Deadline14 : ToNeu_ZeroTorque = TRUE ∧ ToNeu_Release_NoClutch = FALSE ∧ Error_ToNeu_Release_NoClutch = FALSE ⇒ time + tick
                     ≤ tToNeu_ZeroTorque + Release_DL
        Deadline15 : ToNeu_OpenClutch = TRUE ∧ ToNeu_Release_Clutch = FALSE ∧ Error_ToNeu_Release_Clutch = FALSE ⇒ time + tick ≤
                     tToNeu_OpenClutch + Release_DL
        Deadline16 : ToNeu_Release_Clutch = TRUE ∧ Error_ToNeu_CloseClutch = FALSE ∧ ToNeu_CloseClutch = FALSE ⇒ time + tick ≤
                     tToNeu_Release_Clutch + CloseClutch_DL
THEN
        act1 :time ≔ time+tick
END

END
```

Machine m7

MACHINE
m7
REFINES
m6
SEES
c4
VARIABLES
isNeu *// Gear Status*
RequestFromNeu *// Flags*
RequestNoNeu *// Flags*
RequestToNeu *// Flags*
FromNeu_SyncSpeed *// Senario1*
FromNeu_OpenClutch *// Flage*
FromNeu_SetGear_NoClutch *// Flage*
FromNeu_SetGear_Clutch *// Flage*
FromNeu_CloseClutch *// Flage*
Error_FromNeu_OpenClutch *// Flage*
Error_FromNeu_SetGear_NoClutch *// Flage*
Error_FromNeu_SetGear_Clutch *// Flage*
Error_FromNeu_CloseClutch *// Senario1*
ToNeu_ZeroTorque *// Senario3 Flage*
ToNeu_OpenClutch *// Senario3 Flage*
Error_ToNeu_OpenClutch *// Senario3 Flage*
ToNeu_Release_NoClutch *// Senario3 Flage*
Error_ToNeu_Release_NoClutch *// Senario3 Flage*
ToNeu_Release_Clutch *// Senario3 Flage*
Error_ToNeu_Release_Clutch *// Senario3 Flage*
ToNeu_CloseClutch *// Senario3 Flage*
Error_ToNeu_CloseClutch *// Senario3 Flage*
NoNeu_ZeroTorque *// Senario2 Flage*
NoNeu_Release_NoClutch *// Senario2 Flage*
NoNeu_OpenClutch_Releasing *// Senario2 Flage*
NoNeu_Release_Clutch *// Senario2 Flage*
NoNeu_SyncSpeed *// Senario2 Flage*
NoNeu_OpenClutch_Setting *// Senario2 Flage*
NoNeu_SetGear_NoClutch *// Senario2 Flage*
NoNeu_SetGear_ReleasingClutch *// Senario2 Flage*
NoNeu_SetGear_SettingClutch *// Senario2 Flage*
NoNeu_CloseClutch_Releasing *// Senario2 Flage*
NoNeu_CloseClutch_Setting *// Senario2 Flage*
Error_NoNeu_OpenClutch_Releasing *// Senario2 Flage*
Error_NoNeu_Release_Clutch *// Senario2 Flage*
Error_NoNeu_Release_NoClutch *// Senario2 Flage*
Error_NoNeu_OpenClutch_Setting *// Senario2 Flage*
Error_NoNeu_SetGear_NoClutch *// Senario2 Flage*
Error_NoNeu_SetGear_ReleasingClutch *// Senario2 Flage*
Error_NoNeu_SetGear_SettingClutch *// Senario2 Flage*
Error_NoNeu_CloseClutch_Releasing *// Senario2 Flage*
Error_NoNeu_CloseClutch_Setting *// Senario2 Flage*
time
tRequestFromNeu
tFromNeu_OpenClutch
tError_FromNeu_OpenClutch
tFromNeu_SyncSpeed
tFromNeu_SetGear_NoClutch
tError_FromNeu_SetGear_NoClutch
tError_FromNeu_SetGear_Clutch
tFromNeu_SetGear_Clutch
tError_FromNeu_CloseClutch
tFromNeu_CloseClutch
tRequestToNeu
tToNeu_ZeroTorque
tError_ToNeu_OpenClutch
tToNeu_OpenClutch
tToNeu_Release_NoClutch
tError_ToNeu_Release_NoClutch
tToNeu_Release_Clutch
tError_ToNeu_Release_Clutch
tError_ToNeu_CloseClutch
tToNeu_CloseClutch
tRequestNoNeu
tNoNeu_OpenClutch_Releasing
tNoNeu_ZeroTorque
tError_NoNeu_OpenClutch_Releasing
tNoNeu_Release_Clutch

tError_NoNeu_Release_Clutch
tNoNeu_Release_NoClutch
tError_NoNeu_Release_NoClutch
tNoNeu_SyncSpeed
tNoNeu_OpenClutch_Setting
tError_NoNeu_OpenClutch_Setting
tNoNeu_SetGear_NoClutch
tError_NoNeu_SetGear_NoClutch
tNoNeu_SetGear_SettingClutch
tError_NoNeu_SetGear_SettingClutch
tNoNeu_CloseClutch_Setting
tError_NoNeu_CloseClutch_Setting
tError_NoNeu_SetGear_ReleasingClutch
tNoNeu_SetGear_ReleasingClutch
tNoNeu_CloseClutch_Releasing
tError_NoNeu_CloseClutch_Releasing

INVARIANTS

{NoNeu_ZeroTorque, NoNeu_OpenClutch_Releasing, Error_NoNeu_OpenClutch_Releasing, NoNeu_Release_NoClutch, Error_NoNeu_Release_NoClutch, NoNeu_Release_Clutch, Error_NoNeu_Release_Clutch, NoNeu_SyncSpeed, NoNeu_OpenClutch_Setting, Error_NoNeu_OpenClutch_Setting,

inv1 :NoNeu_SetGear_NoClutch, Error_NoNeu_SetGear_NoClutch, NoNeu_SetGear_ReleasingClutch, NoNeu_SetGear_SettingClutch, Error_NoNeu_SetGear_ReleasingClutch,Error_NoNeu_SetGear_SettingClutch, NoNeu_CloseClutch_Setting, Error_NoNeu_CloseClutch_Releasing,Error_NoNeu_CloseClutch_Setting, NoNeu_CloseClutch_Releasing} ∈ ℙ(BOOL)

inv2 :NoNeu_Release_NoClutch = Releasing_NoNeu_NoClutch
inv3 :NoNeu_Release_Clutch = Releasing_NoNeu_Clutch
inv4 :NoNeu_SetGear_NoClutch = Setting_NoNeu_NoClutch
inv5 :NoNeu_CloseClutch_Releasing = Setting_NoNeu_ReleaseClutch
inv6 :NoNeu_CloseClutch_Setting = Setting_NoNeu_Clutch
inv7 :NoNeu_ZeroTorque = TRUE ∨ NoNeu_OpenClutch_Releasing = TRUE ⇒ RequestNoNeu = TRUE
inv8 :NoNeu_Release_NoClutch = TRUE ⇒ NoNeu_ZeroTorque = TRUE
inv9 :NoNeu_Release_Clutch = TRUE ⇒ NoNeu_OpenClutch_Releasing = TRUE
inv10 :NoNeu_ZeroTorque = TRUE ⇒ NoNeu_OpenClutch_Releasing = FALSE ∧ Error_NoNeu_OpenClutch_Releasing = FALSE

inv11 :Error_NoNeu_OpenClutch_Releasing = FALSE ∧
Error_NoNeu_Release_NoClutch = FALSE ∧
Error_NoNeu_Release_Clutch = FALSE
⇒ Error_Releasing_NoNeu = FALSE

inv12 :Error_NoNeu_OpenClutch_Releasing = TRUE ∨
Error_NoNeu_Release_NoClutch = TRUE ∨
Error_NoNeu_Release_Clutch = TRUE
⇒ Error_Releasing_NoNeu = TRUE

inv13 :NoNeu_Release_Clutch = TRUE ⇒ Error_NoNeu_Release_Clutch = FALSE
inv14 :NoNeu_Release_NoClutch = TRUE ⇒ Error_NoNeu_Release_NoClutch = FALSE
inv15 :NoNeu_OpenClutch_Releasing = TRUE ⇒ Error_NoNeu_OpenClutch_Releasing = FALSE
inv16 :RequestNoNeu = TRUE ∧ Error_NoNeu_Release_Clutch = TRUE ⇒ NoNeu_OpenClutch_Releasing = TRUE
inv17 :RequestNoNeu = TRUE ∧ Error_NoNeu_Release_NoClutch = TRUE ⇒ NoNeu_ZeroTorque = TRUE
inv18 :NoNeu_SyncSpeed = TRUE ∨ NoNeu_OpenClutch_Setting = TRUE ⇒ NoNeu_Release_NoClutch = TRUE
inv19 :NoNeu_SetGear_ReleasingClutch = TRUE ⇒ NoNeu_Release_Clutch = TRUE
inv20 :NoNeu_SetGear_SettingClutch = TRUE ⇒ NoNeu_OpenClutch_Setting = TRUE
inv21 :NoNeu_SetGear_NoClutch = TRUE ⇒ NoNeu_SyncSpeed = TRUE
inv22 :NoNeu_SyncSpeed = TRUE ⇒ NoNeu_OpenClutch_Setting = FALSE ∧ Error_NoNeu_OpenClutch_Setting = FALSE
inv23 :NoNeu_CloseClutch_Releasing = TRUE ⇒ NoNeu_SetGear_ReleasingClutch = TRUE
inv24 :NoNeu_CloseClutch_Setting = TRUE ⇒ NoNeu_SetGear_SettingClutch = TRUE

inv25 :Error_NoNeu_OpenClutch_Setting = FALSE ∧
Error_NoNeu_SetGear_NoClutch = FALSE ∧
Error_NoNeu_SetGear_ReleasingClutch = FALSE ∧
Error_NoNeu_SetGear_SettingClutch = FALSE ∧
Error_NoNeu_CloseClutch_Releasing= FALSE ∧
Error_NoNeu_CloseClutch_Setting = FALSE
⇒ Error_Setting_NoNeu = FALSE

inv26 :Error_NoNeu_OpenClutch_Setting = TRUE ∨
Error_NoNeu_SetGear_NoClutch = TRUE ∨
Error_NoNeu_SetGear_ReleasingClutch = TRUE ∨
Error_NoNeu_SetGear_SettingClutch= TRUE ∨
Error_NoNeu_CloseClutch_Releasing = TRUE ∨
Error_NoNeu_CloseClutch_Setting = TRUE
⇒ Error_Setting_NoNeu = TRUE

inv27 :NoNeu_SetGear_ReleasingClutch = TRUE ⇒ Error_NoNeu_SetGear_ReleasingClutch = FALSE
inv28 :NoNeu_SetGear_SettingClutch = TRUE ⇒ Error_NoNeu_SetGear_SettingClutch = FALSE
inv29 :NoNeu_SetGear_NoClutch = TRUE ⇒ Error_NoNeu_SetGear_NoClutch = FALSE
inv30 :NoNeu_CloseClutch_Releasing = TRUE ⇒ Error_NoNeu_CloseClutch_Releasing = FALSE
inv31 :NoNeu_CloseClutch_Setting = TRUE ⇒ Error_NoNeu_CloseClutch_Setting = FALSE
inv32 :NoNeu_OpenClutch_Releasing = TRUE ⇒ Error_NoNeu_OpenClutch_Releasing = FALSE
inv33 :NoNeu_OpenClutch_Setting = TRUE ⇒ Error_NoNeu_OpenClutch_Setting = FALSE
inv34 :RequestNoNeu = TRUE ∧ Error_NoNeu_SetGear_ReleasingClutch = TRUE ⇒ NoNeu_Release_Clutch = TRUE
inv35 :RequestNoNeu = TRUE ∧ Error_NoNeu_SetGear_SettingClutch = TRUE ⇒ NoNeu_OpenClutch_Setting = TRUE

inv36 :RequestNoNeu = TRUE ∧ Error_NoNeu_SetGear_NoClutch = TRUE ⇒ NoNeu_SyncSpeed = TRUE
inv37 :RequestNoNeu = TRUE ∧ Error_NoNeu_CloseClutch_Releasing = TRUE ⇒ NoNeu_SetGear_ReleasingClutch = TRUE
inv38 :RequestNoNeu = TRUE ∧ Error_NoNeu_CloseClutch_Setting = TRUE ⇒ NoNeu_SetGear_SettingClutch = TRUE
inv39 :RequestNoNeu = TRUE ∧ Error_NoNeu_OpenClutch_Setting = TRUE ⇒ NoNeu_Release_NoClutch = TRUE
inv40 :NoNeu_Release_Clutch = TRUE ⇒ NoNeu_SyncSpeed = FALSE ∧ NoNeu_OpenClutch_Setting = FALSE
tNoNeu_OpenClutch_Releasing :tNoNeu_OpenClutch_Releasing ∈ ℕ
tNoNeu_ZeroTorque :tNoNeu_ZeroTorque ∈ ℕ
tError_NoNeu_OpenClutch_Releasing :tError_NoNeu_OpenClutch_Releasing ∈ ℕ
Deadline17 : RequestNoNeu = TRUE ∧ NoNeu_OpenClutch_Releasing = FALSE ∧ NoNeu_ZeroTorque = FALSE ∧ Error_NoNeu_OpenClutch_Releasing = FALSE ⇒ time ≤ tRequestNoNeu + ZeroOpen_DL
NoNeu_OpenClutch_ReleasingDurationDeadline17 : RequestNoNeu = TRUE ∧ NoNeu_OpenClutch_Releasing = TRUE ⇒ tNoNeu_OpenClutch_Releasing ≤ tRequestNoNeu + ZeroOpen_DL
NoNeu_ZeroTorqueDurationDeadline17 : RequestNoNeu = TRUE ∧ NoNeu_ZeroTorque = TRUE ⇒ tNoNeu_ZeroTorque ≤ tRequestNoNeu + ZeroOpen_DL
Error_NoNeu_OpenClutch_ReleasingDurationDeadline17 : RequestNoNeu = TRUE ∧ Error_NoNeu_OpenClutch_Releasing = TRUE ⇒ tError_NoNeu_OpenClutch_Releasing ≤ tRequestNoNeu + ZeroOpen_DL
NoNeu_ZeroTorqueDurationExpiry4 : RequestNoNeu = TRUE ∧ NoNeu_ZeroTorque = TRUE ⇒ tNoNeu_ZeroTorque ≤ tRequestNoNeu + Zero_EX
tNoNeu_Release_Clutch :tNoNeu_Release_Clutch ∈ ℕ
tError_NoNeu_Release_Clutch :tError_NoNeu_Release_Clutch ∈ ℕ
Deadline18 : NoNeu_OpenClutch_Releasing = TRUE ∧ NoNeu_Release_Clutch = FALSE ∧ Error_NoNeu_Release_Clutch = FALSE ⇒ time ≤ tNoNeu_OpenClutch_Releasing + Release_DL
NoNeu_Release_ClutchDurationDeadline18 : NoNeu_OpenClutch_Releasing = TRUE ∧ NoNeu_Release_Clutch = TRUE ⇒ tNoNeu_Release_Clutch ≤ tNoNeu_OpenClutch_Releasing + Release_DL
Error_NoNeu_Release_ClutchDurationDeadline18 : NoNeu_OpenClutch_Releasing = TRUE ∧ Error_NoNeu_Release_Clutch = TRUE ⇒ tError_NoNeu_Release_Clutch ≤ tNoNeu_OpenClutch_Releasing + Release_DL
tNoNeu_Release_NoClutch :tNoNeu_Release_NoClutch ∈ ℕ
tError_NoNeu_Release_NoClutch :tError_NoNeu_Release_NoClutch ∈ ℕ
Deadline19 : NoNeu_ZeroTorque = TRUE ∧ NoNeu_Release_NoClutch = FALSE ∧ Error_NoNeu_Release_NoClutch = FALSE ⇒ time ≤ tNoNeu_ZeroTorque + Release_DL
NoNeu_Release_NoClutchDurationDeadline19 : NoNeu_ZeroTorque = TRUE ∧ NoNeu_Release_NoClutch = TRUE ⇒ tNoNeu_Release_NoClutch ≤ tNoNeu_ZeroTorque + Release_DL
Error_NoNeu_Release_NoClutchDurationDeadline19 : NoNeu_ZeroTorque = TRUE ∧ Error_NoNeu_Release_NoClutch = TRUE ⇒ tError_NoNeu_Release_NoClutch ≤ tNoNeu_ZeroTorque + Release_DL
tNoNeu_SyncSpeed :tNoNeu_SyncSpeed ∈ ℕ
tNoNeu_OpenClutch_Setting :tNoNeu_OpenClutch_Setting ∈ ℕ
tError_NoNeu_OpenClutch_Setting :tError_NoNeu_OpenClutch_Setting ∈ ℕ
Deadline20 : NoNeu_Release_NoClutch = TRUE ∧ NoNeu_SyncSpeed = FALSE ∧ NoNeu_OpenClutch_Setting = FALSE ∧ Error_NoNeu_OpenClutch_Setting = FALSE ⇒ time ≤ tNoNeu_Release_NoClutch + SyncOpen_DL
NoNeu_SyncSpeedDurationDeadline20 : NoNeu_Release_NoClutch = TRUE ∧ NoNeu_SyncSpeed = TRUE ⇒ tNoNeu_SyncSpeed ≤ tNoNeu_Release_NoClutch + SyncOpen_DL
NoNeu_OpenClutch_SettingDurationDeadline20 : NoNeu_Release_NoClutch = TRUE ∧ NoNeu_OpenClutch_Setting = TRUE ⇒ tNoNeu_OpenClutch_Setting ≤ tNoNeu_Release_NoClutch + SyncOpen_DL
Error_NoNeu_OpenClutch_SettingDurationDeadline20 : NoNeu_Release_NoClutch = TRUE ∧ Error_NoNeu_OpenClutch_Setting = TRUE ⇒ tError_NoNeu_OpenClutch_Setting ≤ tNoNeu_Release_NoClutch + SyncOpen_DL
NoNeu_SyncSpeedDurationExpiry5 : NoNeu_Release_NoClutch = TRUE ∧ NoNeu_SyncSpeed = TRUE ⇒ tNoNeu_SyncSpeed ≤ tNoNeu_Release_NoClutch + Sync_EX
tNoNeu_SetGear_NoClutch :tNoNeu_SetGear_NoClutch ∈ ℕ
tError_NoNeu_SetGear_NoClutch :tError_NoNeu_SetGear_NoClutch ∈ ℕ
Deadline21 : NoNeu_SyncSpeed = TRUE ∧ NoNeu_SetGear_NoClutch = FALSE ∧ Error_NoNeu_SetGear_NoClutch = FALSE ⇒ time ≤ tNoNeu_SyncSpeed + SetGear_DL
NoNeu_SetGear_NoClutchDurationDeadline21 : NoNeu_SyncSpeed = TRUE ∧ NoNeu_SetGear_NoClutch = TRUE ⇒ tNoNeu_SetGear_NoClutch ≤ tNoNeu_SyncSpeed + SetGear_DL
Error_NoNeu_SetGear_NoClutchDurationDeadline21 : NoNeu_SyncSpeed = TRUE ∧ Error_NoNeu_SetGear_NoClutch = TRUE ⇒ tError_NoNeu_SetGear_NoClutch ≤ tNoNeu_SyncSpeed + SetGear_DL
tNoNeu_SetGear_SettingClutch :tNoNeu_SetGear_SettingClutch ∈ ℕ
tError_NoNeu_SetGear_SettingClutch :tError_NoNeu_SetGear_SettingClutch ∈ ℕ
Deadline22 : NoNeu_OpenClutch_Setting = TRUE ∧ NoNeu_SetGear_SettingClutch = FALSE ∧ Error_NoNeu_SetGear_SettingClutch = FALSE ⇒ time ≤ tNoNeu_OpenClutch_Setting + SetGear_DL
NoNeu_SetGear_SettingClutchDurationDeadline22 : NoNeu_OpenClutch_Setting = TRUE ∧ NoNeu_SetGear_SettingClutch = TRUE ⇒ tNoNeu_SetGear_SettingClutch ≤ tNoNeu_OpenClutch_Setting + SetGear_DL
Error_NoNeu_SetGear_SettingClutchDurationDeadline22 : NoNeu_OpenClutch_Setting = TRUE ∧ Error_NoNeu_SetGear_SettingClutch = TRUE ⇒ tError_NoNeu_SetGear_SettingClutch ≤ tNoNeu_OpenClutch_Setting + SetGear_DL
tNoNeu_CloseClutch_Setting :tNoNeu_CloseClutch_Setting ∈ ℕ
tError_NoNeu_CloseClutch_Setting :tError_NoNeu_CloseClutch_Setting ∈ ℕ
Deadline23 : NoNeu_SetGear_SettingClutch = TRUE ∧ NoNeu_CloseClutch_Setting = FALSE ∧ Error_NoNeu_CloseClutch_Setting = FALSE ⇒ time ≤ tNoNeu_SetGear_SettingClutch + CloseClutch_DL
NoNeu_CloseClutch_SettingDurationDeadline23 : NoNeu_SetGear_SettingClutch = TRUE ∧ NoNeu_CloseClutch_Setting = TRUE ⇒ tNoNeu_CloseClutch_Setting ≤ tNoNeu_SetGear_SettingClutch + CloseClutch_DL
Error_NoNeu_CloseClutch_SettingDurationDeadline23 : NoNeu_SetGear_SettingClutch = TRUE ∧ Error_NoNeu_CloseClutch_Setting = TRUE ⇒ tError_NoNeu_CloseClutch_Setting ≤ tNoNeu_SetGear_SettingClutch + CloseClutch_DL
tError_NoNeu_SetGear_ReleasingClutch :tError_NoNeu_SetGear_ReleasingClutch ∈ ℕ
tNoNeu_SetGear_ReleasingClutch :tNoNeu_SetGear_ReleasingClutch ∈ ℕ
Deadline24 : NoNeu_Release_Clutch = TRUE ∧ Error_NoNeu_SetGear_ReleasingClutch = FALSE ∧ NoNeu_SetGear_ReleasingClutch = FALSE ⇒ time ≤ tNoNeu_Release_Clutch + SetGear_DL

Error_NoNeu_SetGear_ReleasingClutchDurationDeadline24 : NoNeu_Release_Clutch = TRUE ∧ Error_NoNeu_SetGear_ReleasingClutch = TRUE ⇒ tError_NoNeu_SetGear_ReleasingClutch ≤ tNoNeu_Release_Clutch + SetGear_DL
NoNeu_SetGear_ReleasingClutchDurationDeadline24 : NoNeu_Release_Clutch = TRUE ∧ NoNeu_SetGear_ReleasingClutch = TRUE ⇒ tNoNeu_SetGear_ReleasingClutch ≤ tNoNeu_Release_Clutch + SetGear_DL
tNoNeu_CloseClutch_Releasing :tNoNeu_CloseClutch_Releasing ∈ ℕ
tError_NoNeu_CloseClutch_Releasing :tError_NoNeu_CloseClutch_Releasing ∈ ℕ
Deadline25 : NoNeu_SetGear_ReleasingClutch = TRUE ∧ NoNeu_CloseClutch_Releasing = FALSE ∧ Error_NoNeu_CloseClutch_Releasing = FALSE ⇒ time ≤ tNoNeu_SetGear_ReleasingClutch + CloseClutch_DL
NoNeu_CloseClutch_ReleasingDurationDeadline25 : NoNeu_SetGear_ReleasingClutch = TRUE ∧ NoNeu_CloseClutch_Releasing = TRUE ⇒ tNoNeu_CloseClutch_Releasing ≤ tNoNeu_SetGear_ReleasingClutch + CloseClutch_DL
Error_NoNeu_CloseClutch_ReleasingDurationDeadline25 : NoNeu_SetGear_ReleasingClutch = TRUE ∧ Error_NoNeu_CloseClutch_Releasing = TRUE ⇒ tError_NoNeu_CloseClutch_Releasing ≤ tNoNeu_SetGear_ReleasingClutch + CloseClutch_DL
inv41 :tNoNeu_Release_Clutch = tReleasing_NoNeu_Clutch
inv42 :tReleasing_NoNeu_NoClutch = tNoNeu_Release_NoClutch

TIMING

Deadline9 :Deadline (RequestFromNeu, FromNeu_OpenClutch ∨ Error_FromNeu_OpenClutch ∨ FromNeu_SyncSpeed, SyncOpen_DL)
Expiry2 :Expiry (RequestFromNeu, FromNeu_SyncSpeed, Sync_EX)
Deadline10 :Deadline (FromNeu_SyncSpeed, FromNeu_SetGear_NoClutch ∨ Error_FromNeu_SetGear_NoClutch, SetGear_DL)
Deadline11 :Deadline (FromNeu_OpenClutch, Error_FromNeu_SetGear_Clutch ∨ FromNeu_SetGear_Clutch, SetGear_DL)
Deadline12 :Deadline (FromNeu_SetGear_Clutch, Error_FromNeu_CloseClutch ∨ FromNeu_CloseClutch, CloseClutch_DL)
Deadline13 :Deadline (RequestToNeu, ToNeu_ZeroTorque ∨ Error_ToNeu_OpenClutch ∨ ToNeu_OpenClutch, ZeroOpen_DL)
Expiry3 :Expiry (RequestToNeu, ToNeu_ZeroTorque, Zero_EX)
Deadline14 :Deadline (ToNeu_ZeroTorque, ToNeu_Release_NoClutch ∨ Error_ToNeu_Release_NoClutch, Release_DL)
Deadline15 :Deadline (ToNeu_OpenClutch, ToNeu_Release_Clutch ∨ Error_ToNeu_Release_Clutch, Release_DL)
Deadline16 :Deadline (ToNeu_Release_Clutch, Error_ToNeu_CloseClutch ∨ ToNeu_CloseClutch, CloseClutch_DL)
Deadline17 : Deadline (RequestNoNeu, NoNeu_OpenClutch_Releasing ∨ NoNeu_ZeroTorque ∨ Error_NoNeu_OpenClutch_Releasing, ZeroOpen_DL)
Expiry4 :Expiry (RequestNoNeu, NoNeu_ZeroTorque, Zero_EX)
Deadline18 :Deadline (NoNeu_OpenClutch_Releasing, NoNeu_Release_Clutch ∨ Error_NoNeu_Release_Clutch, Release_DL)
Deadline19 :Deadline (NoNeu_ZeroTorque, NoNeu_Release_NoClutch ∨ Error_NoNeu_Release_NoClutch, Release_DL)
Deadline20 : Deadline (NoNeu_Release_NoClutch, NoNeu_SyncSpeed ∨ NoNeu_OpenClutch_Setting ∨ Error_NoNeu_OpenClutch_Setting, SyncOpen_DL)
Expiry5 :Expiry (NoNeu_Release_NoClutch, NoNeu_SyncSpeed, Sync_EX)
Deadline21 :Deadline (NoNeu_SyncSpeed, NoNeu_SetGear_NoClutch ∨ Error_NoNeu_SetGear_NoClutch, SetGear_DL)
Deadline22 :Deadline (NoNeu_OpenClutch_Setting, NoNeu_SetGear_SettingClutch ∨ Error_NoNeu_SetGear_SettingClutch, SetGear_DL)
Deadline23 :Deadline (NoNeu_SetGear_SettingClutch, NoNeu_CloseClutch_Setting ∨ Error_NoNeu_CloseClutch_Setting, CloseClutch_DL)
Deadline24 :Deadline (NoNeu_Release_Clutch, Error_NoNeu_SetGear_ReleasingClutch ∨ NoNeu_SetGear_ReleasingClutch, SetGear_DL)
Deadline25 : Deadline (NoNeu_SetGear_ReleasingClutch, NoNeu_CloseClutch_Releasing ∨ Error_NoNeu_CloseClutch_Releasing, CloseClutch_DL)

EVENTS

INITIALISATION ≙

STATUS

ordinary

BEGIN

act1 :isNeu ≔ TRUE
act2 :RequestNoNeu ≔ FALSE
act3 :RequestToNeu ≔ FALSE
act4 :RequestFromNeu ≔ FALSE
act5 :FromNeu_SyncSpeed ≔ FALSE
act6 :FromNeu_OpenClutch ≔ FALSE
act7 :FromNeu_SetGear_NoClutch ≔ FALSE
act8 :FromNeu_SetGear_Clutch ≔ FALSE
act9 :FromNeu_CloseClutch ≔ FALSE
act10 :Error_FromNeu_OpenClutch ≔ FALSE
act11 :Error_FromNeu_SetGear_NoClutch ≔ FALSE
act12 :Error_FromNeu_SetGear_Clutch ≔ FALSE
act13 :Error_FromNeu_CloseClutch ≔ FALSE
act14 :ToNeu_ZeroTorque≔ FALSE *// Senario3 Flage*
act15 :ToNeu_OpenClutch ≔ FALSE *// Senario3 Flage*
act16 :Error_ToNeu_OpenClutch ≔ FALSE *// Senario3 Flage*
act17 :ToNeu_Release_NoClutch≔ FALSE *// Senario3 Flage*
act18 :Error_ToNeu_Release_NoClutch≔ FALSE *// Senario3 Flage*
act19 :ToNeu_Release_Clutch≔ FALSE *// Senario3 Flage*
act20 :Error_ToNeu_Release_Clutch ≔ FALSE *// Senario3 Flage*
act21 :ToNeu_CloseClutch≔ FALSE *// Senario3 Flage*
act22 :Error_ToNeu_CloseClutch≔ FALSE *// Senario3 Flage*
act23 :NoNeu_ZeroTorque≔ FALSE *// Senario2 Flage*
act24 :NoNeu_OpenClutch_Releasing≔ FALSE *// Senario2 Flage*
act25 :NoNeu_Release_NoClutch≔ FALSE *// Senario2 Flage*
act26 :NoNeu_Release_Clutch≔ FALSE *// Senario2 Flage*
act27 :NoNeu_SyncSpeed ≔ FALSE *// Senario2 Flage*
act28 :NoNeu_OpenClutch_Setting ≔ FALSE *// Senario2 Flage*
act29 :NoNeu_SetGear_NoClutch≔ FALSE *// Senario2 Flage*
act30 :NoNeu_SetGear_ReleasingClutch≔ FALSE *// Senario2 Flage*
act31 :NoNeu_SetGear_SettingClutch≔ FALSE *// Senario2 Flage*

```
        act32 :NoNeu_CloseClutch_Releasing:= FALSE      // Senario2 Flage
        act33 :NoNeu_CloseClutch_Setting:= FALSE      // Senario2 Flage
        act34 :Error_NoNeu_OpenClutch_Releasing:= FALSE      // Senario2 Flage
        act35 :Error_NoNeu_Release_NoClutch:= FALSE      // Senario2 Flage
        act36 :Error_NoNeu_Release_Clutch:= FALSE      // Senario2 Flage
        act37 :Error_NoNeu_OpenClutch_Setting := FALSE      // Senario2 Flage
        act38 :Error_NoNeu_SetGear_NoClutch:= FALSE      // Senario2 Flage
        act39 :Error_NoNeu_SetGear_ReleasingClutch:= FALSE      // Senario2 Flage
        act40 :Error_NoNeu_SetGear_SettingClutch:= FALSE      // Senario2 Flage
        act41 :Error_NoNeu_CloseClutch_Releasing := FALSE      // Senario2 Flage
        act42 :Error_NoNeu_CloseClutch_Setting := FALSE      // Senario2 Flage
        time :time := 0
        tRequestFromNeu :tRequestFromNeu := 0
        tFromNeu_OpenClutch :tFromNeu_OpenClutch := 0
        tError_FromNeu_OpenClutch :tError_FromNeu_OpenClutch := 0
        tFromNeu_SyncSpeed :tFromNeu_SyncSpeed := 0
        tFromNeu_SetGear_NoClutch :tFromNeu_SetGear_NoClutch := 0
        tError_FromNeu_SetGear_NoClutch :tError_FromNeu_SetGear_NoClutch := 0
        tError_FromNeu_SetGear_Clutch :tError_FromNeu_SetGear_Clutch := 0
        tFromNeu_SetGear_Clutch :tFromNeu_SetGear_Clutch := 0
        tError_FromNeu_CloseClutch :tError_FromNeu_CloseClutch := 0
        tFromNeu_CloseClutch :tFromNeu_CloseClutch := 0
        tRequestToNeu :tRequestToNeu := 0
        tToNeu_ZeroTorque :tToNeu_ZeroTorque := 0
        tError_ToNeu_OpenClutch :tError_ToNeu_OpenClutch := 0
        tToNeu_OpenClutch :tToNeu_OpenClutch := 0
        tToNeu_Release_NoClutch :tToNeu_Release_NoClutch := 0
        tError_ToNeu_Release_NoClutch :tError_ToNeu_Release_NoClutch := 0
        tToNeu_Release_Clutch :tToNeu_Release_Clutch := 0
        tError_ToNeu_Release_Clutch :tError_ToNeu_Release_Clutch := 0
        tError_ToNeu_CloseClutch :tError_ToNeu_CloseClutch := 0
        tToNeu_CloseClutch :tToNeu_CloseClutch := 0
        tRequestNoNeu :tRequestNoNeu := 0
        tNoNeu_OpenClutch_Releasing :tNoNeu_OpenClutch_Releasing := 0
        tNoNeu_ZeroTorque :tNoNeu_ZeroTorque := 0
        tError_NoNeu_OpenClutch_Releasing :tError_NoNeu_OpenClutch_Releasing := 0
        tNoNeu_Release_Clutch :tNoNeu_Release_Clutch := 0
        tError_NoNeu_Release_Clutch :tError_NoNeu_Release_Clutch := 0
        tNoNeu_Release_NoClutch :tNoNeu_Release_NoClutch := 0
        tError_NoNeu_Release_NoClutch :tError_NoNeu_Release_NoClutch := 0
        tNoNeu_SyncSpeed :tNoNeu_SyncSpeed := 0
        tNoNeu_OpenClutch_Setting :tNoNeu_OpenClutch_Setting := 0
        tError_NoNeu_OpenClutch_Setting :tError_NoNeu_OpenClutch_Setting := 0
        tNoNeu_SetGear_NoClutch :tNoNeu_SetGear_NoClutch := 0
        tError_NoNeu_SetGear_NoClutch :tError_NoNeu_SetGear_NoClutch := 0
        tNoNeu_SetGear_SettingClutch :tNoNeu_SetGear_SettingClutch := 0
        tError_NoNeu_SetGear_SettingClutch :tError_NoNeu_SetGear_SettingClutch := 0
        tNoNeu_CloseClutch_Setting :tNoNeu_CloseClutch_Setting := 0
        tError_NoNeu_CloseClutch_Setting :tError_NoNeu_CloseClutch_Setting := 0
        tError_NoNeu_SetGear_ReleasingClutch :tError_NoNeu_SetGear_ReleasingClutch := 0
        tNoNeu_SetGear_ReleasingClutch :tNoNeu_SetGear_ReleasingClutch := 0
        tNoNeu_CloseClutch_Releasing :tNoNeu_CloseClutch_Releasing := 0
        tError_NoNeu_CloseClutch_Releasing :tError_NoNeu_CloseClutch_Releasing := 0
END

    RequestFromNeu ≙
      extended
          STATUS
      ordinary
REFINES
      RequestFromNeu
WHEN
      grd1 :RequestFromNeu = FALSE
      grd2 :RequestNoNeu = FALSE
      grd3 :RequestToNeu = FALSE
      grd4 :isNeu = TRUE
THEN
      act1 :RequestFromNeu := TRUE
      tRequestFromNeu :tRequestFromNeu := time
END

    RequestNoNeu ≙
          STATUS
      ordinary
REFINES
      RequestNoNeu
WHEN
      grd1 :RequestFromNeu = FALSE
      grd2 :RequestNoNeu = FALSE
```

grd3 :RequestToNeu = FALSE
grd4 :isNeu = FALSE
THEN
act1 :RequestNoNeu ≔ TRUE
tRequestNoNeu :tRequestNoNeu ≔ time
END

RequestToNeu ≙
extended
STATUS
ordinary
REFINES
RequestToNeu
WHEN
grd1 :RequestFromNeu = FALSE
grd2 :RequestNoNeu = FALSE
grd3 :RequestToNeu = FALSE
grd4 :isNeu = FALSE
THEN
act1 :RequestToNeu ≔ TRUE
tRequestToNeu :tRequestToNeu ≔ time
END

FromNeu_SyncSpeed ≙
extended
STATUS
ordinary
REFINES
FromNeu_SyncSpeed
WHEN
grd1 :RequestFromNeu = TRUE
grd2 :FromNeu_SyncSpeed = FALSE
grd3 :FromNeu_OpenClutch = FALSE
grd4 :Error_FromNeu_OpenClutch = FALSE
Expiry2 :time ≤ tRequestFromNeu + Sync_EX
THEN
act1 :FromNeu_SyncSpeed ≔ TRUE
tFromNeu_SyncSpeed :tFromNeu_SyncSpeed ≔ time
END

FromNeu_OpenClutch ≙
extended
STATUS
ordinary
REFINES
FromNeu_OpenClutch
WHEN
grd1 :RequestFromNeu = TRUE
grd2 :Error_FromNeu_OpenClutch = FALSE
grd3 :FromNeu_SyncSpeed = FALSE
grd4 :FromNeu_OpenClutch = FALSE
THEN
act1 :FromNeu_OpenClutch ≔ TRUE
tFromNeu_OpenClutch :tFromNeu_OpenClutch ≔ time
END

Error_FromNeu_OpenClutch ≙
extended
STATUS
ordinary
REFINES
Error_FromNeu_OpenClutch
WHEN
grd1 :RequestFromNeu = TRUE
grd2 :Error_FromNeu_OpenClutch = FALSE
grd3 :FromNeu_SyncSpeed = FALSE
grd4 :FromNeu_OpenClutch = FALSE
THEN
act1 :Error_FromNeu_OpenClutch ≔ TRUE
tError_FromNeu_OpenClutch :tError_FromNeu_OpenClutch ≔ time
END

FromNeu_SetGear_NoClutch ≙
extended
STATUS
ordinary
REFINES
FromNeu_SetGear_NoClutch
WHEN

```
        grd1 :FromNeu_SyncSpeed = TRUE
        grd2 :Error_FromNeu_SetGear_NoClutch = FALSE
        grd3 :FromNeu_SetGear_NoClutch = FALSE
THEN
        act1 :FromNeu_SetGear_NoClutch := TRUE
        act2 :isNeu := FALSE
        tFromNeu_SetGear_NoClutch :tFromNeu_SetGear_NoClutch := time
END

    Error_FromNeu_SetGear_NoClutch ≙
        extended
            STATUS
        ordinary
REFINES
        Error_FromNeu_SetGear_NoClutch
WHEN
        grd1 :FromNeu_SyncSpeed = TRUE
        grd2 :Error_FromNeu_SetGear_NoClutch = FALSE
        grd3 :FromNeu_SetGear_NoClutch = FALSE
THEN
        act1 :Error_FromNeu_SetGear_NoClutch := TRUE
        tError_FromNeu_SetGear_NoClutch :tError_FromNeu_SetGear_NoClutch := time
END

    FromNeu_SetGear_Clutch ≙
        extended
            STATUS
        ordinary
REFINES
        FromNeu_SetGear_Clutch
WHEN
        grd1 :FromNeu_OpenClutch = TRUE
        grd2 :Error_FromNeu_SetGear_Clutch = FALSE
        grd3 :FromNeu_SetGear_Clutch = FALSE
THEN
        act1 :FromNeu_SetGear_Clutch := TRUE
        tFromNeu_SetGear_Clutch :tFromNeu_SetGear_Clutch := time
END

    Error_FromNeu_SetGear_Clutch ≙
        extended
            STATUS
        ordinary
REFINES
        Error_FromNeu_SetGear_Clutch
WHEN
        grd1 :FromNeu_OpenClutch = TRUE
        grd2 :Error_FromNeu_SetGear_Clutch = FALSE
        grd3 :FromNeu_SetGear_Clutch = FALSE
THEN
        act1 :Error_FromNeu_SetGear_Clutch := TRUE
        tError_FromNeu_SetGear_Clutch :tError_FromNeu_SetGear_Clutch := time
END

    FromNeu_CloseClutch ≙
        extended
            STATUS
        ordinary
REFINES
        FromNeu_CloseClutch
WHEN
        grd1 :FromNeu_SetGear_Clutch = TRUE
        grd2 :Error_FromNeu_CloseClutch = FALSE
        grd3 :FromNeu_CloseClutch = FALSE
THEN
        act1 :FromNeu_CloseClutch := TRUE
        act2 :isNeu := FALSE
        tFromNeu_CloseClutch :tFromNeu_CloseClutch := time
END

    Error_FromNeu_CloseClutch ≙
        extended
            STATUS
        ordinary
REFINES
        Error_FromNeu_CloseClutch
WHEN
        grd1 :FromNeu_SetGear_Clutch = TRUE
        grd2 :Error_FromNeu_CloseClutch = FALSE
```

```
        grd3 :FromNeu_CloseClutch = FALSE
THEN
        act1 :Error_FromNeu_CloseClutch := TRUE
        tError_FromNeu_CloseClutch :tError_FromNeu_CloseClutch := time
END

    ToNeu_ZeroTorque ≙      // First Event of Senarion3
        extended
            STATUS
        ordinary
REFINES
        ToNeu_ZeroTorque
WHEN
        grd1 :RequestToNeu = TRUE
        grd2 :ToNeu_ZeroTorque = FALSE
        grd3 :ToNeu_OpenClutch = FALSE
        grd4 :Error_ToNeu_OpenClutch = FALSE
        Expiry3 :time ≤ tRequestToNeu + Zero_EX
THEN
        act1 :ToNeu_ZeroTorque := TRUE
        tToNeu_ZeroTorque :tToNeu_ZeroTorque := time
END

    ToNeu_OpenClutch ≙
        extended
            STATUS
        ordinary
REFINES
        ToNeu_OpenClutch
WHEN
        grd1 :RequestToNeu = TRUE
        grd2 :ToNeu_ZeroTorque = FALSE
        grd3 :ToNeu_OpenClutch = FALSE
        grd4 :Error_ToNeu_OpenClutch = FALSE
THEN
        act1 :ToNeu_OpenClutch := TRUE
        tToNeu_OpenClutch :tToNeu_OpenClutch := time
END

    Error_ToNeu_OpenClutch ≙
        extended
            STATUS
        ordinary
REFINES
        Error_ToNeu_OpenClutch
WHEN
        grd1 :RequestToNeu = TRUE
        grd2 :ToNeu_ZeroTorque = FALSE
        grd3 :ToNeu_OpenClutch = FALSE
        grd4 :Error_ToNeu_OpenClutch = FALSE
THEN
        act1 :Error_ToNeu_OpenClutch := TRUE
        tError_ToNeu_OpenClutch :tError_ToNeu_OpenClutch := time
END

    ToNeu_Release_NoClutch ≙
        extended
            STATUS
        ordinary
REFINES
        ToNeu_Release_NoClutch
WHEN
        grd1 :ToNeu_ZeroTorque = TRUE
        grd2 :ToNeu_Release_NoClutch = FALSE
        grd3 :Error_ToNeu_Release_NoClutch = FALSE
THEN
        act1 :ToNeu_Release_NoClutch := TRUE
        act2 :isNeu := TRUE
        tToNeu_Release_NoClutch :tToNeu_Release_NoClutch := time
END

    Error_ToNeu_Release_NoClutch ≙
        extended
            STATUS
        ordinary
REFINES
        Error_ToNeu_Release_NoClutch
WHEN
        grd1 :ToNeu_ZeroTorque = TRUE
```

```
        grd2 :ToNeu_Release_NoClutch = FALSE
        grd3 :Error_ToNeu_Release_NoClutch = FALSE
THEN
        act1 :Error_ToNeu_Release_NoClutch := TRUE
        tError_ToNeu_Release_NoClutch :tError_ToNeu_Release_NoClutch := time
END

    ToNeu_Release_Clutch ≙
        extended
            STATUS
        ordinary
REFINES
        ToNeu_Release_Clutch
WHEN
        grd1 :ToNeu_OpenClutch = TRUE
        grd2 :ToNeu_Release_Clutch = FALSE
        grd3 :Error_ToNeu_Release_Clutch = FALSE
THEN
        act1 :ToNeu_Release_Clutch := TRUE
        tToNeu_Release_Clutch :tToNeu_Release_Clutch := time
END

    Error_ToNeu_Release_Clutch ≙
        extended
            STATUS
        ordinary
REFINES
        Error_ToNeu_Release_Clutch
WHEN
        grd1 :ToNeu_OpenClutch = TRUE
        grd2 :ToNeu_Release_Clutch = FALSE
        grd3 :Error_ToNeu_Release_Clutch = FALSE
THEN
        act1 :Error_ToNeu_Release_Clutch := TRUE
        tError_ToNeu_Release_Clutch :tError_ToNeu_Release_Clutch := time
END

    ToNeu_CloseClutch ≙
        extended
            STATUS
        ordinary
REFINES
        ToNeu_CloseClutch
WHEN
        grd1 :ToNeu_Release_Clutch = TRUE
        grd2 :ToNeu_CloseClutch = FALSE
        grd3 :Error_ToNeu_CloseClutch = FALSE
THEN
        act1 :ToNeu_CloseClutch := TRUE
        act2 :isNeu := TRUE
        tToNeu_CloseClutch :tToNeu_CloseClutch := time
END

    Error_ToNeu_CloseClutch ≙      // Last Event of Senarion3
        extended
            STATUS
        ordinary
REFINES
        Error_ToNeu_CloseClutch
WHEN
        grd1 :ToNeu_Release_Clutch = TRUE
        grd2 :ToNeu_CloseClutch = FALSE
        grd3 :Error_ToNeu_CloseClutch = FALSE
THEN
        act1 :Error_ToNeu_CloseClutch := TRUE
        tError_ToNeu_CloseClutch :tError_ToNeu_CloseClutch := time
END

    NoNeu_ZeroTorque ≙      // First Event of Senarion2
            STATUS
        ordinary
WHEN
        grd1 :RequestNoNeu = TRUE
        grd2 :NoNeu_ZeroTorque = FALSE
        grd3 :NoNeu_OpenClutch_Releasing = FALSE
        grd4 :Error_NoNeu_OpenClutch_Releasing = FALSE
        Expiry4 :time ≤ tRequestNoNeu + Zero_EX
THEN
        act1 :NoNeu_ZeroTorque := TRUE
```

```
        tNoNeu_ZeroTorque :tNoNeu_ZeroTorque ≔ time
END

    NoNeu_OpenClutch_Releasing ≙
        STATUS
        ordinary
WHEN
        grd1 :RequestNoNeu = TRUE
        grd2 :NoNeu_ZeroTorque = FALSE
        grd3 :NoNeu_OpenClutch_Releasing = FALSE
        grd4 :Error_NoNeu_OpenClutch_Releasing = FALSE
THEN
        act1 :NoNeu_OpenClutch_Releasing ≔ TRUE
        tNoNeu_OpenClutch_Releasing :tNoNeu_OpenClutch_Releasing ≔ time
END

    Error_NoNeu_OpenClutch_Releasing ≙
        STATUS
        ordinary
REFINES
        Error_Releasing_NoNeu
WHEN
        grd1 :RequestNoNeu = TRUE
        grd2 :NoNeu_ZeroTorque = FALSE
        grd3 :NoNeu_OpenClutch_Releasing = FALSE
        grd4 :Error_NoNeu_OpenClutch_Releasing = FALSE
THEN
        act1 :Error_NoNeu_OpenClutch_Releasing ≔ TRUE
        tError_NoNeu_OpenClutch_Releasing :tError_NoNeu_OpenClutch_Releasing ≔ time
END

    NoNeu_Release_NoClutch ≙
        STATUS
        ordinary
REFINES
        Releasing_NoNeu_NoClutch
WHEN
        grd1 :NoNeu_ZeroTorque = TRUE
        grd2 :NoNeu_Release_NoClutch = FALSE
        grd3 :Error_NoNeu_Release_NoClutch = FALSE
THEN
        act1 :NoNeu_Release_NoClutch ≔ TRUE
        tNoNeu_Release_NoClutch :tNoNeu_Release_NoClutch ≔ time
END

    Error_NoNeu_Release_NoClutch ≙
        STATUS
        ordinary
REFINES
        Error_Releasing_NoNeu
WHEN
        grd1 :NoNeu_ZeroTorque = TRUE
        grd2 :NoNeu_Release_NoClutch = FALSE
        grd3 :Error_NoNeu_Release_NoClutch = FALSE
THEN
        act1 :Error_NoNeu_Release_NoClutch ≔ TRUE
        tError_NoNeu_Release_NoClutch :tError_NoNeu_Release_NoClutch ≔ time
END

    NoNeu_Release_Clutch ≙
        STATUS
        ordinary
REFINES
        Releasing_NoNeu_Clutch
WHEN
        grd1 :NoNeu_OpenClutch_Releasing = TRUE
        grd2 :NoNeu_Release_Clutch = FALSE
        grd3 :Error_NoNeu_Release_Clutch = FALSE
THEN
        act1 :NoNeu_Release_Clutch ≔ TRUE
        tNoNeu_Release_Clutch :tNoNeu_Release_Clutch ≔ time
END

    Error_NoNeu_Release_Clutch ≙
        STATUS
        ordinary
REFINES
        Error_Releasing_NoNeu
WHEN
```

```
        grd1 :NoNeu_OpenClutch_Releasing = TRUE
        grd2 :NoNeu_Release_Clutch = FALSE
        grd3 :Error_NoNeu_Release_Clutch = FALSE
THEN
        act1 :Error_NoNeu_Release_Clutch ≔ TRUE
        tError_NoNeu_Release_Clutch :tError_NoNeu_Release_Clutch ≔ time
END

    NoNeu_SyncSpeed ≙
        STATUS
        ordinary
WHEN
        grd1 :NoNeu_Release_NoClutch = TRUE
        grd2 :NoNeu_SyncSpeed = FALSE
        grd3 :NoNeu_OpenClutch_Setting = FALSE
        grd4 :Error_NoNeu_OpenClutch_Setting = FALSE
        Expiry5 :time ≤ tNoNeu_Release_NoClutch + Sync_EX
THEN
        act1 :NoNeu_SyncSpeed ≔ TRUE
        tNoNeu_SyncSpeed :tNoNeu_SyncSpeed ≔ time
END

    NoNeu_OpenClutch_Setting ≙
        STATUS
        ordinary
WHEN
        grd1 :NoNeu_Release_NoClutch = TRUE
        grd2 :Error_NoNeu_OpenClutch_Setting = FALSE
        grd3 :NoNeu_SyncSpeed = FALSE
        grd4 :NoNeu_OpenClutch_Setting = FALSE
THEN
        act1 :NoNeu_OpenClutch_Setting ≔ TRUE
        tNoNeu_OpenClutch_Setting :tNoNeu_OpenClutch_Setting ≔ time
END

    Error_NoNeu_OpenClutch_Setting ≙
        STATUS
        ordinary
REFINES
        Error_Setting_NoNeu
WHEN
        grd1 :NoNeu_Release_NoClutch = TRUE
        grd2 :Error_NoNeu_OpenClutch_Setting = FALSE
        grd3 :NoNeu_SyncSpeed = FALSE
        grd4 :NoNeu_OpenClutch_Setting = FALSE
THEN
        act1 :Error_NoNeu_OpenClutch_Setting ≔ TRUE
        tError_NoNeu_OpenClutch_Setting :tError_NoNeu_OpenClutch_Setting ≔ time
END

    NoNeu_SetGear_NoClutch ≙
        STATUS
        ordinary
REFINES
        Setting_NoNeu_NoClutch
WHEN
        grd1 :NoNeu_SyncSpeed = TRUE
        grd2 :Error_NoNeu_SetGear_NoClutch = FALSE
        grd3 :NoNeu_SetGear_NoClutch = FALSE
THEN
        act1 :NoNeu_SetGear_NoClutch ≔ TRUE
        tNoNeu_SetGear_NoClutch :tNoNeu_SetGear_NoClutch ≔ time
END

    Error_NoNeu_SetGear_NoClutch ≙
        STATUS
        ordinary
REFINES
        Error_Setting_NoNeu
WHEN
        grd1 :NoNeu_SyncSpeed = TRUE
        grd2 :Error_NoNeu_SetGear_NoClutch = FALSE
        grd3 :NoNeu_SetGear_NoClutch = FALSE
THEN
        act1 :Error_NoNeu_SetGear_NoClutch ≔ TRUE
        tError_NoNeu_SetGear_NoClutch :tError_NoNeu_SetGear_NoClutch ≔ time
END

    NoNeu_SetGear_ReleasingClutch ≙
```

```
        STATUS
    ordinary
WHEN
    grd1 :NoNeu_Release_Clutch = TRUE
    grd2 :Error_NoNeu_SetGear_ReleasingClutch = FALSE
    grd3 :NoNeu_SetGear_ReleasingClutch = FALSE
THEN
    act1 :NoNeu_SetGear_ReleasingClutch ≔ TRUE
    tNoNeu_SetGear_ReleasingClutch :tNoNeu_SetGear_ReleasingClutch ≔ time
END

  Error_NoNeu_SetGear_ReleasingClutch ≙
        STATUS
    ordinary
REFINES
    Error_Setting_NoNeu
WHEN
    grd1 :NoNeu_Release_Clutch = TRUE
    grd2 :Error_NoNeu_SetGear_ReleasingClutch = FALSE
    grd3 :NoNeu_SetGear_ReleasingClutch = FALSE
THEN
    act1 :Error_NoNeu_SetGear_ReleasingClutch ≔ TRUE
    tError_NoNeu_SetGear_ReleasingClutch :tError_NoNeu_SetGear_ReleasingClutch ≔ time
END

  NoNeu_SetGear_SettingClutch ≙
        STATUS
    ordinary
WHEN
    grd1 :NoNeu_OpenClutch_Setting = TRUE
    grd2 :Error_NoNeu_SetGear_SettingClutch = FALSE
    grd3 :NoNeu_SetGear_SettingClutch = FALSE
THEN
    act1 :NoNeu_SetGear_SettingClutch ≔ TRUE
    tNoNeu_SetGear_SettingClutch :tNoNeu_SetGear_SettingClutch ≔ time
END

  Error_NoNeu_SetGear_SettingClutch ≙
        STATUS
    ordinary
REFINES
    Error_Setting_NoNeu
WHEN
    grd1 :NoNeu_OpenClutch_Setting = TRUE
    grd2 :Error_NoNeu_SetGear_SettingClutch = FALSE
    grd3 :NoNeu_SetGear_SettingClutch = FALSE
THEN
    act1 :Error_NoNeu_SetGear_SettingClutch ≔ TRUE
    tError_NoNeu_SetGear_SettingClutch :tError_NoNeu_SetGear_SettingClutch ≔ time
END

  NoNeu_CloseClutch_Setting ≙
        STATUS
    ordinary
REFINES
    Setting_NoNeu_Clutch
WHEN
    grd1 :NoNeu_SetGear_SettingClutch = TRUE
    grd2 :Error_NoNeu_CloseClutch_Setting = FALSE
    grd3 :NoNeu_CloseClutch_Setting = FALSE
THEN
    act1 :NoNeu_CloseClutch_Setting ≔ TRUE
    tNoNeu_CloseClutch_Setting :tNoNeu_CloseClutch_Setting ≔ time
END

  Error_NoNeu_CloseClutch_Setting ≙
        STATUS
    ordinary
REFINES
    Error_Setting_NoNeu
WHEN
    grd1 :NoNeu_SetGear_SettingClutch = TRUE
    grd2 :Error_NoNeu_CloseClutch_Setting = FALSE
    grd3 :NoNeu_CloseClutch_Setting = FALSE
THEN
    act1 :Error_NoNeu_CloseClutch_Setting ≔ TRUE
    tError_NoNeu_CloseClutch_Setting :tError_NoNeu_CloseClutch_Setting ≔ time
END
```

```
NoNeu_CloseClutch_Releasing ≙
    STATUS
    ordinary
REFINES
    Setting_NoNeu_ReleaseClutch
WHEN
    grd1 :NoNeu_SetGear_ReleasingClutch = TRUE
    grd2 :Error_NoNeu_CloseClutch_Releasing = FALSE
    grd3 :NoNeu_CloseClutch_Releasing = FALSE
THEN
    act1 :NoNeu_CloseClutch_Releasing ≔ TRUE
    tNoNeu_CloseClutch_Releasing :tNoNeu_CloseClutch_Releasing ≔ time
END

Error_NoNeu_CloseClutch_Releasing ≙
    STATUS
    ordinary
REFINES
    Error_Setting_NoNeu
WHEN
    grd1 :NoNeu_SetGear_ReleasingClutch = TRUE
    grd2 :Error_NoNeu_CloseClutch_Releasing = FALSE
    grd3 :NoNeu_CloseClutch_Releasing = FALSE
THEN
    act1 :Error_NoNeu_CloseClutch_Releasing ≔ TRUE
    tError_NoNeu_CloseClutch_Releasing :tError_NoNeu_CloseClutch_Releasing ≔ time
END

FINAL ≙
    STATUS
    ordinary
REFINES
    FINAL
WHEN
    grd1 : FromNeu_SetGear_NoClutch = TRUE ∨ NoNeu_SetGear_NoClutch = TRUE ∨
           ToNeu_Release_NoClutch = TRUE ∨ FromNeu_CloseClutch = TRUE ∨
           NoNeu_CloseClutch_Setting = TRUE ∨ NoNeu_CloseClutch_Releasing = TRUE ∨
           ToNeu_CloseClutch = TRUE
THEN
    act1 :RequestFromNeu ≔ FALSE
    act2 :RequestNoNeu ≔ FALSE
    act3 :RequestToNeu ≔ FALSE
    act4 :FromNeu_SyncSpeed ≔ FALSE
    act5 :FromNeu_OpenClutch ≔ FALSE
    act6 :FromNeu_SetGear_NoClutch ≔ FALSE
    act7 :FromNeu_SetGear_Clutch ≔ FALSE
    act8 :FromNeu_CloseClutch ≔ FALSE
    act9 :ToNeu_Release_NoClutch ≔ FALSE
    act10 :ToNeu_CloseClutch ≔ FALSE
    act11 :ToNeu_ZeroTorque≔ FALSE      // Senario3 Flage
    act12 :ToNeu_OpenClutch ≔ FALSE     // Senario3 Flage
    act13 :ToNeu_Release_Clutch≔ FALSE      // Senario3 Flage
    act14 :NoNeu_ZeroTorque≔ FALSE      // Senario2 Flage
    act15 :NoNeu_OpenClutch_Releasing ≔ FALSE
    act16 :NoNeu_Release_NoClutch≔ FALSE      // Senario2 Flage
    act17 :NoNeu_Release_Clutch≔ FALSE      // Senario2 Flage
    act18 :NoNeu_SyncSpeed ≔ FALSE      // Senario2 Flage
    act19 :NoNeu_OpenClutch_Setting ≔ FALSE      // Senario2 Flage
    act20 :NoNeu_SetGear_NoClutch≔ FALSE      // Senario2 Flage
    act21 :NoNeu_SetGear_ReleasingClutch≔ FALSE      // Senario2 Flage
    act22 :NoNeu_SetGear_SettingClutch≔ FALSE      // Senario2 Flage
    act23 :NoNeu_CloseClutch_Setting≔ FALSE      // Senario2 Flage
    act24 :NoNeu_CloseClutch_Releasing≔ FALSE      // Senario2 Flage
END

Tick_Tock ≙
    STATUS
    ordinary
REFINES
    Tick_Tock
ANY
    tick
WHERE
    tick :tick > 0
    Deadline9 : RequestFromNeu = TRUE ∧ FromNeu_OpenClutch = FALSE ∧ Error_FromNeu_OpenClutch = FALSE ∧ FromNeu_SyncSpeed = FALSE ⇒ time + tick ≤ tRequestFromNeu + SyncOpen_DL
    Deadline10 : FromNeu_SyncSpeed = TRUE ∧ FromNeu_SetGear_NoClutch = FALSE ∧ Error_FromNeu_SetGear_NoClutch = FALSE ⇒ time + tick ≤ tFromNeu_SyncSpeed + SetGear_DL
```

```
        Deadline11 : FromNeu_OpenClutch = TRUE ∧ Error_FromNeu_SetGear_Clutch = FALSE ∧ FromNeu_SetGear_Clutch = FALSE ⇒ time + tick ≤ tFromNeu_OpenClutch + SetGear_DL
        Deadline12 : FromNeu_SetGear_Clutch = TRUE ∧ Error_FromNeu_CloseClutch = FALSE ∧ FromNeu_CloseClutch = FALSE ⇒ time + tick ≤ tFromNeu_SetGear_Clutch + CloseClutch_DL
        Deadline13 : RequestToNeu = TRUE ∧ ToNeu_ZeroTorque = FALSE ∧ Error_ToNeu_OpenClutch = FALSE ∧ ToNeu_OpenClutch = FALSE ⇒ time + tick ≤ tRequestToNeu + ZeroOpen_DL
        Deadline14 : ToNeu_ZeroTorque = TRUE ∧ ToNeu_Release_NoClutch = FALSE ∧ Error_ToNeu_Release_NoClutch = FALSE ⇒ time + tick ≤ tToNeu_ZeroTorque + Release_DL
        Deadline15 : ToNeu_OpenClutch = TRUE ∧ ToNeu_Release_Clutch = FALSE ∧ Error_ToNeu_Release_Clutch = FALSE ⇒ time + tick ≤ tToNeu_OpenClutch + Release_DL
        Deadline16 : ToNeu_Release_Clutch = TRUE ∧ Error_ToNeu_CloseClutch = FALSE ∧ ToNeu_CloseClutch = FALSE ⇒ time + tick ≤ tToNeu_Release_Clutch + CloseClutch_DL
        Deadline17 : RequestNoNeu = TRUE ∧ NoNeu_OpenClutch_Releasing = FALSE ∧ NoNeu_ZeroTorque = FALSE ∧ Error_NoNeu_OpenClutch_Releasing = FALSE ⇒ time + tick ≤ tRequestNoNeu + ZeroOpen_DL
        Deadline18 : NoNeu_OpenClutch_Releasing = TRUE ∧ NoNeu_Release_Clutch = FALSE ∧ Error_NoNeu_Release_Clutch = FALSE ⇒ time + tick ≤ tNoNeu_OpenClutch_Releasing + Release_DL
        Deadline19 : NoNeu_ZeroTorque = TRUE ∧ NoNeu_Release_NoClutch = FALSE ∧ Error_NoNeu_Release_NoClutch = FALSE ⇒ time + tick ≤ tNoNeu_ZeroTorque + Release_DL
        Deadline20 : NoNeu_Release_NoClutch = TRUE ∧ NoNeu_SyncSpeed = FALSE ∧ NoNeu_OpenClutch_Setting = FALSE ∧ Error_NoNeu_OpenClutch_Setting = FALSE ⇒ time + tick ≤ tNoNeu_Release_NoClutch + SyncOpen_DL
        Deadline21 : NoNeu_SyncSpeed = TRUE ∧ NoNeu_SetGear_NoClutch = FALSE ∧ Error_NoNeu_SetGear_NoClutch = FALSE ⇒ time + tick ≤ tNoNeu_SyncSpeed + SetGear_DL
        Deadline22 : NoNeu_OpenClutch_Setting = TRUE ∧ NoNeu_SetGear_SettingClutch = FALSE ∧ Error_NoNeu_SetGear_SettingClutch = FALSE ⇒ time + tick ≤ tNoNeu_OpenClutch_Setting + SetGear_DL
        Deadline23 : NoNeu_SetGear_SettingClutch = TRUE ∧ NoNeu_CloseClutch_Setting = FALSE ∧ Error_NoNeu_CloseClutch_Setting = FALSE ⇒ time + tick ≤ tNoNeu_SetGear_SettingClutch + CloseClutch_DL
        Deadline24 : NoNeu_Release_Clutch = TRUE ∧ Error_NoNeu_SetGear_ReleasingClutch = FALSE ∧ NoNeu_SetGear_ReleasingClutch = FALSE ⇒ time + tick ≤ tNoNeu_Release_Clutch + SetGear_DL
        Deadline25 : NoNeu_SetGear_ReleasingClutch = TRUE ∧ NoNeu_CloseClutch_Releasing = FALSE ∧ Error_NoNeu_CloseClutch_Releasing = FALSE ⇒ time + tick ≤ tNoNeu_SetGear_ReleasingClutch + CloseClutch_DL
THEN
        act1 :time ≔ time+tick
END

END
```

Machine m8

MACHINE
m8
REFINES
m7
SEES
c5
VARIABLES
isNeu *// Gear Status*
RequestFromNeu *// Flags*
RequestNoNeu *// Flags*
RequestToNeu *// Flags*
FromNeu_SyncSpeed *// Senario1*
FromNeu_OpenClutch *// Flage*
FromNeu_SetGear_NoClutch *// Flage*
FromNeu_SetGear_Clutch *// Flage*
FromNeu_CloseClutch *// Flage*
Error_FromNeu_OpenClutch *// Flage*
Error_FromNeu_SetGear_NoClutch *// Flage*
Error_FromNeu_SetGear_Clutch *// Flage*
Error_FromNeu_CloseClutch *// Senario1*
ToNeu_ZeroTorque *// Senario3 Flage*
ToNeu_OpenClutch *// Senario3 Flage*
Error_ToNeu_OpenClutch *// Senario3 Flage*
ToNeu_Release_NoClutch *// Senario3 Flage*
Error_ToNeu_Release_NoClutch *// Senario3 Flage*
ToNeu_Release_Clutch *// Senario3 Flage*
Error_ToNeu_Release_Clutch *// Senario3 Flage*
ToNeu_CloseClutch *// Senario3 Flage*
Error_ToNeu_CloseClutch *// Senario3 Flage*
NoNeu_ZeroTorque *// Senario2 Flage*
NoNeu_Release_NoClutch *// Senario2 Flage*
NoNeu_OpenClutch_Releasing *// Senario2 Flage*
NoNeu_Release_Clutch *// Senario2 Flage*
NoNeu_SyncSpeed *// Senario2 Flage*
NoNeu_OpenClutch_Setting *// Senario2 Flage*
NoNeu_SetGear_NoClutch *// Senario2 Flage*
NoNeu_SetGear_ReleasingClutch *// Senario2 Flage*
NoNeu_SetGear_SettingClutch *// Senario2 Flage*
NoNeu_CloseClutch_Releasing *// Senario2 Flage*
NoNeu_CloseClutch_Setting *// Senario2 Flage*
Error_NoNeu_OpenClutch_Releasing *// Senario2 Flage*
Error_NoNeu_Release_Clutch *// Senario2 Flage*
Error_NoNeu_Release_NoClutch *// Senario2 Flage*
Error_NoNeu_OpenClutch_Setting *// Senario2 Flage*
Error_NoNeu_SetGear_NoClutch *// Senario2 Flage*
Error_NoNeu_SetGear_ReleasingClutch *// Senario2 Flage*
Error_NoNeu_SetGear_SettingClutch *// Senario2 Flage*
Error_NoNeu_CloseClutch_Releasing *// Senario2 Flage*
Error_NoNeu_CloseClutch_Setting *// Senario2 Flage*
Engine_SyncSpeed *// Engine Flags*
Engine_WaitForSyncClutch *// Engine Flgas*
Engine_ZeroTorque *// Engine Flgas*
Engine_WaitForZeroClutch *// Engine Flgas*
Clutch_Open *// Clutch Flags*
Error_Clutch_Open *// Clutch Flags*
Clutch_Close *// Clutch Flags*
Error_Clutch_Close *// Clutch Flags*
Gear_Release *// Gear Flags*
Error_Gear_Release *// Gear Flags*
Gear_Set *// Gear Flags*
Error_Gear_Set *// Gear Flags*
FromNeu_RequestOpenClutch *// Senario1 Flag*
ToNeu_RequestOpenClutch *// Senario3 Flag*
NoNeu_RequestOpenClutch_Releasing *// Senario2 Flag*
NoNeu_RequestOpenClutch_Setting *// Senario2 Flag*
time
tRequestFromNeu
tFromNeu_OpenClutch
tFromNeu_SyncSpeed
tFromNeu_SetGear_NoClutch
tError_FromNeu_SetGear_NoClutch
tError_FromNeu_SetGear_Clutch
tFromNeu_SetGear_Clutch
tError_FromNeu_CloseClutch
tFromNeu_CloseClutch

tRequestToNeu
tToNeu_ZeroTorque
tToNeu_OpenClutch
tToNeu_Release_NoClutch
tError_ToNeu_Release_NoClutch
tToNeu_Release_Clutch
tError_ToNeu_Release_Clutch
tError_ToNeu_CloseClutch
tToNeu_CloseClutch
tRequestNoNeu
tNoNeu_OpenClutch_Releasing
tNoNeu_ZeroTorque
tNoNeu_Release_Clutch
tError_NoNeu_Release_Clutch
tNoNeu_Release_NoClutch
tError_NoNeu_Release_NoClutch
tNoNeu_SyncSpeed
tNoNeu_OpenClutch_Setting
tNoNeu_SetGear_NoClutch
tError_NoNeu_SetGear_NoClutch
tNoNeu_SetGear_SettingClutch
tError_NoNeu_SetGear_SettingClutch
tNoNeu_CloseClutch_Setting
tError_NoNeu_CloseClutch_Setting
tError_NoNeu_SetGear_ReleasingClutch
tNoNeu_SetGear_ReleasingClutch
tNoNeu_CloseClutch_Releasing
tError_NoNeu_CloseClutch_Releasing
tFromNeu_RequestOpenClutch
tError_FromNeu_OpenClutch
tToNeu_RequestOpenClutch
tError_ToNeu_OpenClutch
tNoNeu_RequestOpenClutch_Releasing
tError_NoNeu_OpenClutch_Releasing
tNoNeu_RequestOpenClutch_Setting
tError_NoNeu_OpenClutch_Setting

INVARIANTS

inv1 : {Engine_SyncSpeed , Engine_WaitForSyncClutch ,Engine_ZeroTorque, Engine_WaitForZeroClutch, Clutch_Open, Error_Clutch_Open, Clutch_Close, Error_Clutch_Close, Gear_Release, Error_Gear_Release, Gear_Set, Error_Gear_Set, FromNeu_RequestOpenClutch, ToNeu_RequestOpenClutch ,NoNeu_RequestOpenClutch_Releasing, NoNeu_RequestOpenClutch_Setting} ∈ ℙ(BOOL)

inv2 : Engine_SyncSpeed= TRUE ⇒ RequestFromNeu = TRUE ∨ NoNeu_Release_NoClutch = TRUE

inv3 : Engine_ZeroTorque = TRUE ⇒ RequestToNeu = TRUE ∨ RequestNoNeu = TRUE

inv4 : FromNeu_RequestOpenClutch = TRUE ⇒ FromNeu_SyncSpeed = FALSE ∧ RequestFromNeu = TRUE

inv5 : FromNeu_RequestOpenClutch = FALSE ⇒ FromNeu_OpenClutch = FALSE ∧ Error_FromNeu_OpenClutch = FALSE

inv6 : ToNeu_RequestOpenClutch = TRUE ⇒ ToNeu_ZeroTorque = FALSE ∧ RequestToNeu = TRUE

inv7 : ToNeu_RequestOpenClutch = FALSE ⇒ ToNeu_OpenClutch = FALSE ∧ Error_ToNeu_OpenClutch = FALSE

inv8 : NoNeu_RequestOpenClutch_Releasing = TRUE ⇒ NoNeu_ZeroTorque = FALSE ∧ RequestNoNeu = TRUE

inv9 : NoNeu_RequestOpenClutch_Releasing = FALSE ⇒ NoNeu_OpenClutch_Releasing = FALSE ∧ Error_NoNeu_OpenClutch_Releasing = FALSE

inv10 : NoNeu_RequestOpenClutch_Setting = TRUE ⇒ NoNeu_SyncSpeed = FALSE ∧ NoNeu_Release_NoClutch = TRUE

inv11 : NoNeu_RequestOpenClutch_Setting = FALSE ⇒ NoNeu_OpenClutch_Setting = FALSE ∧ Error_NoNeu_OpenClutch_Setting = FALSE

tFromNeu_RequestOpenClutch : tFromNeu_RequestOpenClutch ∈ ℕ

FromNeu_RequestOpenClutchDurationDelay1 : RequestFromNeu = TRUE ∧ FromNeu_RequestOpenClutch = TRUE ⇒ tFromNeu_RequestOpenClutch ≥ tRequestFromNeu + OpenClutch_Sync_DE

Deadline27 : FromNeu_RequestOpenClutch = TRUE ∧ FromNeu_OpenClutch = FALSE ∧ Error_FromNeu_OpenClutch = FALSE ⇒ time ≤ tFromNeu_RequestOpenClutch + OpenClutch_DL

FromNeu_OpenClutchDurationDeadline27 : FromNeu_RequestOpenClutch = TRUE ∧ FromNeu_OpenClutch = TRUE ⇒ tFromNeu_OpenClutch ≤ tFromNeu_RequestOpenClutch + OpenClutch_DL

Error_FromNeu_OpenClutchDurationDeadline27 : FromNeu_RequestOpenClutch = TRUE ∧ Error_FromNeu_OpenClutch = TRUE ⇒ tError_FromNeu_OpenClutch ≤ tFromNeu_RequestOpenClutch + OpenClutch_DL

tToNeu_RequestOpenClutch : tToNeu_RequestOpenClutch ∈ ℕ

Deadline28 : RequestToNeu = TRUE ∧ ToNeu_ZeroTorque = FALSE ∧ ToNeu_RequestOpenClutch = FALSE ⇒ time ≤ tRequestToNeu + Zero_DL

ToNeu_ZeroTorqueDurationDeadline28 : RequestToNeu = TRUE ∧ ToNeu_ZeroTorque = TRUE ⇒ tToNeu_ZeroTorque ≤ tRequestToNeu + Zero_DL

ToNeu_RequestOpenClutchDurationDeadline28 : RequestToNeu = TRUE ∧ ToNeu_RequestOpenClutch = TRUE ⇒ tToNeu_RequestOpenClutch ≤ tRequestToNeu + Zero_DL

ToNeu_RequestOpenClutchDurationDelay2 : RequestToNeu = TRUE ∧ ToNeu_RequestOpenClutch = TRUE ⇒ tToNeu_RequestOpenClutch ≥ tRequestToNeu + OpenClutch_Zero_DE

Deadline29 : ToNeu_RequestOpenClutch = TRUE ∧ ToNeu_OpenClutch = FALSE ∧ Error_ToNeu_OpenClutch = FALSE ⇒ time ≤ tToNeu_RequestOpenClutch + OpenClutch_DL

ToNeu_OpenClutchDurationDeadline29 : ToNeu_RequestOpenClutch = TRUE ∧ ToNeu_OpenClutch = TRUE ⇒ tToNeu_OpenClutch ≤ tToNeu_RequestOpenClutch + OpenClutch_DL

Error_ToNeu_OpenClutchDurationDeadline29 : ToNeu_RequestOpenClutch = TRUE ∧ Error_ToNeu_OpenClutch = TRUE ⇒ tError_ToNeu_OpenClutch ≤ tToNeu_RequestOpenClutch + OpenClutch_DL
tNoNeu_RequestOpenClutch_Releasing : tNoNeu_RequestOpenClutch_Releasing ∈ ℕ
Deadline30 : RequestNoNeu = TRUE ∧ NoNeu_RequestOpenClutch_Releasing = FALSE ∧ NoNeu_ZeroTorque = FALSE ⇒ time ≤ tRequestNoNeu + Zero_DL
NoNeu_RequestOpenClutch_ReleasingDurationDeadline30 : RequestNoNeu = TRUE ∧ NoNeu_RequestOpenClutch_Releasing = TRUE ⇒ tNoNeu_RequestOpenClutch_Releasing ≤ tRequestNoNeu + Zero_DL
NoNeu_ZeroTorqueDurationDeadline30 : RequestNoNeu = TRUE ∧ NoNeu_ZeroTorque = TRUE ⇒ tNoNeu_ZeroTorque ≤ tRequestNoNeu + Zero_DL
NoNeu_RequestOpenClutch_ReleasingDurationDelay3 : RequestNoNeu = TRUE ∧ NoNeu_RequestOpenClutch_Releasing = TRUE ⇒ tNoNeu_RequestOpenClutch_Releasing ≥ tRequestNoNeu + OpenClutch_Zero_DE
Deadline31 : NoNeu_RequestOpenClutch_Releasing = TRUE ∧ NoNeu_OpenClutch_Releasing = FALSE ∧ Error_NoNeu_OpenClutch_Releasing = FALSE ⇒ time ≤ tNoNeu_RequestOpenClutch_Releasing + OpenClutch_DL
NoNeu_OpenClutch_ReleasingDurationDeadline31 : NoNeu_RequestOpenClutch_Releasing = TRUE ∧ NoNeu_OpenClutch_Releasing = TRUE ⇒ tNoNeu_OpenClutch_Releasing ≤ tNoNeu_RequestOpenClutch_Releasing + OpenClutch_DL
Error_NoNeu_OpenClutch_ReleasingDurationDeadline31 : NoNeu_RequestOpenClutch_Releasing = TRUE ∧ Error_NoNeu_OpenClutch_Releasing = TRUE ⇒ tError_NoNeu_OpenClutch_Releasing ≤ tNoNeu_RequestOpenClutch_Releasing + OpenClutch_DL
tNoNeu_RequestOpenClutch_Setting : tNoNeu_RequestOpenClutch_Setting ∈ ℕ
Deadline32 : NoNeu_Release_NoClutch = TRUE ∧ NoNeu_RequestOpenClutch_Setting = FALSE ∧ NoNeu_SyncSpeed = FALSE ⇒ time ≤ tNoNeu_Release_NoClutch + Sync_DL
NoNeu_RequestOpenClutch_SettingDurationDeadline32 : NoNeu_Release_NoClutch = TRUE ∧ NoNeu_RequestOpenClutch_Setting = TRUE ⇒ tNoNeu_RequestOpenClutch_Setting ≤ tNoNeu_Release_NoClutch + Sync_DL
NoNeu_SyncSpeedDurationDeadline32 : NoNeu_Release_NoClutch = TRUE ∧ NoNeu_SyncSpeed = TRUE ⇒ tNoNeu_SyncSpeed ≤ tNoNeu_Release_NoClutch + Sync_DL
NoNeu_RequestOpenClutch_SettingDurationDelay4 : NoNeu_Release_NoClutch = TRUE ∧ NoNeu_RequestOpenClutch_Setting = TRUE ⇒ tNoNeu_RequestOpenClutch_Setting ≥ tNoNeu_Release_NoClutch + OpenClutch_Sync_DE
Deadline33 : NoNeu_RequestOpenClutch_Setting = TRUE ∧ NoNeu_OpenClutch_Setting = FALSE ∧ Error_NoNeu_OpenClutch_Setting = FALSE ⇒ time ≤ tNoNeu_RequestOpenClutch_Setting + OpenClutch_DL
NoNeu_OpenClutch_SettingDurationDeadline33 : NoNeu_RequestOpenClutch_Setting = TRUE ∧ NoNeu_OpenClutch_Setting = TRUE ⇒ tNoNeu_OpenClutch_Setting ≤ tNoNeu_RequestOpenClutch_Setting + OpenClutch_DL
Error_NoNeu_OpenClutch_SettingDurationDeadline33 : NoNeu_RequestOpenClutch_Setting = TRUE ∧ Error_NoNeu_OpenClutch_Setting = TRUE ⇒ tError_NoNeu_OpenClutch_Setting ≤ tNoNeu_RequestOpenClutch_Setting + OpenClutch_DL
inv12 : NoNeu_Release_NoClutch = FALSE ⇒ NoNeu_SyncSpeed = FALSE ∧ NoNeu_OpenClutch_Setting = FALSE
Deadline34 : RequestFromNeu = TRUE ∧ FromNeu_RequestOpenClutch = FALSE ∧ FromNeu_SyncSpeed = FALSE ⇒ time ≤ tRequestFromNeu + Sync_DL
FromNeu_RequestOpenClutchDurationDeadline34 : RequestFromNeu = TRUE ∧ FromNeu_RequestOpenClutch = TRUE ⇒ tFromNeu_RequestOpenClutch ≤ tRequestFromNeu + Sync_DL
FromNeu_SyncSpeedDurationDeadline34 : RequestFromNeu = TRUE ∧ FromNeu_SyncSpeed = TRUE ⇒ tFromNeu_SyncSpeed ≤ tRequestFromNeu + Sync_DL

TIMING

Expiry2 : Expiry (RequestFromNeu, FromNeu_SyncSpeed, Sync_EX)
Deadline10 : Deadline (FromNeu_SyncSpeed, FromNeu_SetGear_NoClutch ∨ Error_FromNeu_SetGear_NoClutch, SetGear_DL)
Deadline11 : Deadline (FromNeu_OpenClutch, Error_FromNeu_SetGear_Clutch ∨ FromNeu_SetGear_Clutch, SetGear_DL)
Deadline12 : Deadline (FromNeu_SetGear_Clutch, Error_FromNeu_CloseClutch ∨ FromNeu_CloseClutch, CloseClutch_DL)
Expiry3 : Expiry (RequestToNeu, ToNeu_ZeroTorque, Zero_EX)
Deadline14 : Deadline (ToNeu_ZeroTorque, ToNeu_Release_NoClutch ∨ Error_ToNeu_Release_NoClutch, Release_DL)
Deadline15 : Deadline (ToNeu_OpenClutch, ToNeu_Release_Clutch ∨ Error_ToNeu_Release_Clutch, Release_DL)
Deadline16 : Deadline (ToNeu_Release_Clutch, Error_ToNeu_CloseClutch ∨ ToNeu_CloseClutch, CloseClutch_DL)
Expiry4 : Expiry (RequestNoNeu, NoNeu_ZeroTorque, Zero_EX)
Deadline18 : Deadline (NoNeu_OpenClutch_Releasing, NoNeu_Release_Clutch ∨ Error_NoNeu_Release_Clutch, Release_DL)
Deadline19 : Deadline (NoNeu_ZeroTorque, NoNeu_Release_NoClutch ∨ Error_NoNeu_Release_NoClutch, Release_DL)
Expiry5 : Expiry (NoNeu_Release_NoClutch, NoNeu_SyncSpeed, Sync_EX)
Deadline21 : Deadline (NoNeu_SyncSpeed, NoNeu_SetGear_NoClutch ∨ Error_NoNeu_SetGear_NoClutch, SetGear_DL)
Deadline22 : Deadline (NoNeu_OpenClutch_Setting, NoNeu_SetGear_SettingClutch ∨ Error_NoNeu_SetGear_SettingClutch, SetGear_DL)
Deadline23 : Deadline (NoNeu_SetGear_SettingClutch, NoNeu_CloseClutch_Setting ∨ Error_NoNeu_CloseClutch_Setting, CloseClutch_DL)
Deadline24 : Deadline (NoNeu_Release_Clutch, Error_NoNeu_SetGear_ReleasingClutch ∨ NoNeu_SetGear_ReleasingClutch, SetGear_DL)
Deadline25 : Deadline (NoNeu_SetGear_ReleasingClutch, NoNeu_CloseClutch_Releasing ∨ Error_NoNeu_CloseClutch_Releasing, CloseClutch_DL)
Delay1 : Delay (RequestFromNeu, FromNeu_RequestOpenClutch, OpenClutch_Sync_DE)
Deadline27 : Deadline (FromNeu_RequestOpenClutch, FromNeu_OpenClutch ∨ Error_FromNeu_OpenClutch, OpenClutch_DL)
Deadline28 : Deadline (RequestToNeu, ToNeu_ZeroTorque ∨ ToNeu_RequestOpenClutch, Zero_DL)
Delay2 : Delay (RequestToNeu, ToNeu_RequestOpenClutch, OpenClutch_Zero_DE)
Deadline29 : Deadline (ToNeu_RequestOpenClutch, ToNeu_OpenClutch ∨ Error_ToNeu_OpenClutch, OpenClutch_DL)
Deadline30 : Deadline (RequestNoNeu, NoNeu_RequestOpenClutch_Releasing ∨ NoNeu_ZeroTorque, Zero_DL)
Delay3 : Delay (RequestNoNeu, NoNeu_RequestOpenClutch_Releasing, OpenClutch_Zero_DE)
Deadline31 : Deadline (NoNeu_RequestOpenClutch_Releasing, NoNeu_OpenClutch_Releasing ∨ Error_NoNeu_OpenClutch_Releasing, OpenClutch_DL)
Deadline32 : Deadline (NoNeu_Release_NoClutch, NoNeu_RequestOpenClutch_Setting ∨ NoNeu_SyncSpeed, Sync_DL)
Delay4 : Delay (NoNeu_Release_NoClutch, NoNeu_RequestOpenClutch_Setting, OpenClutch_Sync_DE)
Deadline33 : Deadline (NoNeu_RequestOpenClutch_Setting, NoNeu_OpenClutch_Setting ∨ Error_NoNeu_OpenClutch_Setting, OpenClutch_DL)
Deadline34 : Deadline (RequestFromNeu, FromNeu_RequestOpenClutch ∨ FromNeu_SyncSpeed, Sync_DL)

EVENTS

```
INITIALISATION ≙
    STATUS
    ordinary
BEGIN
    act1 :isNeu ≔ TRUE
    act2 :RequestNoNeu ≔ FALSE
    act3 :RequestToNeu ≔ FALSE
    act4 :RequestFromNeu ≔ FALSE
    act5 :FromNeu_SyncSpeed ≔ FALSE
    act6 :FromNeu_OpenClutch ≔ FALSE
    act7 :FromNeu_SetGear_NoClutch ≔ FALSE
    act8 :FromNeu_SetGear_Clutch ≔ FALSE
    act9 :FromNeu_CloseClutch ≔ FALSE
    act10 :Error_FromNeu_OpenClutch ≔ FALSE
    act11 :Error_FromNeu_SetGear_NoClutch ≔ FALSE
    act12 :Error_FromNeu_SetGear_Clutch ≔ FALSE
    act13 :Error_FromNeu_CloseClutch ≔ FALSE
    act14 :ToNeu_ZeroTorque≔ FALSE      // Senario3 Flage
    act15 :ToNeu_OpenClutch ≔ FALSE      // Senario3 Flage
    act16 :Error_ToNeu_OpenClutch ≔ FALSE      // Senario3 Flage
    act17 :ToNeu_Release_NoClutch≔ FALSE      // Senario3 Flage
    act18 :Error_ToNeu_Release_NoClutch≔ FALSE      // Senario3 Flage
    act19 :ToNeu_Release_Clutch≔ FALSE      // Senario3 Flage
    act20 :Error_ToNeu_Release_Clutch ≔ FALSE      // Senario3 Flage
    act21 :ToNeu_CloseClutch≔ FALSE      // Senario3 Flage
    act22 :Error_ToNeu_CloseClutch≔ FALSE      // Senario3 Flage
    act23 :NoNeu_ZeroTorque≔ FALSE      // Senario2 Flage
    act24 :NoNeu_OpenClutch_Releasing≔ FALSE      // Senario2 Flage
    act25 :NoNeu_Release_NoClutch≔ FALSE      // Senario2 Flage
    act26 :NoNeu_Release_Clutch≔ FALSE      // Senario2 Flage
    act27 :NoNeu_SyncSpeed ≔ FALSE      // Senario2 Flage
    act28 :NoNeu_OpenClutch_Setting ≔ FALSE      // Senario2 Flage
    act29 :NoNeu_SetGear_NoClutch≔ FALSE      // Senario2 Flage
    act30 :NoNeu_SetGear_ReleasingClutch≔ FALSE      // Senario2 Flage
    act31 :NoNeu_SetGear_SettingClutch≔ FALSE      // Senario2 Flage
    act32 :NoNeu_CloseClutch_Releasing≔ FALSE      // Senario2 Flage
    act33 :NoNeu_CloseClutch_Setting≔ FALSE      // Senario2 Flage
    act34 :Error_NoNeu_OpenClutch_Releasing≔ FALSE      // Senario2 Flage
    act35 :Error_NoNeu_Release_NoClutch≔ FALSE      // Senario2 Flage
    act36 :Error_NoNeu_Release_Clutch≔ FALSE      // Senario2 Flage
    act37 :Error_NoNeu_OpenClutch_Setting ≔ FALSE      // Senario2 Flage
    act38 :Error_NoNeu_SetGear_NoClutch≔ FALSE      // Senario2 Flage
    act39 :Error_NoNeu_SetGear_ReleasingClutch≔ FALSE      // Senario2 Flage
    act40 :Error_NoNeu_SetGear_SettingClutch≔ FALSE      // Senario2 Flage
    act41 :Error_NoNeu_CloseClutch_Releasing ≔ FALSE      // Senario2 Flage
    act42 :Error_NoNeu_CloseClutch_Setting ≔ FALSE      // Senario2 Flage
    act43 :Engine_SyncSpeed ≔ FALSE
    act44 :Engine_WaitForSyncClutch ≔ FALSE
    act45 :Engine_ZeroTorque ≔ FALSE
    act46 :Engine_WaitForZeroClutch ≔ FALSE
    act47 :Clutch_Open ≔ FALSE      // Clutch Flags
    act48 :Error_Clutch_Open ≔ FALSE      // Clutch Flags
    act49 :Clutch_Close ≔ FALSE      // Clutch Flags
    act50 :Error_Clutch_Close ≔ FALSE      // Clutch Flags
    act51 :Gear_Release ≔ FALSE      // Gear Flags
    act52 :Error_Gear_Release ≔ FALSE      // Gear Flags
    act53 :Gear_Set ≔ FALSE      // Gear Flags
    act54 :Error_Gear_Set ≔ FALSE      // Gear Flags
    act55 :FromNeu_RequestOpenClutch ≔ FALSE      // Senario1 Flag
    act56 :ToNeu_RequestOpenClutch ≔ FALSE      // Senario3 Flag
    act57 :NoNeu_RequestOpenClutch_Releasing ≔ FALSE      // Senario2 Flag
    act58 :NoNeu_RequestOpenClutch_Setting ≔ FALSE      // Senario2 Flag
    time :time ≔ 0
    tRequestFromNeu :tRequestFromNeu ≔ 0
    tFromNeu_OpenClutch :tFromNeu_OpenClutch ≔ 0
    tFromNeu_SyncSpeed :tFromNeu_SyncSpeed ≔ 0
    tFromNeu_SetGear_NoClutch :tFromNeu_SetGear_NoClutch ≔ 0
    tError_FromNeu_SetGear_NoClutch :tError_FromNeu_SetGear_NoClutch ≔ 0
    tError_FromNeu_SetGear_Clutch :tError_FromNeu_SetGear_Clutch ≔ 0
    tFromNeu_SetGear_Clutch :tFromNeu_SetGear_Clutch ≔ 0
    tError_FromNeu_CloseClutch :tError_FromNeu_CloseClutch ≔ 0
    tFromNeu_CloseClutch :tFromNeu_CloseClutch ≔ 0
    tRequestToNeu :tRequestToNeu ≔ 0
    tToNeu_ZeroTorque :tToNeu_ZeroTorque ≔ 0
    tToNeu_OpenClutch :tToNeu_OpenClutch ≔ 0
    tToNeu_Release_NoClutch :tToNeu_Release_NoClutch ≔ 0
    tError_ToNeu_Release_NoClutch :tError_ToNeu_Release_NoClutch ≔ 0
    tToNeu_Release_Clutch :tToNeu_Release_Clutch ≔ 0
    tError_ToNeu_Release_Clutch :tError_ToNeu_Release_Clutch ≔ 0
```

```
        tError_ToNeu_CloseClutch :tError_ToNeu_CloseClutch ≔ 0
        tToNeu_CloseClutch :tToNeu_CloseClutch ≔ 0
        tRequestNoNeu :tRequestNoNeu ≔ 0
        tNoNeu_OpenClutch_Releasing :tNoNeu_OpenClutch_Releasing ≔ 0
        tNoNeu_ZeroTorque :tNoNeu_ZeroTorque ≔ 0
        tNoNeu_Release_Clutch :tNoNeu_Release_Clutch ≔ 0
        tError_NoNeu_Release_Clutch :tError_NoNeu_Release_Clutch ≔ 0
        tNoNeu_Release_NoClutch :tNoNeu_Release_NoClutch ≔ 0
        tError_NoNeu_Release_NoClutch :tError_NoNeu_Release_NoClutch ≔ 0
        tNoNeu_SyncSpeed :tNoNeu_SyncSpeed ≔ 0
        tNoNeu_OpenClutch_Setting :tNoNeu_OpenClutch_Setting ≔ 0
        tNoNeu_SetGear_NoClutch :tNoNeu_SetGear_NoClutch ≔ 0
        tError_NoNeu_SetGear_NoClutch :tError_NoNeu_SetGear_NoClutch ≔ 0
        tNoNeu_SetGear_SettingClutch :tNoNeu_SetGear_SettingClutch ≔ 0
        tError_NoNeu_SetGear_SettingClutch :tError_NoNeu_SetGear_SettingClutch ≔ 0
        tNoNeu_CloseClutch_Setting :tNoNeu_CloseClutch_Setting ≔ 0
        tError_NoNeu_CloseClutch_Setting :tError_NoNeu_CloseClutch_Setting ≔ 0
        tError_NoNeu_SetGear_ReleasingClutch :tError_NoNeu_SetGear_ReleasingClutch ≔ 0
        tNoNeu_SetGear_ReleasingClutch :tNoNeu_SetGear_ReleasingClutch ≔ 0
        tNoNeu_CloseClutch_Releasing :tNoNeu_CloseClutch_Releasing ≔ 0
        tError_NoNeu_CloseClutch_Releasing :tError_NoNeu_CloseClutch_Releasing ≔ 0
        tFromNeu_RequestOpenClutch :tFromNeu_RequestOpenClutch ≔ 0
        tError_FromNeu_OpenClutch :tError_FromNeu_OpenClutch ≔ 0
        tToNeu_RequestOpenClutch :tToNeu_RequestOpenClutch ≔ 0
        tError_ToNeu_OpenClutch :tError_ToNeu_OpenClutch ≔ 0
        tNoNeu_RequestOpenClutch_Releasing :tNoNeu_RequestOpenClutch_Releasing ≔ 0
        tError_NoNeu_OpenClutch_Releasing :tError_NoNeu_OpenClutch_Releasing ≔ 0
        tNoNeu_RequestOpenClutch_Setting :tNoNeu_RequestOpenClutch_Setting ≔ 0
        tError_NoNeu_OpenClutch_Setting :tError_NoNeu_OpenClutch_Setting ≔ 0
END

    RequestFromNeu ≙
        STATUS
        ordinary
REFINES
        RequestFromNeu
WHEN
        grd1 :RequestFromNeu = FALSE
        grd2 :RequestNoNeu = FALSE
        grd3 :RequestToNeu = FALSE
        grd4 :isNeu = TRUE
THEN
        act1 :RequestFromNeu ≔ TRUE
        tRequestFromNeu :tRequestFromNeu ≔ time
END

    RequestNoNeu ≙
        STATUS
        ordinary
REFINES
        RequestNoNeu
WHEN
        grd1 :RequestFromNeu = FALSE
        grd2 :RequestNoNeu = FALSE
        grd3 :RequestToNeu = FALSE
        grd4 :isNeu = FALSE
THEN
        act1 :RequestNoNeu ≔ TRUE
        tRequestNoNeu :tRequestNoNeu ≔ time
END

    RequestToNeu ≙
        STATUS
        ordinary
REFINES
        RequestToNeu
WHEN
        grd1 :RequestFromNeu = FALSE
        grd2 :RequestNoNeu = FALSE
        grd3 :RequestToNeu = FALSE
        grd4 :isNeu = FALSE
THEN
        act1 :RequestToNeu ≔ TRUE
        tRequestToNeu :tRequestToNeu ≔ time
END

    FromNeu_SyncSpeed ≙
        STATUS
        ordinary
```

```
REFINES
        FromNeu_SyncSpeed
WHEN
        grd1 :RequestFromNeu = TRUE
        grd2 :FromNeu_SyncSpeed = FALSE
        grd3 :FromNeu_RequestOpenClutch = FALSE
        grd4 :Engine_SyncSpeed = TRUE
        Expiry2 :time ≤ tRequestFromNeu + Sync_EX
THEN
        act1 :FromNeu_SyncSpeed ≔ TRUE
        tFromNeu_SyncSpeed :tFromNeu_SyncSpeed ≔ time
END

    FromNeu_RequestOpenClutch ≙
        STATUS
        ordinary
WHEN
        grd1 :RequestFromNeu = TRUE
        grd2 :FromNeu_SyncSpeed = FALSE
        grd3 :FromNeu_RequestOpenClutch = FALSE
        Delay1 :time ≥ tRequestFromNeu + OpenClutch_Sync_DE
THEN
        act1 :FromNeu_RequestOpenClutch ≔ TRUE
        tFromNeu_RequestOpenClutch :tFromNeu_RequestOpenClutch ≔ time
END

    FromNeu_OpenClutch ≙
        STATUS
        ordinary
REFINES
        FromNeu_OpenClutch
WHEN
        grd1 :FromNeu_RequestOpenClutch = TRUE
        grd2 :Error_FromNeu_OpenClutch = FALSE
        grd3 :FromNeu_OpenClutch = FALSE
        grd4 :Clutch_Open = TRUE
THEN
        act1 :FromNeu_OpenClutch ≔ TRUE
        tFromNeu_OpenClutch :tFromNeu_OpenClutch ≔ time
END

    Error_FromNeu_OpenClutch ≙
        STATUS
        ordinary
REFINES
        Error_FromNeu_OpenClutch
WHEN
        grd1 :FromNeu_RequestOpenClutch = TRUE
        grd2 :Error_FromNeu_OpenClutch = FALSE
        grd3 :FromNeu_OpenClutch = FALSE
THEN
        act1 :Error_FromNeu_OpenClutch ≔ TRUE
        tError_FromNeu_OpenClutch :tError_FromNeu_OpenClutch ≔ time
END

    FromNeu_SetGear_NoClutch ≙
        STATUS
        ordinary
REFINES
        FromNeu_SetGear_NoClutch
WHEN
        grd1 :FromNeu_SyncSpeed = TRUE
        grd2 :Error_FromNeu_SetGear_NoClutch = FALSE
        grd3 :FromNeu_SetGear_NoClutch = FALSE
        grd4 :Gear_Set = TRUE
THEN
        act1 :FromNeu_SetGear_NoClutch ≔ TRUE
        act2 :isNeu ≔ FALSE
        tFromNeu_SetGear_NoClutch :tFromNeu_SetGear_NoClutch ≔ time
END

    Error_FromNeu_SetGear_NoClutch ≙
        STATUS
        ordinary
REFINES
        Error_FromNeu_SetGear_NoClutch
WHEN
        grd1 :FromNeu_SyncSpeed = TRUE
        grd2 :Error_FromNeu_SetGear_NoClutch = FALSE
```

```
        grd3 :FromNeu_SetGear_NoClutch = FALSE
        grd4 :Gear_Set= TRUE
THEN
        act1 :Error_FromNeu_SetGear_NoClutch ≔ TRUE
        tError_FromNeu_SetGear_NoClutch :tError_FromNeu_SetGear_NoClutch ≔ time
END

    FromNeu_SetGear_Clutch ≙
        STATUS
        ordinary
REFINES
        FromNeu_SetGear_Clutch
WHEN
        grd1 :FromNeu_OpenClutch = TRUE
        grd2 :Error_FromNeu_SetGear_Clutch = FALSE
        grd3 :FromNeu_SetGear_Clutch = FALSE
        grd4 :Gear_Set= TRUE
THEN
        act1 :FromNeu_SetGear_Clutch ≔ TRUE
        tFromNeu_SetGear_Clutch :tFromNeu_SetGear_Clutch ≔ time
END

    Error_FromNeu_SetGear_Clutch ≙
        STATUS
        ordinary
REFINES
        Error_FromNeu_SetGear_Clutch
WHEN
        grd1 :FromNeu_OpenClutch = TRUE
        grd2 :Error_FromNeu_SetGear_Clutch = FALSE
        grd3 :FromNeu_SetGear_Clutch = FALSE
THEN
        act1 :Error_FromNeu_SetGear_Clutch ≔ TRUE
        tError_FromNeu_SetGear_Clutch :tError_FromNeu_SetGear_Clutch ≔ time
END

    FromNeu_CloseClutch ≙
        STATUS
        ordinary
REFINES
        FromNeu_CloseClutch
WHEN
        grd1 :FromNeu_SetGear_Clutch = TRUE
        grd2 :Error_FromNeu_CloseClutch = FALSE
        grd3 :FromNeu_CloseClutch = FALSE
        grd4 :Clutch_Close = TRUE
THEN
        act1 :FromNeu_CloseClutch ≔ TRUE
        act2 :isNeu ≔ FALSE
        tFromNeu_CloseClutch :tFromNeu_CloseClutch ≔ time
END

    Error_FromNeu_CloseClutch ≙
        STATUS
        ordinary
REFINES
        Error_FromNeu_CloseClutch
WHEN
        grd1 :FromNeu_SetGear_Clutch = TRUE
        grd2 :Error_FromNeu_CloseClutch = FALSE
        grd3 :FromNeu_CloseClutch = FALSE
THEN
        act1 :Error_FromNeu_CloseClutch ≔ TRUE
        tError_FromNeu_CloseClutch :tError_FromNeu_CloseClutch ≔ time
END

    ToNeu_ZeroTorque ≙      // First Event of Senarion3
        STATUS
        ordinary
REFINES
        ToNeu_ZeroTorque
WHEN
        grd1 :RequestToNeu = TRUE
        grd2 :ToNeu_ZeroTorque = FALSE
        grd3 :ToNeu_RequestOpenClutch = FALSE
        grd4 :Engine_ZeroTorque = TRUE
        Expiry3 :time ≤ tRequestToNeu + Zero_EX
THEN
        act1 :ToNeu_ZeroTorque ≔ TRUE
```

```
        tToNeu_ZeroTorque :tToNeu_ZeroTorque ≔ time
END

    ToNeu_RequestOpenClutch ≜
        STATUS
        ordinary
WHEN
        grd1 :RequestToNeu = TRUE
        grd2 :ToNeu_ZeroTorque = FALSE
        grd3 :ToNeu_RequestOpenClutch = FALSE
        Delay2 :time ≥ tRequestToNeu + OpenClutch_Zero_DE
THEN
        act1 :ToNeu_RequestOpenClutch ≔ TRUE
        tToNeu_RequestOpenClutch :tToNeu_RequestOpenClutch ≔ time
END

    ToNeu_OpenClutch ≜
        STATUS
        ordinary
REFINES
        ToNeu_OpenClutch
WHEN
        grd1 :ToNeu_RequestOpenClutch = TRUE
        grd2 :ToNeu_OpenClutch = FALSE
        grd3 :Error_ToNeu_OpenClutch = FALSE
        grd4 :Clutch_Open = TRUE
THEN
        act1 :ToNeu_OpenClutch ≔ TRUE
        tToNeu_OpenClutch :tToNeu_OpenClutch ≔ time
END

    Error_ToNeu_OpenClutch ≜
        STATUS
        ordinary
REFINES
        Error_ToNeu_OpenClutch
WHEN
        grd1 :ToNeu_RequestOpenClutch = TRUE
        grd2 :ToNeu_OpenClutch = FALSE
        grd3 :Error_ToNeu_OpenClutch = FALSE
THEN
        act1 :Error_ToNeu_OpenClutch ≔ TRUE
        tError_ToNeu_OpenClutch :tError_ToNeu_OpenClutch ≔ time
END

    ToNeu_Release_NoClutch ≜
        STATUS
        ordinary
REFINES
        ToNeu_Release_NoClutch
WHEN
        grd1 :ToNeu_ZeroTorque = TRUE
        grd2 :ToNeu_Release_NoClutch = FALSE
        grd3 :Error_ToNeu_Release_NoClutch = FALSE
        grd4 :Gear_Release = TRUE
THEN
        act1 :ToNeu_Release_NoClutch ≔ TRUE
        act2 :isNeu ≔ TRUE
        tToNeu_Release_NoClutch :tToNeu_Release_NoClutch ≔ time
END

    Error_ToNeu_Release_NoClutch ≜
        STATUS
        ordinary
REFINES
        Error_ToNeu_Release_NoClutch
WHEN
        grd1 :ToNeu_ZeroTorque = TRUE
        grd2 :ToNeu_Release_NoClutch = FALSE
        grd3 :Error_ToNeu_Release_NoClutch = FALSE
THEN
        act1 :Error_ToNeu_Release_NoClutch ≔ TRUE
        tError_ToNeu_Release_NoClutch :tError_ToNeu_Release_NoClutch ≔ time
END

    ToNeu_Release_Clutch ≜
        STATUS
        ordinary
REFINES
```

```
        ToNeu_Release_Clutch
WHEN
        grd1 :ToNeu_OpenClutch = TRUE
        grd2 :ToNeu_Release_Clutch = FALSE
        grd3 :Error_ToNeu_Release_Clutch = FALSE
        grd4 :Gear_Release = TRUE
THEN
        act1 :ToNeu_Release_Clutch ≔ TRUE
        tToNeu_Release_Clutch :tToNeu_Release_Clutch ≔ time
END

    Error_ToNeu_Release_Clutch ≙
        STATUS
        ordinary
REFINES
        Error_ToNeu_Release_Clutch
WHEN
        grd1 :ToNeu_OpenClutch = TRUE
        grd2 :ToNeu_Release_Clutch = FALSE
        grd3 :Error_ToNeu_Release_Clutch = FALSE
THEN
        act1 :Error_ToNeu_Release_Clutch ≔ TRUE
        tError_ToNeu_Release_Clutch :tError_ToNeu_Release_Clutch ≔ time
END

    ToNeu_CloseClutch ≙
        STATUS
        ordinary
REFINES
        ToNeu_CloseClutch
WHEN
        grd1 :ToNeu_Release_Clutch = TRUE
        grd2 :ToNeu_CloseClutch = FALSE
        grd3 :Error_ToNeu_CloseClutch = FALSE
        grd4 :Clutch_Close = TRUE
THEN
        act1 :ToNeu_CloseClutch ≔ TRUE
        act2 :isNeu ≔ TRUE
        tToNeu_CloseClutch :tToNeu_CloseClutch ≔ time
END

    Error_ToNeu_CloseClutch ≙      // Last Event of Senarion3
        STATUS
        ordinary
REFINES
        Error_ToNeu_CloseClutch
WHEN
        grd1 :ToNeu_Release_Clutch = TRUE
        grd2 :ToNeu_CloseClutch = FALSE
        grd3 :Error_ToNeu_CloseClutch = FALSE
THEN
        act1 :Error_ToNeu_CloseClutch ≔ TRUE
        tError_ToNeu_CloseClutch :tError_ToNeu_CloseClutch ≔ time
END

    NoNeu_ZeroTorque ≙      // First Event of Senarion2
        STATUS
        ordinary
REFINES
        NoNeu_ZeroTorque
WHEN
        grd1 :RequestNoNeu = TRUE
        grd2 :NoNeu_ZeroTorque = FALSE
        grd3 :NoNeu_RequestOpenClutch_Releasing = FALSE
        grd4 :Engine_ZeroTorque = TRUE
        Expiry4 :time ≤ tRequestNoNeu + Zero_EX
THEN
        act1 :NoNeu_ZeroTorque ≔ TRUE
        tNoNeu_ZeroTorque :tNoNeu_ZeroTorque ≔ time
END

    NoNeu_RequestOpenClutch_Releasing ≙
        STATUS
        ordinary
WHEN
        grd1 :RequestNoNeu = TRUE
        grd2 :NoNeu_ZeroTorque = FALSE
        grd3 :NoNeu_RequestOpenClutch_Releasing = FALSE
        Delay3 :time ≥ tRequestNoNeu + OpenClutch_Zero_DE
```

```
THEN
        act1 :NoNeu_RequestOpenClutch_Releasing ≔ TRUE
        tNoNeu_RequestOpenClutch_Releasing :tNoNeu_RequestOpenClutch_Releasing ≔ time
END

    NoNeu_OpenClutch_Releasing ≙
        STATUS
        ordinary
REFINES
        NoNeu_OpenClutch_Releasing
WHEN
        grd1 :NoNeu_OpenClutch_Releasing = TRUE
        grd2 :NoNeu_OpenClutch_Releasing = FALSE
        grd3 :Error_NoNeu_OpenClutch_Releasing = FALSE
        grd4 :Clutch_Open = TRUE
THEN
        act1 :NoNeu_OpenClutch_Releasing ≔ TRUE
        tNoNeu_OpenClutch_Releasing :tNoNeu_OpenClutch_Releasing ≔ time
END

    Error_NoNeu_OpenClutch_Releasing ≙
        STATUS
        ordinary
REFINES
        Error_NoNeu_OpenClutch_Releasing
WHEN
        grd1 :NoNeu_RequestOpenClutch_Releasing = TRUE
        grd2 :NoNeu_OpenClutch_Releasing = FALSE
        grd3 :Error_NoNeu_OpenClutch_Releasing = FALSE
THEN
        act1 :Error_NoNeu_OpenClutch_Releasing ≔ TRUE
        tError_NoNeu_OpenClutch_Releasing :tError_NoNeu_OpenClutch_Releasing ≔ time
END

    NoNeu_Release_NoClutch ≙
        STATUS
        ordinary
REFINES
        NoNeu_Release_NoClutch
WHEN
        grd1 :NoNeu_ZeroTorque = TRUE
        grd2 :NoNeu_Release_NoClutch = FALSE
        grd3 :Error_NoNeu_Release_NoClutch = FALSE
        grd4 :Gear_Release = TRUE
THEN
        act1 :NoNeu_Release_NoClutch ≔ TRUE
        tNoNeu_Release_NoClutch :tNoNeu_Release_NoClutch ≔ time
END

    Error_NoNeu_Release_NoClutch ≙
        STATUS
        ordinary
REFINES
        Error_NoNeu_Release_NoClutch
WHEN
        grd1 :NoNeu_ZeroTorque = TRUE
        grd2 :NoNeu_Release_NoClutch = FALSE
        grd3 :Error_NoNeu_Release_NoClutch = FALSE
THEN
        act1 :Error_NoNeu_Release_NoClutch ≔ TRUE
        tError_NoNeu_Release_NoClutch :tError_NoNeu_Release_NoClutch ≔ time
END

    NoNeu_Release_Clutch ≙
        STATUS
        ordinary
REFINES
        NoNeu_Release_Clutch
WHEN
        grd1 :NoNeu_OpenClutch_Releasing = TRUE
        grd2 :NoNeu_Release_Clutch = FALSE
        grd3 :Error_NoNeu_Release_Clutch = FALSE
        grd4 :Gear_Release = TRUE
THEN
        act1 :NoNeu_Release_Clutch ≔ TRUE
        tNoNeu_Release_Clutch :tNoNeu_Release_Clutch ≔ time
END

    Error_NoNeu_Release_Clutch ≙
```

```
        STATUS
    ordinary
REFINES
    Error_NoNeu_Release_Clutch
WHEN
    grd1 :NoNeu_OpenClutch_Releasing = TRUE
    grd2 :NoNeu_Release_Clutch = FALSE
    grd3 :Error_NoNeu_Release_Clutch = FALSE
THEN
    act1 :Error_NoNeu_Release_Clutch ≔ TRUE
    tError_NoNeu_Release_Clutch :tError_NoNeu_Release_Clutch ≔ time
END

  NoNeu_SyncSpeed ≙
        STATUS
    ordinary
REFINES
    NoNeu_SyncSpeed
WHEN
    grd1 :NoNeu_Release_NoClutch = TRUE
    grd2 :NoNeu_SyncSpeed = FALSE
    grd3 :NoNeu_RequestOpenClutch_Setting = FALSE
    grd4 :Engine_SyncSpeed= TRUE
    Expiry5 :time ≤ tNoNeu_Release_NoClutch + Sync_EX
THEN
    act1 :NoNeu_SyncSpeed ≔ TRUE
    tNoNeu_SyncSpeed :tNoNeu_SyncSpeed ≔ time
END

  NoNeu_RequestOpenClutch_Setting ≙
        STATUS
    ordinary
WHEN
    grd1 :NoNeu_Release_NoClutch = TRUE
    grd2 :NoNeu_SyncSpeed = FALSE
    grd3 :NoNeu_RequestOpenClutch_Setting = FALSE
    Delay4 :time ≥ tNoNeu_Release_NoClutch + OpenClutch_Sync_DE
THEN
    act1 :NoNeu_RequestOpenClutch_Setting ≔ TRUE
    tNoNeu_RequestOpenClutch_Setting :tNoNeu_RequestOpenClutch_Setting ≔ time
END

  NoNeu_OpenClutch_Setting ≙
        STATUS
    ordinary
REFINES
    NoNeu_OpenClutch_Setting
WHEN
    grd1 :NoNeu_RequestOpenClutch_Setting = TRUE
    grd2 :Error_NoNeu_OpenClutch_Setting = FALSE
    grd3 :NoNeu_OpenClutch_Setting = FALSE
    grd4 :Clutch_Open = TRUE
THEN
    act1 :NoNeu_OpenClutch_Setting ≔ TRUE
    tNoNeu_OpenClutch_Setting :tNoNeu_OpenClutch_Setting ≔ time
END

  Error_NoNeu_OpenClutch_Setting ≙
        STATUS
    ordinary
REFINES
    Error_NoNeu_OpenClutch_Setting
WHEN
    grd1 :NoNeu_RequestOpenClutch_Setting = TRUE
    grd2 :Error_NoNeu_OpenClutch_Setting = FALSE
    grd3 :NoNeu_OpenClutch_Setting = FALSE
THEN
    act1 :Error_NoNeu_OpenClutch_Setting ≔ TRUE
    tError_NoNeu_OpenClutch_Setting :tError_NoNeu_OpenClutch_Setting ≔ time
END

  NoNeu_SetGear_NoClutch ≙
        STATUS
    ordinary
REFINES
    NoNeu_SetGear_NoClutch
WHEN
    grd1 :NoNeu_SyncSpeed = TRUE
    grd2 :Error_NoNeu_SetGear_NoClutch = FALSE
```

```
        grd3 :NoNeu_SetGear_NoClutch = FALSE
        grd4 :Gear_Set = TRUE
THEN
        act1 :NoNeu_SetGear_NoClutch ≔ TRUE
        tNoNeu_SetGear_NoClutch :tNoNeu_SetGear_NoClutch ≔ time
END

    Error_NoNeu_SetGear_NoClutch ≙
        STATUS
        ordinary
REFINES
        Error_NoNeu_SetGear_NoClutch
WHEN
        grd1 :NoNeu_SyncSpeed = TRUE
        grd2 :Error_NoNeu_SetGear_NoClutch = FALSE
        grd3 :NoNeu_SetGear_NoClutch = FALSE
THEN
        act1 :Error_NoNeu_SetGear_NoClutch ≔ TRUE
        tError_NoNeu_SetGear_NoClutch :tError_NoNeu_SetGear_NoClutch ≔ time
END

    NoNeu_SetGear_ReleasingClutch ≙
        STATUS
        ordinary
REFINES
        NoNeu_SetGear_ReleasingClutch
WHEN
        grd1 :NoNeu_Release_Clutch = TRUE
        grd2 :Error_NoNeu_SetGear_ReleasingClutch = FALSE
        grd3 :NoNeu_SetGear_ReleasingClutch = FALSE
        grd4 :Gear_Set = TRUE
THEN
        act1 :NoNeu_SetGear_ReleasingClutch ≔ TRUE
        tNoNeu_SetGear_ReleasingClutch :tNoNeu_SetGear_ReleasingClutch ≔ time
END

    Error_NoNeu_SetGear_ReleasingClutch ≙
        STATUS
        ordinary
REFINES
        Error_NoNeu_SetGear_ReleasingClutch
WHEN
        grd1 :NoNeu_Release_Clutch = TRUE
        grd2 :Error_NoNeu_SetGear_ReleasingClutch = FALSE
        grd3 :NoNeu_SetGear_ReleasingClutch = FALSE
THEN
        act1 :Error_NoNeu_SetGear_ReleasingClutch ≔ TRUE
        tError_NoNeu_SetGear_ReleasingClutch :tError_NoNeu_SetGear_ReleasingClutch ≔ time
END

    NoNeu_SetGear_SettingClutch ≙
        STATUS
        ordinary
REFINES
        NoNeu_SetGear_SettingClutch
WHEN
        grd1 :NoNeu_OpenClutch_Setting = TRUE
        grd2 :Error_NoNeu_SetGear_SettingClutch = FALSE
        grd3 :NoNeu_SetGear_SettingClutch = FALSE
        grd4 :Gear_Set = TRUE
THEN
        act1 :NoNeu_SetGear_SettingClutch ≔ TRUE
        tNoNeu_SetGear_SettingClutch :tNoNeu_SetGear_SettingClutch ≔ time
END

    Error_NoNeu_SetGear_SettingClutch ≙
        STATUS
        ordinary
REFINES
        Error_NoNeu_SetGear_SettingClutch
WHEN
        grd1 :NoNeu_OpenClutch_Setting = TRUE
        grd2 :Error_NoNeu_SetGear_SettingClutch = FALSE
        grd3 :NoNeu_SetGear_SettingClutch = FALSE
THEN
        act1 :Error_NoNeu_SetGear_SettingClutch ≔ TRUE
        tError_NoNeu_SetGear_SettingClutch :tError_NoNeu_SetGear_SettingClutch ≔ time
END
```

```
    NoNeu_CloseClutch_Setting ≜
        STATUS
        ordinary
REFINES
        NoNeu_CloseClutch_Setting
WHEN
        grd1 :NoNeu_SetGear_SettingClutch = TRUE
        grd2 :Error_NoNeu_CloseClutch_Setting = FALSE
        grd3 :NoNeu_CloseClutch_Setting = FALSE
        grd4 :Clutch_Close = TRUE
THEN
        act1 :NoNeu_CloseClutch_Setting ≔ TRUE
        tNoNeu_CloseClutch_Setting :tNoNeu_CloseClutch_Setting ≔ time
END

    Error_NoNeu_CloseClutch_Setting ≜
        STATUS
        ordinary
REFINES
        Error_NoNeu_CloseClutch_Setting
WHEN
        grd1 :NoNeu_SetGear_SettingClutch = TRUE
        grd2 :Error_NoNeu_CloseClutch_Setting = FALSE
        grd3 :NoNeu_CloseClutch_Setting = FALSE
THEN
        act1 :Error_NoNeu_CloseClutch_Setting ≔ TRUE
        tError_NoNeu_CloseClutch_Setting :tError_NoNeu_CloseClutch_Setting ≔ time
END

    NoNeu_CloseClutch_Releasing ≜
        STATUS
        ordinary
REFINES
        NoNeu_CloseClutch_Releasing
WHEN
        grd1 :NoNeu_SetGear_ReleasingClutch = TRUE
        grd2 :Error_NoNeu_CloseClutch_Releasing = FALSE
        grd3 :NoNeu_CloseClutch_Releasing = FALSE
        grd4 :Clutch_Close = TRUE
THEN
        act1 :NoNeu_CloseClutch_Releasing ≔ TRUE
        tNoNeu_CloseClutch_Releasing :tNoNeu_CloseClutch_Releasing ≔ time
END

    Error_NoNeu_CloseClutch_Releasing ≜
        STATUS
        ordinary
REFINES
        Error_NoNeu_CloseClutch_Releasing
WHEN
        grd1 :NoNeu_SetGear_ReleasingClutch = TRUE
        grd2 :Error_NoNeu_CloseClutch_Releasing = FALSE
        grd3 :NoNeu_CloseClutch_Releasing = FALSE
THEN
        act1 :Error_NoNeu_CloseClutch_Releasing ≔ TRUE
        tError_NoNeu_CloseClutch_Releasing :tError_NoNeu_CloseClutch_Releasing ≔ time
END

    Engine_SyncSpeed ≜
        STATUS
        ordinary
WHEN
        grd1 :RequestFromNeu = TRUE ∨ NoNeu_Release_NoClutch = TRUE
        grd2 :Engine_SyncSpeed = FALSE
        grd3 :Engine_WaitForSyncClutch = FALSE
THEN
        act1 :Engine_SyncSpeed ≔ TRUE
END

    Engine_WaitForSyncClutch ≜
        STATUS
        ordinary
WHEN
        grd1 :RequestFromNeu = TRUE ∨ NoNeu_Release_NoClutch = TRUE
        grd2 :Engine_SyncSpeed = FALSE
        grd3 :Engine_WaitForSyncClutch = FALSE
THEN
        act1 :Engine_WaitForSyncClutch ≔ TRUE
END
```

```
    Engine_ZeroTorque ≜
        STATUS
      ordinary
WHEN
      grd1 :RequestToNeu = TRUE ∨ RequestNoNeu = TRUE
      grd2 :Engine_ZeroTorque = FALSE
      grd3 :Engine_WaitForZeroClutch = FALSE
THEN
      act1 :Engine_ZeroTorque ≔ TRUE
END

    Engine_WaitForZeroClutch ≜
        STATUS
      ordinary
WHEN
      grd1 :RequestToNeu = TRUE ∨ RequestNoNeu = TRUE
      grd2 :Engine_ZeroTorque = FALSE
      grd3 :Engine_WaitForZeroClutch = FALSE
THEN
      act1 :Engine_WaitForZeroClutch ≔ TRUE
END

    Clutch_Open ≜
        STATUS
      ordinary
WHEN
      grd1 :FromNeu_RequestOpenClutch = TRUE ∨ ToNeu_RequestOpenClutch = TRUE ∨
            NoNeu_RequestOpenClutch_Releasing = TRUE ∨ NoNeu_RequestOpenClutch_Setting = TRUE
      grd2 :Clutch_Open = FALSE
      grd3 :Error_Clutch_Open = FALSE
THEN
      act1 :Clutch_Open ≔ TRUE
END

    Error_Clutch_Open ≜
        STATUS
      ordinary
WHEN
      grd1 :FromNeu_RequestOpenClutch = TRUE ∨ ToNeu_RequestOpenClutch = TRUE ∨
            NoNeu_RequestOpenClutch_Releasing = TRUE ∨ NoNeu_RequestOpenClutch_Setting = TRUE
      grd2 :Clutch_Open = FALSE
      grd3 :Error_Clutch_Open = FALSE
THEN
      act1 :Error_Clutch_Open ≔ TRUE
END

    Clutch_Close ≜
        STATUS
      ordinary
WHEN
      grd1 :FromNeu_SetGear_Clutch = TRUE ∨ ToNeu_Release_Clutch = TRUE ∨
            NoNeu_SetGear_ReleasingClutch = TRUE ∨ NoNeu_SetGear_SettingClutch= TRUE
      grd2 :Clutch_Close = FALSE
      grd3 :Error_Clutch_Close = FALSE
THEN
      act1 :Clutch_Close ≔ TRUE
END

    Error_Clutch_Close ≜
        STATUS
      ordinary
WHEN
      grd1 :FromNeu_SetGear_Clutch = TRUE ∨ ToNeu_Release_Clutch = TRUE ∨
            NoNeu_SetGear_ReleasingClutch = TRUE ∨ NoNeu_SetGear_SettingClutch= TRUE
      grd2 :Clutch_Close = FALSE
      grd3 :Error_Clutch_Close = FALSE
THEN
      act1 :Error_Clutch_Close ≔ TRUE
END

    Gear_Release ≜
        STATUS
      ordinary
WHEN
      grd1 :ToNeu_ZeroTorque = TRUE ∨ ToNeu_OpenClutch = TRUE ∨
            NoNeu_ZeroTorque = TRUE ∨ NoNeu_OpenClutch_Releasing= TRUE
      grd2 :Gear_Release = FALSE
```

```
        grd3 :Error_Gear_Release = FALSE
THEN
        act1 :Gear_Release ≔ TRUE
END

    Error_Gear_Release ≙
        STATUS
        ordinary
WHEN
        grd1 :ToNeu_ZeroTorque = TRUE ∨ ToNeu_OpenClutch = TRUE ∨
              NoNeu_ZeroTorque = TRUE ∨ NoNeu_OpenClutch_Releasing= TRUE
        grd2 :Gear_Release = FALSE
        grd3 :Error_Gear_Release = FALSE
THEN
        act1 :Error_Gear_Release ≔ TRUE
END

    Gear_Set ≙
        STATUS
        ordinary
WHEN
              FromNeu_SyncSpeed = TRUE ∨ FromNeu_OpenClutch = TRUE ∨
        grd1 :NoNeu_Release_Clutch = TRUE ∨ NoNeu_SyncSpeed = TRUE ∨
              NoNeu_OpenClutch_Setting = TRUE
        grd2 :Gear_Set = FALSE
        grd3 :Error_Gear_Set = FALSE
THEN
        act1 :Gear_Set ≔ TRUE
END

    Error_Gear_Set ≙
        STATUS
        ordinary
WHEN
              FromNeu_SyncSpeed = TRUE ∨ FromNeu_OpenClutch = TRUE ∨
        grd1 :NoNeu_Release_Clutch = TRUE ∨ NoNeu_SyncSpeed = TRUE ∨
              NoNeu_OpenClutch_Setting = TRUE
        grd2 :Gear_Set = FALSE
        grd3 :Error_Gear_Set = FALSE
THEN
        act1 :Error_Gear_Set ≔ TRUE
END

    FINAL ≙
        extended
        STATUS
        ordinary
REFINES
        FINAL
WHEN
              FromNeu_SetGear_NoClutch = TRUE ∨ NoNeu_SetGear_NoClutch = TRUE ∨
        grd1 :ToNeu_Release_NoClutch = TRUE ∨ FromNeu_CloseClutch = TRUE ∨
              NoNeu_CloseClutch_Setting = TRUE ∨ NoNeu_CloseClutch_Releasing = TRUE ∨
              ToNeu_CloseClutch = TRUE
THEN
        act1 :RequestFromNeu ≔ FALSE
        act2 :RequestNoNeu ≔ FALSE
        act3 :RequestToNeu ≔ FALSE
        act4 :FromNeu_SyncSpeed ≔ FALSE
        act5 :FromNeu_OpenClutch ≔ FALSE
        act6 :FromNeu_SetGear_NoClutch ≔ FALSE
        act7 :FromNeu_SetGear_Clutch ≔ FALSE
        act8 :FromNeu_CloseClutch ≔ FALSE
        act9 :ToNeu_Release_NoClutch ≔ FALSE
        act10 :ToNeu_CloseClutch ≔ FALSE
        act11 :ToNeu_ZeroTorque≔ FALSE      // Senario3 Flage
        act12 :ToNeu_OpenClutch ≔ FALSE      // Senario3 Flage
        act13 :ToNeu_Release_Clutch≔ FALSE      // Senario3 Flage
        act14 :NoNeu_ZeroTorque≔ FALSE      // Senario2 Flage
        act15 :NoNeu_OpenClutch_Releasing ≔ FALSE
        act16 :NoNeu_Release_NoClutch≔ FALSE      // Senario2 Flage
        act17 :NoNeu_Release_Clutch≔ FALSE      // Senario2 Flage
        act18 :NoNeu_SyncSpeed ≔ FALSE      // Senario2 Flage
        act19 :NoNeu_OpenClutch_Setting ≔ FALSE      // Senario2 Flage
        act20 :NoNeu_SetGear_NoClutch≔ FALSE      // Senario2 Flage
        act21 :NoNeu_SetGear_ReleasingClutch≔ FALSE      // Senario2 Flage
        act22 :NoNeu_SetGear_SettingClutch≔ FALSE      // Senario2 Flage
        act23 :NoNeu_CloseClutch_Setting≔ FALSE      // Senario2 Flage
```

```
        act24 :NoNeu_CloseClutch_Releasing:= FALSE      // Senario2 Flage
        act25 :Engine_SyncSpeed ≔ FALSE
        act26 :Engine_WaitForSyncClutch ≔ FALSE
        act27 :Engine_ZeroTorque ≔ FALSE
        act28 :Engine_WaitForZeroClutch ≔ FALSE
        act29 :Clutch_Open ≔ FALSE      // Clutch Flags
        act30 :Clutch_Close ≔ FALSE      // Clutch Flags
        act31 :Gear_Release ≔ FALSE      // Gear Flags
        act32 :Gear_Set ≔ FALSE      // Gear Flags
        act33 :FromNeu_RequestOpenClutch ≔ FALSE      // Senario1 Flag
        act34 :ToNeu_RequestOpenClutch ≔ FALSE      // Senario3 Flag
        act35 :NoNeu_RequestOpenClutch_Releasing ≔ FALSE      // Senario2 Flag
        act36 :NoNeu_RequestOpenClutch_Setting ≔ FALSE      // Senario2 Flag
END

    Tick_Tock ≙
        STATUS
        ordinary
REFINES
        Tick_Tock
ANY
        tick
WHERE
        tick :tick > 0
        Deadline10 FromNeu_SyncSpeed = TRUE ∧ FromNeu_SetGear_NoClutch = FALSE ∧ Error_FromNeu_SetGear_NoClutch = FALSE ⇒
        :          time + tick ≤ tFromNeu_SyncSpeed + SetGear_DL
        Deadline11 FromNeu_OpenClutch = TRUE ∧ Error_FromNeu_SetGear_Clutch = FALSE ∧ FromNeu_SetGear_Clutch = FALSE ⇒ time +
        :          tick ≤ tFromNeu_OpenClutch + SetGear_DL
        Deadline12 FromNeu_SetGear_Clutch = TRUE ∧ Error_FromNeu_CloseClutch = FALSE ∧ FromNeu_CloseClutch = FALSE ⇒ time + tick
        :          ≤ tFromNeu_SetGear_Clutch + CloseClutch_DL
        Deadline14 ToNeu_ZeroTorque = TRUE ∧ ToNeu_Release_NoClutch = FALSE ∧ Error_ToNeu_Release_NoClutch = FALSE ⇒ time + tick
        :          ≤ tToNeu_ZeroTorque + Release_DL
        Deadline15 ToNeu_OpenClutch = TRUE ∧ ToNeu_Release_Clutch = FALSE ∧ Error_ToNeu_Release_Clutch = FALSE ⇒ time + tick ≤
        :          tToNeu_OpenClutch + Release_DL
        Deadline16 ToNeu_Release_Clutch = TRUE ∧ Error_ToNeu_CloseClutch = FALSE ∧ ToNeu_CloseClutch = FALSE ⇒ time + tick ≤
        :          tToNeu_Release_Clutch + CloseClutch_DL
        Deadline18 NoNeu_OpenClutch_Releasing = TRUE ∧ NoNeu_Release_Clutch = FALSE ∧ Error_NoNeu_Release_Clutch = FALSE ⇒ time
        :          + tick ≤ tNoNeu_OpenClutch_Releasing + Release_DL
        Deadline19 NoNeu_ZeroTorque = TRUE ∧ NoNeu_Release_NoClutch = FALSE ∧ Error_NoNeu_Release_NoClutch = FALSE ⇒ time +
        :          tick ≤ tNoNeu_ZeroTorque + Release_DL
        Deadline21 NoNeu_SyncSpeed = TRUE ∧ NoNeu_SetGear_NoClutch = FALSE ∧ Error_NoNeu_SetGear_NoClutch = FALSE ⇒ time + tick
        :          ≤ tNoNeu_SyncSpeed + SetGear_DL
        Deadline22 NoNeu_OpenClutch_Setting = TRUE ∧ NoNeu_SetGear_SettingClutch = FALSE ∧ Error_NoNeu_SetGear_SettingClutch =
        :          FALSE ⇒ time + tick ≤ tNoNeu_OpenClutch_Setting + SetGear_DL
        Deadline23 NoNeu_SetGear_SettingClutch = TRUE ∧ NoNeu_CloseClutch_Setting = FALSE ∧ Error_NoNeu_CloseClutch_Setting =
        :          FALSE ⇒ time + tick ≤ tNoNeu_SetGear_SettingClutch + CloseClutch_DL
        Deadline24 NoNeu_Release_Clutch = TRUE ∧ Error_NoNeu_SetGear_ReleasingClutch = FALSE ∧ NoNeu_SetGear_ReleasingClutch =
        :          FALSE ⇒ time + tick ≤ tNoNeu_Release_Clutch + SetGear_DL
        Deadline25 NoNeu_SetGear_ReleasingClutch = TRUE ∧ NoNeu_CloseClutch_Releasing = FALSE ∧ Error_NoNeu_CloseClutch_Releasing
        :          = FALSE ⇒ time + tick ≤ tNoNeu_SetGear_ReleasingClutch + CloseClutch_DL
        Deadline27 FromNeu_RequestOpenClutch = TRUE ∧ FromNeu_OpenClutch = FALSE ∧ Error_FromNeu_OpenClutch = FALSE ⇒ time +
        :          tick ≤ tFromNeu_RequestOpenClutch + OpenClutch_DL
        Deadline28 RequestToNeu = TRUE ∧ ToNeu_ZeroTorque = FALSE ∧ ToNeu_RequestOpenClutch = FALSE ⇒ time + tick ≤
        :          tRequestToNeu + Zero_DL
        Deadline29 ToNeu_RequestOpenClutch = TRUE ∧ ToNeu_OpenClutch = FALSE ∧ Error_ToNeu_OpenClutch = FALSE ⇒ time + tick ≤
        :          tToNeu_RequestOpenClutch + OpenClutch_DL
        Deadline30 RequestNoNeu = TRUE ∧ NoNeu_RequestOpenClutch_Releasing = FALSE ∧ NoNeu_ZeroTorque = FALSE ⇒ time + tick ≤
        :          tRequestNoNeu + Zero_DL
        Deadline31 NoNeu_RequestOpenClutch_Releasing = TRUE ∧ NoNeu_OpenClutch_Releasing = FALSE ∧
        :          Error_NoNeu_OpenClutch_Releasing = FALSE ⇒ time + tick ≤ tNoNeu_RequestOpenClutch_Releasing + OpenClutch_DL
        Deadline32 NoNeu_Release_NoClutch = TRUE ∧ NoNeu_RequestOpenClutch_Setting = FALSE ∧ NoNeu_SyncSpeed = FALSE ⇒ time +
        :          tick ≤ tNoNeu_Release_NoClutch + Sync_DL
        Deadline33 NoNeu_RequestOpenClutch_Setting = TRUE ∧ NoNeu_OpenClutch_Setting = FALSE ∧ Error_NoNeu_OpenClutch_Setting =
        :          FALSE ⇒ time + tick ≤ tNoNeu_RequestOpenClutch_Setting + OpenClutch_DL
        Deadline34 RequestFromNeu = TRUE ∧ FromNeu_RequestOpenClutch = FALSE ∧ FromNeu_SyncSpeed = FALSE ⇒ time + tick ≤
        :          tRequestFromNeu + Sync_DL
THEN
        act1 :time ≔ time+tick
END

END
```

Machine m9

MACHINE
m9
REFINES
m8
SEES
c6
VARIABLES
isNeu *// Gear Status*
RequestFromNeu *// Flags*
RequestNoNeu *// Flags*
RequestToNeu *// Flags*
FromNeu_SyncSpeed *// Senario1*
FromNeu_OpenClutch *// Flage*
FromNeu_SetGear_NoClutch *// Flage*
FromNeu_SetGear_Clutch *// Flage*
FromNeu_CloseClutch *// Flage*
Error_FromNeu_OpenClutch *// Flage*
Error_FromNeu_SetGear_NoClutch *// Flage*
Error_FromNeu_SetGear_Clutch *// Flage*
Error_FromNeu_CloseClutch *// Senario1*
ToNeu_ZeroTorque *// Senario3 Flage*
ToNeu_OpenClutch *// Senario3 Flage*
Error_ToNeu_OpenClutch *// Senario3 Flage*
ToNeu_Release_NoClutch *// Senario3 Flage*
Error_ToNeu_Release_NoClutch *// Senario3 Flage*
ToNeu_Release_Clutch *// Senario3 Flage*
Error_ToNeu_Release_Clutch *// Senario3 Flage*
ToNeu_CloseClutch *// Senario3 Flage*
Error_ToNeu_CloseClutch *// Senario3 Flage*
NoNeu_ZeroTorque *// Senario2 Flage*
NoNeu_Release_NoClutch *// Senario2 Flage*
NoNeu_OpenClutch_Releasing *// Senario2 Flage*
NoNeu_Release_Clutch *// Senario2 Flage*
NoNeu_SyncSpeed *// Senario2 Flage*
NoNeu_OpenClutch_Setting *// Senario2 Flage*
NoNeu_SetGear_NoClutch *// Senario2 Flage*
NoNeu_SetGear_ReleasingClutch *// Senario2 Flage*
NoNeu_SetGear_SettingClutch *// Senario2 Flage*
NoNeu_CloseClutch_Releasing *// Senario2 Flage*
NoNeu_CloseClutch_Setting *// Senario2 Flage*
Error_NoNeu_OpenClutch_Releasing *// Senario2 Flage*
Error_NoNeu_Release_Clutch *// Senario2 Flage*
Error_NoNeu_Release_NoClutch *// Senario2 Flage*
Error_NoNeu_OpenClutch_Setting *// Senario2 Flage*
Error_NoNeu_SetGear_NoClutch *// Senario2 Flage*
Error_NoNeu_SetGear_ReleasingClutch *// Senario2 Flage*
Error_NoNeu_SetGear_SettingClutch *// Senario2 Flage*
Error_NoNeu_CloseClutch_Releasing *// Senario2 Flage*
Error_NoNeu_CloseClutch_Setting *// Senario2 Flage*
Engine_SyncSpeed *// Engine Flags*
Engine_WaitForSyncClutch *// Engine Flgas*
Engine_ZeroTorque *// Engine Flgas*
Engine_WaitForZeroClutch *// Engine Flgas*
Clutch_Open *// Clutch Flags*
Error_Clutch_Open *// Clutch Flags*
Clutch_Close *// Clutch Flags*
Error_Clutch_Close *// Clutch Flags*
Gear_Release *// Gear Flags*
Error_Gear_Release *// Gear Flags*
Gear_Set *// Gear Flags*
Error_Gear_Set *// Gear Flags*
FromNeu_RequestOpenClutch *// Senario1 Flag*
ToNeu_RequestOpenClutch *// Senario3 Flag*
NoNeu_RequestOpenClutch_Releasing *// Senario2 Flag*
NoNeu_RequestOpenClutch_Setting *// Senario2 Flag*
Engine_Request_SyncSpeed *// Engine Flgas*
Engine_Request_ZeroTorque *// Engine Flgas*
Clutch_Request_Open *// Clutch Flags*
Clutch_Request_Close *// Clutch Flags*
Gear_Request_Release *// Gear Flags*
Gear_Request_Set *// Gear Flags*
time
tRequestFromNeu
tFromNeu_SyncSpeed
tFromNeu_SetGear_NoClutch

tError_FromNeu_SetGear_NoClutch
tFromNeu_OpenClutch
tError_FromNeu_SetGear_Clutch
tFromNeu_SetGear_Clutch
tError_FromNeu_CloseClutch
tFromNeu_CloseClutch
tRequestToNeu
tToNeu_ZeroTorque
tToNeu_Release_NoClutch
tError_ToNeu_Release_NoClutch
tToNeu_OpenClutch
tToNeu_Release_Clutch
tError_ToNeu_Release_Clutch
tError_ToNeu_CloseClutch
tToNeu_CloseClutch
tRequestNoNeu
tNoNeu_ZeroTorque
tNoNeu_OpenClutch_Releasing
tNoNeu_Release_Clutch
tError_NoNeu_Release_Clutch
tNoNeu_Release_NoClutch
tError_NoNeu_Release_NoClutch
tNoNeu_SyncSpeed
tNoNeu_SetGear_NoClutch
tError_NoNeu_SetGear_NoClutch
tNoNeu_OpenClutch_Setting
tNoNeu_SetGear_SettingClutch
tError_NoNeu_SetGear_SettingClutch
tNoNeu_CloseClutch_Setting
tError_NoNeu_CloseClutch_Setting
tError_NoNeu_SetGear_ReleasingClutch
tNoNeu_SetGear_ReleasingClutch
tNoNeu_CloseClutch_Releasing
tError_NoNeu_CloseClutch_Releasing
tFromNeu_RequestOpenClutch
tError_FromNeu_OpenClutch
tToNeu_RequestOpenClutch
tError_ToNeu_OpenClutch
tNoNeu_RequestOpenClutch_Releasing
tError_NoNeu_OpenClutch_Releasing
tNoNeu_RequestOpenClutch_Setting
tError_NoNeu_OpenClutch_Setting
tEngine_Request_SyncSpeed
tEngine_Request_ZeroTorque
tEngine_ZeroTorque
tEngine_SyncSpeed
tEngine_WaitForSyncClutch
tEngine_WaitForZeroClutch

INVARIANTS

{Engine_Request_SyncSpeed,Engine_Request_ZeroTorque,
inv1 :Clutch_Request_Open,Clutch_Request_Close,
Gear_Request_Release,Gear_Request_Set} ∈ ℙ(BOOL)

inv3 :Engine_Request_SyncSpeed = TRUE ⇒ RequestFromNeu = TRUE ∨ NoNeu_Release_NoClutch = TRUE

inv4 :Engine_Request_ZeroTorque = TRUE ⇒ RequestToNeu = TRUE ∨ RequestNoNeu = TRUE

inv5 :Clutch_Request_Open= TRUE ⇒ FromNeu_RequestOpenClutch = TRUE ∨ ToNeu_RequestOpenClutch = TRUE ∨
NoNeu_RequestOpenClutch_Releasing = TRUE ∨ NoNeu_RequestOpenClutch_Setting = TRUE

inv6 :Clutch_Request_Close = TRUE ⇒ FromNeu_SetGear_Clutch = TRUE ∨ ToNeu_Release_Clutch = TRUE ∨
NoNeu_SetGear_ReleasingClutch = TRUE ∨ NoNeu_SetGear_SettingClutch= TRUE

inv7 :Gear_Request_Release= TRUE ⇒ ToNeu_ZeroTorque = TRUE ∨ ToNeu_OpenClutch = TRUE ∨
NoNeu_ZeroTorque = TRUE ∨ NoNeu_OpenClutch_Releasing= TRUE

Gear_Request_Set = TRUE ⇒ FromNeu_SyncSpeed = TRUE ∨ FromNeu_OpenClutch = TRUE ∨
inv8 :NoNeu_Release_Clutch = TRUE ∨ NoNeu_SyncSpeed = TRUE ∨
NoNeu_OpenClutch_Setting = TRUE

inv9 Gear_Set = FALSE ⇒ NoNeu_SetGear_NoClutch = FALSE ∧ NoNeu_SetGear_ReleasingClutch = FALSE ∧
: NoNeu_SetGear_SettingClutch = FALSE ∧ FromNeu_SetGear_Clutch = FALSE ∧ FromNeu_SetGear_NoClutch = FALSE

inv10 Gear_Release = FALSE ⇒ NoNeu_Release_Clutch = FALSE ∧ NoNeu_Release_NoClutch = FALSE ∧ ToNeu_Release_Clutch =
: FALSE ∧ ToNeu_Release_NoClutch = FALSE

inv11 Clutch_Close = FALSE ⇒ NoNeu_CloseClutch_Releasing = FALSE ∧ NoNeu_CloseClutch_Setting = FALSE ∧ ToNeu_CloseClutch =
: FALSE ∧ FromNeu_CloseClutch = FALSE

inv12 Clutch_Open = FALSE ⇒ NoNeu_OpenClutch_Releasing = FALSE ∧ NoNeu_OpenClutch_Setting = FALSE ∧ ToNeu_OpenClutch =
: FALSE ∧ FromNeu_OpenClutch = FALSE

inv13 :Engine_SyncSpeed = FALSE ⇒ NoNeu_SyncSpeed = FALSE ∧ FromNeu_SyncSpeed = FALSE

inv14 :Engine_ZeroTorque = FALSE ⇒ NoNeu_ZeroTorque = FALSE ∧ ToNeu_ZeroTorque = FALSE

inv15 :Gear_Request_Release = FALSE ⇒ Gear_Release= FALSE ∧ Error_Gear_Release = FALSE

inv16 :Gear_Request_Set = FALSE ⇒ Gear_Set= FALSE ∧ Error_Gear_Set = FALSE

inv17 :Clutch_Request_Close = FALSE ⇒ Clutch_Close= FALSE ∧ Error_Clutch_Close = FALSE

inv18 :Clutch_Request_Open = FALSE ⇒ Clutch_Open = FALSE ∧ Error_Clutch_Open = FALSE

inv19 :Engine_Request_SyncSpeed = FALSE ⇒ Engine_SyncSpeed = FALSE ∧ Engine_WaitForSyncClutch = FALSE

inv20 :Engine_Request_ZeroTorque = FALSE ⇒ Engine_ZeroTorque= FALSE ∧ Engine_WaitForZeroClutch = FALSE
inv21 :Gear_Release= TRUE ⇒ Error_Gear_Release = FALSE
inv22 :Clutch_Close= TRUE ⇒ Error_Clutch_Close = FALSE
inv23 :Clutch_Open = TRUE ⇒ Error_Clutch_Open = FALSE
inv24 :Gear_Set= TRUE ⇒ Error_Gear_Set = FALSE
tEngine_Request_SyncSpeed :tEngine_Request_SyncSpeed ∈ ℕ
Deadline35 :RequestFromNeu = TRUE ∧ Engine_Request_SyncSpeed = FALSE ⇒ time ≤ tRequestFromNeu + Channel_DL
Engine_Request_SyncSpeedDurationDeadline35 : RequestFromNeu = TRUE ∧ Engine_Request_SyncSpeed = TRUE ⇒ tEngine_Request_SyncSpeed ≤ tRequestFromNeu + Channel_DL
Deadline36 :NoNeu_Release_NoClutch = TRUE ∧ Engine_Request_SyncSpeed = FALSE ⇒ time ≤ tNoNeu_Release_NoClutch + Channel_DL
Engine_Request_SyncSpeedDurationDeadline36 : NoNeu_Release_NoClutch = TRUE ∧ Engine_Request_SyncSpeed = TRUE ⇒ tEngine_Request_SyncSpeed ≤ tNoNeu_Release_NoClutch + Channel_DL
tEngine_Request_ZeroTorque :tEngine_Request_ZeroTorque ∈ ℕ
Deadline37 :RequestToNeu = TRUE ∧ Engine_Request_ZeroTorque = FALSE ⇒ time ≤ tRequestToNeu + Channel_DL
Engine_Request_ZeroTorqueDurationDeadline37 : RequestToNeu = TRUE ∧ Engine_Request_ZeroTorque = TRUE ⇒ tEngine_Request_ZeroTorque ≤ tRequestToNeu + Channel_DL
Deadline38 :RequestNoNeu = TRUE ∧ Engine_Request_ZeroTorque = FALSE ⇒ time ≤ tRequestNoNeu + Channel_DL
Engine_Request_ZeroTorqueDurationDeadline38 : RequestNoNeu = TRUE ∧ Engine_Request_ZeroTorque = TRUE ⇒ tEngine_Request_ZeroTorque ≤ tRequestNoNeu + Channel_DL
tEngine_ZeroTorque :tEngine_ZeroTorque ∈ ℕ
Deadline39 : Engine_ZeroTorque = TRUE ∧ NoNeu_ZeroTorque = FALSE ∧ ToNeu_ZeroTorque = FALSE ⇒ time ≤ tEngine_ZeroTorque + Channel_DL
NoNeu_ZeroTorqueDurationDeadline39 : Engine_ZeroTorque = TRUE ∧ NoNeu_ZeroTorque = TRUE ⇒ tNoNeu_ZeroTorque ≤ tEngine_ZeroTorque + Channel_DL
ToNeu_ZeroTorqueDurationDeadline39 : Engine_ZeroTorque = TRUE ∧ ToNeu_ZeroTorque = TRUE ⇒ tToNeu_ZeroTorque ≤ tEngine_ZeroTorque + Channel_DL
tEngine_SyncSpeed :tEngine_SyncSpeed ∈ ℕ
Deadline40 : Engine_SyncSpeed = TRUE ∧ FromNeu_SyncSpeed = FALSE ∧ NoNeu_SyncSpeed = FALSE ⇒ time ≤ tEngine_SyncSpeed + Channel_DL
FromNeu_SyncSpeedDurationDeadline40 : Engine_SyncSpeed = TRUE ∧ FromNeu_SyncSpeed = TRUE ⇒ tFromNeu_SyncSpeed ≤ tEngine_SyncSpeed + Channel_DL
NoNeu_SyncSpeedDurationDeadline40 : Engine_SyncSpeed = TRUE ∧ NoNeu_SyncSpeed = TRUE ⇒ tNoNeu_SyncSpeed ≤ tEngine_SyncSpeed + Channel_DL
tEngine_WaitForSyncClutch :tEngine_WaitForSyncClutch ∈ ℕ
Deadline41 : Engine_Request_SyncSpeed = TRUE ∧ Engine_SyncSpeed = FALSE ∧ Engine_WaitForSyncClutch = FALSE ⇒ time ≤ tEngine_Request_SyncSpeed + Engine_Sync_DL
Engine_SyncSpeedDurationDeadline41 : Engine_Request_SyncSpeed = TRUE ∧ Engine_SyncSpeed = TRUE ⇒ tEngine_SyncSpeed ≤ tEngine_Request_SyncSpeed + Engine_Sync_DL
Engine_WaitForSyncClutchDurationDeadline41 : Engine_Request_SyncSpeed = TRUE ∧ Engine_WaitForSyncClutch = TRUE ⇒ tEngine_WaitForSyncClutch ≤ tEngine_Request_SyncSpeed + Engine_Sync_DL
tEngine_WaitForZeroClutch :tEngine_WaitForZeroClutch ∈ ℕ
Deadline42 : Engine_Request_ZeroTorque = TRUE ∧ Engine_WaitForZeroClutch = FALSE ∧ Engine_ZeroTorque = FALSE ⇒ time ≤ tEngine_Request_ZeroTorque + Engine_Zero_DL
Engine_WaitForZeroClutchDurationDeadline42 : Engine_Request_ZeroTorque = TRUE ∧ Engine_WaitForZeroClutch = TRUE ⇒ tEngine_WaitForZeroClutch ≤ tEngine_Request_ZeroTorque + Engine_Zero_DL
Engine_ZeroTorqueDurationDeadline42 : Engine_Request_ZeroTorque = TRUE ∧ Engine_ZeroTorque = TRUE ⇒ tEngine_ZeroTorque ≤ tEngine_Request_ZeroTorque + Engine_Zero_DL

TIMING

Expiry2 :Expiry (RequestFromNeu, FromNeu_SyncSpeed, Sync_EX)
Deadline10 :Deadline (FromNeu_SyncSpeed, FromNeu_SetGear_NoClutch ∨ Error_FromNeu_SetGear_NoClutch, SetGear_DL)
Deadline11 :Deadline (FromNeu_OpenClutch, Error_FromNeu_SetGear_Clutch ∨ FromNeu_SetGear_Clutch, SetGear_DL)
Deadline12 :Deadline (FromNeu_SetGear_Clutch, Error_FromNeu_CloseClutch ∨ FromNeu_CloseClutch, CloseClutch_DL)
Expiry3 :Expiry (RequestToNeu, ToNeu_ZeroTorque, Zero_EX)
Deadline14 :Deadline (ToNeu_ZeroTorque, ToNeu_Release_NoClutch ∨ Error_ToNeu_Release_NoClutch, Release_DL)
Deadline15 :Deadline (ToNeu_OpenClutch, ToNeu_Release_Clutch ∨ Error_ToNeu_Release_Clutch, Release_DL)
Deadline16 :Deadline (ToNeu_Release_Clutch, Error_ToNeu_CloseClutch ∨ ToNeu_CloseClutch, CloseClutch_DL)
Expiry4 :Expiry (RequestNoNeu, NoNeu_ZeroTorque, Zero_EX)
Deadline18 :Deadline (NoNeu_OpenClutch_Releasing, NoNeu_Release_Clutch ∨ Error_NoNeu_Release_Clutch, Release_DL)
Deadline19 :Deadline (NoNeu_ZeroTorque, NoNeu_Release_NoClutch ∨ Error_NoNeu_Release_NoClutch, Release_DL)
Expiry5 :Expiry (NoNeu_Release_NoClutch, NoNeu_SyncSpeed, Sync_EX)
Deadline21 :Deadline (NoNeu_SyncSpeed, NoNeu_SetGear_NoClutch ∨ Error_NoNeu_SetGear_NoClutch, SetGear_DL)
Deadline22 :Deadline (NoNeu_OpenClutch_Setting, NoNeu_SetGear_SettingClutch ∨ Error_NoNeu_SetGear_SettingClutch, SetGear_DL)
Deadline23 :Deadline (NoNeu_SetGear_SettingClutch, NoNeu_CloseClutch_Setting ∨ Error_NoNeu_CloseClutch_Setting, CloseClutch_DL)
Deadline24 :Deadline (NoNeu_Release_Clutch, Error_NoNeu_SetGear_ReleasingClutch ∨ NoNeu_SetGear_ReleasingClutch, SetGear_DL)
Deadline25 : Deadline (NoNeu_SetGear_ReleasingClutch, NoNeu_CloseClutch_Releasing ∨ Error_NoNeu_CloseClutch_Releasing, CloseClutch_DL)
Delay1 :Delay (RequestFromNeu, FromNeu_RequestOpenClutch, OpenClutch_Sync_DE)
Deadline27 :Deadline (FromNeu_RequestOpenClutch, FromNeu_OpenClutch ∨ Error_FromNeu_OpenClutch, OpenClutch_DL)
Deadline28 :Deadline (RequestToNeu, ToNeu_ZeroTorque ∨ ToNeu_RequestOpenClutch, Zero_DL)
Delay2 :Delay (RequestToNeu, ToNeu_RequestOpenClutch, OpenClutch_Zero_DE)
Deadline29 :Deadline (ToNeu_RequestOpenClutch, ToNeu_OpenClutch ∨ Error_ToNeu_OpenClutch, OpenClutch_DL)
Deadline30 :Deadline (RequestNoNeu, NoNeu_RequestOpenClutch_Releasing ∨ NoNeu_ZeroTorque, Zero_DL)
Delay3 :Delay (RequestNoNeu, NoNeu_RequestOpenClutch_Releasing, OpenClutch_Zero_DE)
Deadline31 : Deadline (NoNeu_RequestOpenClutch_Releasing, NoNeu_OpenClutch_Releasing ∨ Error_NoNeu_OpenClutch_Releasing, OpenClutch_DL)
Deadline32 :Deadline (NoNeu_Release_NoClutch, NoNeu_RequestOpenClutch_Setting ∨ NoNeu_SyncSpeed, Sync_DL)
Delay4 :Delay (NoNeu_Release_NoClutch, NoNeu_RequestOpenClutch_Setting, OpenClutch_Sync_DE)

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Deadline33 : Deadline (NoNeu_RequestOpenClutch_Setting, NoNeu_OpenClutch_Setting ∨ Error_NoNeu_OpenClutch_Setting, OpenClutch_DL)
Deadline34 :Deadline (RequestFromNeu, FromNeu_RequestOpenClutch ∨ FromNeu_SyncSpeed, Sync_DL)
Deadline35 :Deadline (RequestFromNeu, Engine_Request_SyncSpeed, Channel_DL)
Deadline36 :Deadline (NoNeu_Release_NoClutch, Engine_Request_SyncSpeed, Channel_DL)
Deadline37 :Deadline (RequestToNeu, Engine_Request_ZeroTorque, Channel_DL)
Deadline38 :Deadline (RequestNoNeu, Engine_Request_ZeroTorque, Channel_DL)
Deadline39 :Deadline (Engine_ZeroTorque, NoNeu_ZeroTorque ∨ ToNeu_ZeroTorque, Channel_DL)
Deadline40 :Deadline (Engine_SyncSpeed, FromNeu_SyncSpeed ∨ NoNeu_SyncSpeed, Channel_DL)
Deadline41 :Deadline (Engine_Request_SyncSpeed, Engine_SyncSpeed ∨ Engine_WaitForSyncClutch, Engine_Sync_DL)
Deadline42 :Deadline (Engine_Request_ZeroTorque, Engine_WaitForZeroClutch ∨ Engine_ZeroTorque, Engine_Zero_DL)
EVENTS
    INITIALISATION ≙
        STATUS
        ordinary
BEGIN
    act1 :isNeu ≔ TRUE
    act2 :RequestNoNeu ≔ FALSE
    act3 :RequestToNeu ≔ FALSE
    act4 :RequestFromNeu ≔ FALSE
    act5 :FromNeu_SyncSpeed ≔ FALSE
    act6 :FromNeu_OpenClutch ≔ FALSE
    act7 :FromNeu_SetGear_NoClutch ≔ FALSE
    act8 :FromNeu_SetGear_Clutch ≔ FALSE
    act9 :FromNeu_CloseClutch ≔ FALSE
    act10 :Error_FromNeu_OpenClutch ≔ FALSE
    act11 :Error_FromNeu_SetGear_NoClutch ≔ FALSE
    act12 :Error_FromNeu_SetGear_Clutch ≔ FALSE
    act13 :Error_FromNeu_CloseClutch ≔ FALSE
    act14 :ToNeu_ZeroTorque:≔ FALSE      // Senario3 Flage
    act15 :ToNeu_OpenClutch ≔ FALSE      // Senario3 Flage
    act16 :Error_ToNeu_OpenClutch ≔ FALSE      // Senario3 Flage
    act17 :ToNeu_Release_NoClutch:≔ FALSE      // Senario3 Flage
    act18 :Error_ToNeu_Release_NoClutch:≔ FALSE      // Senario3 Flage
    act19 :ToNeu_Release_Clutch:≔ FALSE      // Senario3 Flage
    act20 :Error_ToNeu_Release_Clutch ≔ FALSE      // Senario3 Flage
    act21 :ToNeu_CloseClutch:≔ FALSE      // Senario3 Flage
    act22 :Error_ToNeu_CloseClutch:≔ FALSE      // Senario3 Flage
    act23 :NoNeu_ZeroTorque:≔ FALSE      // Senario2 Flage
    act24 :NoNeu_OpenClutch_Releasing:≔ FALSE      // Senario2 Flage
    act25 :NoNeu_Release_NoClutch:≔ FALSE      // Senario2 Flage
    act26 :NoNeu_Release_Clutch:≔ FALSE      // Senario2 Flage
    act27 :NoNeu_SyncSpeed ≔ FALSE      // Senario2 Flage
    act28 :NoNeu_OpenClutch_Setting ≔ FALSE      // Senario2 Flage
    act29 :NoNeu_SetGear_NoClutch:≔ FALSE      // Senario2 Flage
    act30 :NoNeu_SetGear_ReleasingClutch:≔ FALSE      // Senario2 Flage
    act31 :NoNeu_SetGear_SettingClutch:≔ FALSE      // Senario2 Flage
    act32 :NoNeu_CloseClutch_Releasing:≔ FALSE      // Senario2 Flage
    act33 :NoNeu_CloseClutch_Setting:≔ FALSE      // Senario2 Flage
    act34 :Error_NoNeu_OpenClutch_Releasing:≔ FALSE      // Senario2 Flage
    act35 :Error_NoNeu_Release_NoClutch:≔ FALSE      // Senario2 Flage
    act36 :Error_NoNeu_Release_Clutch:≔ FALSE      // Senario2 Flage
    act37 :Error_NoNeu_OpenClutch_Setting ≔ FALSE      // Senario2 Flage
    act38 :Error_NoNeu_SetGear_NoClutch:≔ FALSE      // Senario2 Flage
    act39 :Error_NoNeu_SetGear_ReleasingClutch:≔ FALSE      // Senario2 Flage
    act40 :Error_NoNeu_SetGear_SettingClutch:≔ FALSE      // Senario2 Flage
    act41 :Error_NoNeu_CloseClutch_Releasing ≔ FALSE      // Senario2 Flage
    act42 :Error_NoNeu_CloseClutch_Setting ≔ FALSE      // Senario2 Flage
    act43 :Engine_SyncSpeed ≔ FALSE
    act44 :Engine_WaitForSyncClutch ≔ FALSE
    act45 :Engine_ZeroTorque ≔ FALSE
    act46 :Engine_WaitForZeroClutch ≔ FALSE
    act47 :Clutch_Open ≔ FALSE      // Clutch Flags
    act48 :Error_Clutch_Open ≔ FALSE      // Clutch Flags
    act49 :Clutch_Close ≔ FALSE      // Clutch Flags
    act50 :Error_Clutch_Close ≔ FALSE      // Clutch Flags
    act51 :Gear_Release ≔ FALSE      // Gear Flags
    act52 :Error_Gear_Release ≔ FALSE      // Gear Flags
    act53 :Gear_Set ≔ FALSE      // Gear Flags
    act54 :Error_Gear_Set ≔ FALSE      // Gear Flags
    act55 :FromNeu_RequestOpenClutch ≔ FALSE      // Senario1 Flag
    act56 :ToNeu_RequestOpenClutch ≔ FALSE      // Senario3 Flag
    act57 :NoNeu_RequestOpenClutch_Releasing ≔ FALSE      // Senario2 Flag
    act58 :NoNeu_RequestOpenClutch_Setting ≔ FALSE      // Senario2 Flag
    act81 :Engine_Request_SyncSpeed ≔ FALSE      // Engine Flgas
    act82 :Engine_Request_ZeroTorque ≔ FALSE      // Engine Flgas
    act83 :Clutch_Request_Open ≔ FALSE      // Clutch Flags
    act84 :Clutch_Request_Close ≔ FALSE      // Clutch Flags
    act85 :Gear_Request_Release ≔ FALSE      // Gear Flags
```

```
        act86 :Gear_Request_Set ≔ FALSE      // Gear Flags
        time :time ≔ 0
        tRequestFromNeu :tRequestFromNeu ≔ 0
        tFromNeu_SyncSpeed :tFromNeu_SyncSpeed ≔ 0
        tFromNeu_SetGear_NoClutch :tFromNeu_SetGear_NoClutch ≔ 0
        tError_FromNeu_SetGear_NoClutch :tError_FromNeu_SetGear_NoClutch ≔ 0
        tFromNeu_OpenClutch :tFromNeu_OpenClutch ≔ 0
        tError_FromNeu_SetGear_Clutch :tError_FromNeu_SetGear_Clutch ≔ 0
        tFromNeu_SetGear_Clutch :tFromNeu_SetGear_Clutch ≔ 0
        tError_FromNeu_CloseClutch :tError_FromNeu_CloseClutch ≔ 0
        tFromNeu_CloseClutch :tFromNeu_CloseClutch ≔ 0
        tRequestToNeu :tRequestToNeu ≔ 0
        tToNeu_ZeroTorque :tToNeu_ZeroTorque ≔ 0
        tToNeu_Release_NoClutch :tToNeu_Release_NoClutch ≔ 0
        tError_ToNeu_Release_NoClutch :tError_ToNeu_Release_NoClutch ≔ 0
        tToNeu_OpenClutch :tToNeu_OpenClutch ≔ 0
        tToNeu_Release_Clutch :tToNeu_Release_Clutch ≔ 0
        tError_ToNeu_Release_Clutch :tError_ToNeu_Release_Clutch ≔ 0
        tError_ToNeu_CloseClutch :tError_ToNeu_CloseClutch ≔ 0
        tToNeu_CloseClutch :tToNeu_CloseClutch ≔ 0
        tRequestNoNeu :tRequestNoNeu ≔ 0
        tNoNeu_ZeroTorque :tNoNeu_ZeroTorque ≔ 0
        tNoNeu_OpenClutch_Releasing :tNoNeu_OpenClutch_Releasing ≔ 0
        tNoNeu_Release_Clutch :tNoNeu_Release_Clutch ≔ 0
        tError_NoNeu_Release_Clutch :tError_NoNeu_Release_Clutch ≔ 0
        tNoNeu_Release_NoClutch :tNoNeu_Release_NoClutch ≔ 0
        tError_NoNeu_Release_NoClutch :tError_NoNeu_Release_NoClutch ≔ 0
        tNoNeu_SyncSpeed :tNoNeu_SyncSpeed ≔ 0
        tNoNeu_SetGear_NoClutch :tNoNeu_SetGear_NoClutch ≔ 0
        tError_NoNeu_SetGear_NoClutch :tError_NoNeu_SetGear_NoClutch ≔ 0
        tNoNeu_OpenClutch_Setting :tNoNeu_OpenClutch_Setting ≔ 0
        tNoNeu_SetGear_SettingClutch :tNoNeu_SetGear_SettingClutch ≔ 0
        tError_NoNeu_SetGear_SettingClutch :tError_NoNeu_SetGear_SettingClutch ≔ 0
        tNoNeu_CloseClutch_Setting :tNoNeu_CloseClutch_Setting ≔ 0
        tError_NoNeu_CloseClutch_Setting :tError_NoNeu_CloseClutch_Setting ≔ 0
        tError_NoNeu_SetGear_ReleasingClutch :tError_NoNeu_SetGear_ReleasingClutch ≔ 0
        tNoNeu_SetGear_ReleasingClutch :tNoNeu_SetGear_ReleasingClutch ≔ 0
        tNoNeu_CloseClutch_Releasing :tNoNeu_CloseClutch_Releasing ≔ 0
        tError_NoNeu_CloseClutch_Releasing :tError_NoNeu_CloseClutch_Releasing ≔ 0
        tFromNeu_RequestOpenClutch :tFromNeu_RequestOpenClutch ≔ 0
        tError_FromNeu_OpenClutch :tError_FromNeu_OpenClutch ≔ 0
        tToNeu_RequestOpenClutch :tToNeu_RequestOpenClutch ≔ 0
        tError_ToNeu_OpenClutch :tError_ToNeu_OpenClutch ≔ 0
        tNoNeu_RequestOpenClutch_Releasing :tNoNeu_RequestOpenClutch_Releasing ≔ 0
        tError_NoNeu_OpenClutch_Releasing :tError_NoNeu_OpenClutch_Releasing ≔ 0
        tNoNeu_RequestOpenClutch_Setting :tNoNeu_RequestOpenClutch_Setting ≔ 0
        tError_NoNeu_OpenClutch_Setting :tError_NoNeu_OpenClutch_Setting ≔ 0
        tEngine_Request_SyncSpeed :tEngine_Request_SyncSpeed ≔ 0
        tEngine_Request_ZeroTorque :tEngine_Request_ZeroTorque ≔ 0
        tEngine_ZeroTorque :tEngine_ZeroTorque ≔ 0
        tEngine_SyncSpeed :tEngine_SyncSpeed ≔ 0
        tEngine_WaitForSyncClutch :tEngine_WaitForSyncClutch ≔ 0
        tEngine_WaitForZeroClutch :tEngine_WaitForZeroClutch ≔ 0
END

    RequestFromNeu ≙
        STATUS
        ordinary
REFINES
        RequestFromNeu
WHEN
        grd1 :RequestFromNeu = FALSE
        grd2 :RequestNoNeu = FALSE
        grd3 :RequestToNeu = FALSE
        grd4 :isNeu = TRUE
THEN
        act1 :RequestFromNeu ≔ TRUE
        tRequestFromNeu :tRequestFromNeu ≔ time
END

    RequestNoNeu ≙
        STATUS
        ordinary
REFINES
        RequestNoNeu
WHEN
        grd1 :RequestFromNeu = FALSE
        grd2 :RequestNoNeu = FALSE
        grd3 :RequestToNeu = FALSE
```

```
        grd4 :isNeu = FALSE
THEN
        act1 :RequestNoNeu ≔ TRUE
        tRequestNoNeu :tRequestNoNeu ≔ time
END

    RequestToNeu ≜
        STATUS
        ordinary
REFINES
        RequestToNeu
WHEN
        grd1 :RequestFromNeu = FALSE
        grd2 :RequestNoNeu = FALSE
        grd3 :RequestToNeu = FALSE
        grd4 :isNeu = FALSE
THEN
        act1 :RequestToNeu ≔ TRUE
        tRequestToNeu :tRequestToNeu ≔ time
END

    FromNeu_SyncSpeed ≜
        STATUS
        ordinary
REFINES
        FromNeu_SyncSpeed
WHEN
        grd1 :RequestFromNeu = TRUE
        grd2 :FromNeu_SyncSpeed = FALSE
        grd3 :FromNeu_RequestOpenClutch = FALSE
        grd4 :Engine_SyncSpeed = TRUE
        Expiry2 :time ≤ tRequestFromNeu + Sync_EX
THEN
        act1 :FromNeu_SyncSpeed ≔ TRUE
        tFromNeu_SyncSpeed :tFromNeu_SyncSpeed ≔ time
END

    FromNeu_RequestOpenClutch ≜
        STATUS
        ordinary
REFINES
        FromNeu_RequestOpenClutch
WHEN
        grd1 :RequestFromNeu = TRUE
        grd2 :FromNeu_SyncSpeed = FALSE
        grd3 :FromNeu_RequestOpenClutch = FALSE
        Delay1 :time ≥ tRequestFromNeu + OpenClutch_Sync_DE
THEN
        act1 :FromNeu_RequestOpenClutch ≔ TRUE
        tFromNeu_RequestOpenClutch :tFromNeu_RequestOpenClutch ≔ time
END

    FromNeu_OpenClutch ≜
        STATUS
        ordinary
REFINES
        FromNeu_OpenClutch
WHEN
        grd1 :FromNeu_RequestOpenClutch = TRUE
        grd2 :Error_FromNeu_OpenClutch = FALSE
        grd3 :FromNeu_OpenClutch = FALSE
        grd4 :Clutch_Open = TRUE
THEN
        act1 :FromNeu_OpenClutch ≔ TRUE
        tFromNeu_OpenClutch :tFromNeu_OpenClutch ≔ time
END

    Error_FromNeu_OpenClutch ≜
        STATUS
        ordinary
REFINES
        Error_FromNeu_OpenClutch
WHEN
        grd1 :FromNeu_RequestOpenClutch = TRUE
        grd2 :Error_FromNeu_OpenClutch = FALSE
        grd3 :FromNeu_OpenClutch = FALSE
THEN
        act1 :Error_FromNeu_OpenClutch ≔ TRUE
        tError_FromNeu_OpenClutch :tError_FromNeu_OpenClutch ≔ time
```

```
END

    FromNeu_SetGear_NoClutch ≙
        STATUS
      ordinary
REFINES
      FromNeu_SetGear_NoClutch
WHEN
      grd1 :FromNeu_SyncSpeed = TRUE
      grd2 :Error_FromNeu_SetGear_NoClutch = FALSE
      grd3 :FromNeu_SetGear_NoClutch = FALSE
      grd4 :Gear_Set = TRUE
THEN
      act1 :FromNeu_SetGear_NoClutch ≔ TRUE
      act2 :isNeu ≔ FALSE
      tFromNeu_SetGear_NoClutch :tFromNeu_SetGear_NoClutch ≔ time
END

    Error_FromNeu_SetGear_NoClutch ≙
        STATUS
      ordinary
REFINES
      Error_FromNeu_SetGear_NoClutch
WHEN
      grd1 :FromNeu_SyncSpeed = TRUE
      grd2 :Error_FromNeu_SetGear_NoClutch = FALSE
      grd3 :FromNeu_SetGear_NoClutch = FALSE
      grd4 :Gear_Set= TRUE
THEN
      act1 :Error_FromNeu_SetGear_NoClutch ≔ TRUE
      tError_FromNeu_SetGear_NoClutch :tError_FromNeu_SetGear_NoClutch ≔ time
END

    FromNeu_SetGear_Clutch ≙
        STATUS
      ordinary
REFINES
      FromNeu_SetGear_Clutch
WHEN
      grd1 :FromNeu_OpenClutch = TRUE
      grd2 :Error_FromNeu_SetGear_Clutch = FALSE
      grd3 :FromNeu_SetGear_Clutch = FALSE
      grd4 :Gear_Set= TRUE
THEN
      act1 :FromNeu_SetGear_Clutch ≔ TRUE
      tFromNeu_SetGear_Clutch :tFromNeu_SetGear_Clutch ≔ time
END

    Error_FromNeu_SetGear_Clutch ≙
        STATUS
      ordinary
REFINES
      Error_FromNeu_SetGear_Clutch
WHEN
      grd1 :FromNeu_OpenClutch = TRUE
      grd2 :Error_FromNeu_SetGear_Clutch = FALSE
      grd3 :FromNeu_SetGear_Clutch = FALSE
THEN
      act1 :Error_FromNeu_SetGear_Clutch ≔ TRUE
      tError_FromNeu_SetGear_Clutch :tError_FromNeu_SetGear_Clutch ≔ time
END

    FromNeu_CloseClutch ≙
        STATUS
      ordinary
REFINES
      FromNeu_CloseClutch
WHEN
      grd1 :FromNeu_SetGear_Clutch = TRUE
      grd2 :Error_FromNeu_CloseClutch = FALSE
      grd3 :FromNeu_CloseClutch = FALSE
      grd4 :Clutch_Close = TRUE
THEN
      act1 :FromNeu_CloseClutch ≔ TRUE
      act2 :isNeu ≔ FALSE
      tFromNeu_CloseClutch :tFromNeu_CloseClutch ≔ time
END

    Error_FromNeu_CloseClutch ≙
```

```
            STATUS
        ordinary
REFINES
        Error_FromNeu_CloseClutch
WHEN
        grd1 :FromNeu_SetGear_Clutch = TRUE
        grd2 :Error_FromNeu_CloseClutch = FALSE
        grd3 :FromNeu_CloseClutch = FALSE
THEN
        act1 :Error_FromNeu_CloseClutch ≔ TRUE
        tError_FromNeu_CloseClutch :tError_FromNeu_CloseClutch ≔ time
END

    ToNeu_ZeroTorque ≙      // First Event of Senarion3
            STATUS
        ordinary
REFINES
        ToNeu_ZeroTorque
WHEN
        grd1 :RequestToNeu = TRUE
        grd2 :ToNeu_ZeroTorque = FALSE
        grd3 :ToNeu_RequestOpenClutch = FALSE
        grd4 :Engine_ZeroTorque = TRUE
        Expiry3 :time ≤ tRequestToNeu + Zero_EX
THEN
        act1 :ToNeu_ZeroTorque ≔ TRUE
        tToNeu_ZeroTorque :tToNeu_ZeroTorque ≔ time
END

    ToNeu_RequestOpenClutch ≙
            STATUS
        ordinary
REFINES
        ToNeu_RequestOpenClutch
WHEN
        grd1 :RequestToNeu = TRUE
        grd2 :ToNeu_ZeroTorque = FALSE
        grd3 :ToNeu_RequestOpenClutch = FALSE
        Delay2 :time ≥ tRequestToNeu + OpenClutch_Zero_DE
THEN
        act1 :ToNeu_RequestOpenClutch ≔ TRUE
        tToNeu_RequestOpenClutch :tToNeu_RequestOpenClutch ≔ time
END

    ToNeu_OpenClutch ≙
            STATUS
        ordinary
REFINES
        ToNeu_OpenClutch
WHEN
        grd1 :ToNeu_RequestOpenClutch = TRUE
        grd2 :ToNeu_OpenClutch = FALSE
        grd3 :Error_ToNeu_OpenClutch = FALSE
        grd4 :Clutch_Open = TRUE
THEN
        act1 :ToNeu_OpenClutch ≔ TRUE
        tToNeu_OpenClutch :tToNeu_OpenClutch ≔ time
END

    Error_ToNeu_OpenClutch ≙
            STATUS
        ordinary
REFINES
        Error_ToNeu_OpenClutch
WHEN
        grd1 :ToNeu_RequestOpenClutch = TRUE
        grd2 :ToNeu_OpenClutch = FALSE
        grd3 :Error_ToNeu_OpenClutch = FALSE
THEN
        act1 :Error_ToNeu_OpenClutch ≔ TRUE
        tError_ToNeu_OpenClutch :tError_ToNeu_OpenClutch ≔ time
END

    ToNeu_Release_NoClutch ≙
            STATUS
        ordinary
REFINES
        ToNeu_Release_NoClutch
WHEN
```

```
        grd1 :ToNeu_ZeroTorque = TRUE
        grd2 :ToNeu_Release_NoClutch = FALSE
        grd3 :Error_ToNeu_Release_NoClutch = FALSE
        grd4 :Gear_Release = TRUE
THEN
        act1 :ToNeu_Release_NoClutch ≔ TRUE
        act2 :isNeu ≔ TRUE
        tToNeu_Release_NoClutch :tToNeu_Release_NoClutch ≔ time
END

    Error_ToNeu_Release_NoClutch ≙
        STATUS
        ordinary
REFINES
        Error_ToNeu_Release_NoClutch
WHEN
        grd1 :ToNeu_ZeroTorque = TRUE
        grd2 :ToNeu_Release_NoClutch = FALSE
        grd3 :Error_ToNeu_Release_NoClutch = FALSE
THEN
        act1 :Error_ToNeu_Release_NoClutch ≔ TRUE
        tError_ToNeu_Release_NoClutch :tError_ToNeu_Release_NoClutch ≔ time
END

    ToNeu_Release_Clutch ≙
        STATUS
        ordinary
REFINES
        ToNeu_Release_Clutch
WHEN
        grd1 :ToNeu_OpenClutch = TRUE
        grd2 :ToNeu_Release_Clutch = FALSE
        grd3 :Error_ToNeu_Release_Clutch = FALSE
        grd4 :Gear_Release = TRUE
THEN
        act1 :ToNeu_Release_Clutch ≔ TRUE
        tToNeu_Release_Clutch :tToNeu_Release_Clutch ≔ time
END

    Error_ToNeu_Release_Clutch ≙
        STATUS
        ordinary
REFINES
        Error_ToNeu_Release_Clutch
WHEN
        grd1 :ToNeu_OpenClutch = TRUE
        grd2 :ToNeu_Release_Clutch = FALSE
        grd3 :Error_ToNeu_Release_Clutch = FALSE
THEN
        act1 :Error_ToNeu_Release_Clutch ≔ TRUE
        tError_ToNeu_Release_Clutch :tError_ToNeu_Release_Clutch ≔ time
END

    ToNeu_CloseClutch ≙
        STATUS
        ordinary
REFINES
        ToNeu_CloseClutch
WHEN
        grd1 :ToNeu_Release_Clutch = TRUE
        grd2 :ToNeu_CloseClutch = FALSE
        grd3 :Error_ToNeu_CloseClutch = FALSE
        grd4 :Clutch_Close = TRUE
THEN
        act1 :ToNeu_CloseClutch ≔ TRUE
        act2 :isNeu ≔ TRUE
        tToNeu_CloseClutch :tToNeu_CloseClutch ≔ time
END

    Error_ToNeu_CloseClutch ≙      // Last Event of Senarion3
        STATUS
        ordinary
REFINES
        Error_ToNeu_CloseClutch
WHEN
        grd1 :ToNeu_Release_Clutch = TRUE
        grd2 :ToNeu_CloseClutch = FALSE
        grd3 :Error_ToNeu_CloseClutch = FALSE
THEN
```

```
        act1 :Error_ToNeu_CloseClutch ≔ TRUE
        tError_ToNeu_CloseClutch :tError_ToNeu_CloseClutch ≔ time
END

    NoNeu_ZeroTorque ≙      // First Event of Senarion2
        STATUS
        ordinary
REFINES
        NoNeu_ZeroTorque
WHEN
        grd1 :RequestNoNeu = TRUE
        grd2 :NoNeu_ZeroTorque = FALSE
        grd3 :NoNeu_RequestOpenClutch_Releasing = FALSE
        grd4 :Engine_ZeroTorque = TRUE
        Expiry4 :time ≤ tRequestNoNeu + Zero_EX
THEN
        act1 :NoNeu_ZeroTorque ≔ TRUE
        tNoNeu_ZeroTorque :tNoNeu_ZeroTorque ≔ time
END

    NoNeu_RequestOpenClutch_Releasing ≙
        STATUS
        ordinary
REFINES
        NoNeu_RequestOpenClutch_Releasing
WHEN
        grd1 :RequestNoNeu = TRUE
        grd2 :NoNeu_ZeroTorque = FALSE
        grd3 :NoNeu_RequestOpenClutch_Releasing = FALSE
        Delay3 :time ≥ tRequestNoNeu + OpenClutch_Zero_DE
THEN
        act1 :NoNeu_RequestOpenClutch_Releasing ≔ TRUE
        tNoNeu_RequestOpenClutch_Releasing :tNoNeu_RequestOpenClutch_Releasing ≔ time
END

    NoNeu_OpenClutch_Releasing ≙
        STATUS
        ordinary
REFINES
        NoNeu_OpenClutch_Releasing
WHEN
        grd1 :NoNeu_OpenClutch_Releasing = TRUE
        grd2 :NoNeu_OpenClutch_Releasing = FALSE
        grd3 :Error_NoNeu_OpenClutch_Releasing = FALSE
        grd4 :Clutch_Open = TRUE
THEN
        act1 :NoNeu_OpenClutch_Releasing ≔ TRUE
        tNoNeu_OpenClutch_Releasing :tNoNeu_OpenClutch_Releasing ≔ time
END

    Error_NoNeu_OpenClutch_Releasing ≙
        STATUS
        ordinary
REFINES
        Error_NoNeu_OpenClutch_Releasing
WHEN
        grd1 :NoNeu_RequestOpenClutch_Releasing = TRUE
        grd2 :NoNeu_OpenClutch_Releasing = FALSE
        grd3 :Error_NoNeu_OpenClutch_Releasing = FALSE
THEN
        act1 :Error_NoNeu_OpenClutch_Releasing ≔ TRUE
        tError_NoNeu_OpenClutch_Releasing :tError_NoNeu_OpenClutch_Releasing ≔ time
END

    NoNeu_Release_NoClutch ≙
        STATUS
        ordinary
REFINES
        NoNeu_Release_NoClutch
WHEN
        grd1 :NoNeu_ZeroTorque = TRUE
        grd2 :NoNeu_Release_NoClutch = FALSE
        grd3 :Error_NoNeu_Release_NoClutch = FALSE
        grd4 :Gear_Release = TRUE
THEN
        act1 :NoNeu_Release_NoClutch ≔ TRUE
        tNoNeu_Release_NoClutch :tNoNeu_Release_NoClutch ≔ time
END
```

```
    Error_NoNeu_Release_NoClutch ≜
        STATUS
        ordinary
REFINES
        Error_NoNeu_Release_NoClutch
WHEN
        grd1 :NoNeu_ZeroTorque = TRUE
        grd2 :NoNeu_Release_NoClutch = FALSE
        grd3 :Error_NoNeu_Release_NoClutch = FALSE
THEN
        act1 :Error_NoNeu_Release_NoClutch ≔ TRUE
        tError_NoNeu_Release_NoClutch :tError_NoNeu_Release_NoClutch ≔ time
END

    NoNeu_Release_Clutch ≜
        STATUS
        ordinary
REFINES
        NoNeu_Release_Clutch
WHEN
        grd1 :NoNeu_OpenClutch_Releasing = TRUE
        grd2 :NoNeu_Release_Clutch = FALSE
        grd3 :Error_NoNeu_Release_Clutch = FALSE
        grd4 :Gear_Release = TRUE
THEN
        act1 :NoNeu_Release_Clutch ≔ TRUE
        tNoNeu_Release_Clutch :tNoNeu_Release_Clutch ≔ time
END

    Error_NoNeu_Release_Clutch ≜
        STATUS
        ordinary
REFINES
        Error_NoNeu_Release_Clutch
WHEN
        grd1 :NoNeu_OpenClutch_Releasing = TRUE
        grd2 :NoNeu_Release_Clutch = FALSE
        grd3 :Error_NoNeu_Release_Clutch = FALSE
THEN
        act1 :Error_NoNeu_Release_Clutch ≔ TRUE
        tError_NoNeu_Release_Clutch :tError_NoNeu_Release_Clutch ≔ time
END

    NoNeu_SyncSpeed ≜
        STATUS
        ordinary
REFINES
        NoNeu_SyncSpeed
WHEN
        grd1 :NoNeu_Release_NoClutch = TRUE
        grd2 :NoNeu_SyncSpeed = FALSE
        grd3 :NoNeu_RequestOpenClutch_Setting = FALSE
        grd4 :Engine_SyncSpeed= TRUE
        Expiry5 :time ≤ tNoNeu_Release_NoClutch + Sync_EX
THEN
        act1 :NoNeu_SyncSpeed ≔ TRUE
        tNoNeu_SyncSpeed :tNoNeu_SyncSpeed ≔ time
END

    NoNeu_RequestOpenClutch_Setting ≜
        STATUS
        ordinary
REFINES
        NoNeu_RequestOpenClutch_Setting
WHEN
        grd1 :NoNeu_Release_NoClutch = TRUE
        grd2 :NoNeu_SyncSpeed = FALSE
        grd3 :NoNeu_RequestOpenClutch_Setting = FALSE
        Delay4 :time ≥ tNoNeu_Release_NoClutch + OpenClutch_Sync_DE
THEN
        act1 :NoNeu_RequestOpenClutch_Setting ≔ TRUE
        tNoNeu_RequestOpenClutch_Setting :tNoNeu_RequestOpenClutch_Setting ≔ time
END

    NoNeu_OpenClutch_Setting ≜
        STATUS
        ordinary
REFINES
        NoNeu_OpenClutch_Setting
```

```
WHEN
        grd1 :NoNeu_RequestOpenClutch_Setting = TRUE
        grd2 :Error_NoNeu_OpenClutch_Setting = FALSE
        grd3 :NoNeu_OpenClutch_Setting = FALSE
        grd4 :Clutch_Open = TRUE
THEN
        act1 :NoNeu_OpenClutch_Setting ≔ TRUE
        tNoNeu_OpenClutch_Setting :tNoNeu_OpenClutch_Setting ≔ time
END

    Error_NoNeu_OpenClutch_Setting ≙
        STATUS
        ordinary
REFINES
        Error_NoNeu_OpenClutch_Setting
WHEN
        grd1 :NoNeu_RequestOpenClutch_Setting = TRUE
        grd2 :Error_NoNeu_OpenClutch_Setting = FALSE
        grd3 :NoNeu_OpenClutch_Setting = FALSE
THEN
        act1 :Error_NoNeu_OpenClutch_Setting ≔ TRUE
        tError_NoNeu_OpenClutch_Setting :tError_NoNeu_OpenClutch_Setting ≔ time
END

    NoNeu_SetGear_NoClutch ≙
        STATUS
        ordinary
REFINES
        NoNeu_SetGear_NoClutch
WHEN
        grd1 :NoNeu_SyncSpeed = TRUE
        grd2 :Error_NoNeu_SetGear_NoClutch = FALSE
        grd3 :NoNeu_SetGear_NoClutch = FALSE
        grd4 :Gear_Set = TRUE
THEN
        act1 :NoNeu_SetGear_NoClutch ≔ TRUE
        tNoNeu_SetGear_NoClutch :tNoNeu_SetGear_NoClutch ≔ time
END

    Error_NoNeu_SetGear_NoClutch ≙
        STATUS
        ordinary
REFINES
        Error_NoNeu_SetGear_NoClutch
WHEN
        grd1 :NoNeu_SyncSpeed = TRUE
        grd2 :Error_NoNeu_SetGear_NoClutch = FALSE
        grd3 :NoNeu_SetGear_NoClutch = FALSE
THEN
        act1 :Error_NoNeu_SetGear_NoClutch ≔ TRUE
        tError_NoNeu_SetGear_NoClutch :tError_NoNeu_SetGear_NoClutch ≔ time
END

    NoNeu_SetGear_ReleasingClutch ≙
        STATUS
        ordinary
REFINES
        NoNeu_SetGear_ReleasingClutch
WHEN
        grd1 :NoNeu_Release_Clutch = TRUE
        grd2 :Error_NoNeu_SetGear_ReleasingClutch = FALSE
        grd3 :NoNeu_SetGear_ReleasingClutch = FALSE
        grd4 :Gear_Set = TRUE
THEN
        act1 :NoNeu_SetGear_ReleasingClutch ≔ TRUE
        tNoNeu_SetGear_ReleasingClutch :tNoNeu_SetGear_ReleasingClutch ≔ time
END

    Error_NoNeu_SetGear_ReleasingClutch ≙
        STATUS
        ordinary
REFINES
        Error_NoNeu_SetGear_ReleasingClutch
WHEN
        grd1 :NoNeu_Release_Clutch = TRUE
        grd2 :Error_NoNeu_SetGear_ReleasingClutch = FALSE
        grd3 :NoNeu_SetGear_ReleasingClutch = FALSE
THEN
        act1 :Error_NoNeu_SetGear_ReleasingClutch ≔ TRUE
```

```
        tError_NoNeu_SetGear_ReleasingClutch :tError_NoNeu_SetGear_ReleasingClutch ≔ time
END

    NoNeu_SetGear_SettingClutch ≙
        STATUS
        ordinary
REFINES
        NoNeu_SetGear_SettingClutch
WHEN
        grd1 :NoNeu_OpenClutch_Setting = TRUE
        grd2 :Error_NoNeu_SetGear_SettingClutch = FALSE
        grd3 :NoNeu_SetGear_SettingClutch = FALSE
        grd4 :Gear_Set = TRUE
THEN
        act1 :NoNeu_SetGear_SettingClutch ≔ TRUE
        tNoNeu_SetGear_SettingClutch :tNoNeu_SetGear_SettingClutch ≔ time
END

    Error_NoNeu_SetGear_SettingClutch ≙
        STATUS
        ordinary
REFINES
        Error_NoNeu_SetGear_SettingClutch
WHEN
        grd1 :NoNeu_OpenClutch_Setting = TRUE
        grd2 :Error_NoNeu_SetGear_SettingClutch = FALSE
        grd3 :NoNeu_SetGear_SettingClutch = FALSE
THEN
        act1 :Error_NoNeu_SetGear_SettingClutch ≔ TRUE
        tError_NoNeu_SetGear_SettingClutch :tError_NoNeu_SetGear_SettingClutch ≔ time
END

    NoNeu_CloseClutch_Setting ≙
        STATUS
        ordinary
REFINES
        NoNeu_CloseClutch_Setting
WHEN
        grd1 :NoNeu_SetGear_SettingClutch = TRUE
        grd2 :Error_NoNeu_CloseClutch_Setting = FALSE
        grd3 :NoNeu_CloseClutch_Setting = FALSE
        grd4 :Clutch_Close = TRUE
THEN
        act1 :NoNeu_CloseClutch_Setting ≔ TRUE
        tNoNeu_CloseClutch_Setting :tNoNeu_CloseClutch_Setting ≔ time
END

    Error_NoNeu_CloseClutch_Setting ≙
        STATUS
        ordinary
REFINES
        Error_NoNeu_CloseClutch_Setting
WHEN
        grd1 :NoNeu_SetGear_SettingClutch = TRUE
        grd2 :Error_NoNeu_CloseClutch_Setting = FALSE
        grd3 :NoNeu_CloseClutch_Setting = FALSE
THEN
        act1 :Error_NoNeu_CloseClutch_Setting ≔ TRUE
        tError_NoNeu_CloseClutch_Setting :tError_NoNeu_CloseClutch_Setting ≔ time
END

    NoNeu_CloseClutch_Releasing ≙
        STATUS
        ordinary
REFINES
        NoNeu_CloseClutch_Releasing
WHEN
        grd1 :NoNeu_SetGear_ReleasingClutch = TRUE
        grd2 :Error_NoNeu_CloseClutch_Releasing = FALSE
        grd3 :NoNeu_CloseClutch_Releasing = FALSE
        grd4 :Clutch_Close = TRUE
THEN
        act1 :NoNeu_CloseClutch_Releasing ≔ TRUE
        tNoNeu_CloseClutch_Releasing :tNoNeu_CloseClutch_Releasing ≔ time
END

    Error_NoNeu_CloseClutch_Releasing ≙
        STATUS
        ordinary
```

```
REFINES
        Error_NoNeu_CloseClutch_Releasing
WHEN
        grd1 :NoNeu_SetGear_ReleasingClutch = TRUE
        grd2 :Error_NoNeu_CloseClutch_Releasing = FALSE
        grd3 :NoNeu_CloseClutch_Releasing = FALSE
THEN
        act1 :Error_NoNeu_CloseClutch_Releasing ≔ TRUE
        tError_NoNeu_CloseClutch_Releasing :tError_NoNeu_CloseClutch_Releasing ≔ time
END

    Engine_Request_SyncSpeed ≙
        STATUS
        ordinary
WHEN
        grd1 :RequestFromNeu = TRUE ∨ NoNeu_Release_NoClutch = TRUE
        grd2 :Engine_Request_SyncSpeed = FALSE
THEN
        act1 :Engine_Request_SyncSpeed ≔ TRUE
        tEngine_Request_SyncSpeed :tEngine_Request_SyncSpeed ≔ time
END

    Engine_SyncSpeed ≙
        STATUS
        ordinary
REFINES
        Engine_SyncSpeed
WHEN
        grd1 :Engine_Request_SyncSpeed = TRUE
        grd2 :Engine_SyncSpeed = FALSE
        grd3 :Engine_WaitForSyncClutch = FALSE
THEN
        act1 :Engine_SyncSpeed ≔ TRUE
        tEngine_SyncSpeed :tEngine_SyncSpeed ≔ time
END

    Engine_WaitForSyncClutch ≙
        STATUS
        ordinary
REFINES
        Engine_WaitForSyncClutch
WHEN
        grd1 :Engine_Request_SyncSpeed = TRUE
        grd2 :Engine_SyncSpeed = FALSE
        grd3 :Engine_WaitForSyncClutch = FALSE
THEN
        act1 :Engine_WaitForSyncClutch ≔ TRUE
        tEngine_WaitForSyncClutch :tEngine_WaitForSyncClutch ≔ time
END

    Engine_Request_ZeroTorque ≙
        STATUS
        ordinary
WHEN
        grd1 :RequestToNeu = TRUE ∨ RequestNoNeu = TRUE
        grd2 :Engine_Request_ZeroTorque = FALSE
THEN
        act1 :Engine_Request_ZeroTorque ≔ TRUE
        tEngine_Request_ZeroTorque :tEngine_Request_ZeroTorque ≔ time
END

    Engine_ZeroTorque ≙
        STATUS
        ordinary
REFINES
        Engine_ZeroTorque
WHEN
        grd1 :Engine_Request_ZeroTorque = TRUE
        grd2 :Engine_ZeroTorque = FALSE
        grd3 :Engine_WaitForZeroClutch = FALSE
THEN
        act1 :Engine_ZeroTorque ≔ TRUE
        tEngine_ZeroTorque :tEngine_ZeroTorque ≔ time
END

    Engine_WaitForZeroClutch ≙
        STATUS
        ordinary
REFINES
```

```
        Engine_WaitForZeroClutch
WHEN
        grd1 :Engine_Request_ZeroTorque = TRUE
        grd2 :Engine_ZeroTorque = FALSE
        grd3 :Engine_WaitForZeroClutch = FALSE
THEN
        act1 :Engine_WaitForZeroClutch ≔ TRUE
        tEngine_WaitForZeroClutch :tEngine_WaitForZeroClutch ≔ time
END

    Clutch_Request_Open ≙
        STATUS
        ordinary
WHEN
        grd1 :FromNeu_RequestOpenClutch = TRUE ∨ ToNeu_RequestOpenClutch = TRUE ∨
              NoNeu_RequestOpenClutch_Releasing = TRUE ∨ NoNeu_RequestOpenClutch_Setting = TRUE
        grd2 :Clutch_Request_Open = FALSE
THEN
        act1 :Clutch_Request_Open ≔ TRUE
END

    Clutch_Open ≙
        STATUS
        ordinary
REFINES
        Clutch_Open
WHEN
        grd1 :Clutch_Request_Open = TRUE
        grd2 :Clutch_Open = FALSE
        grd3 :Error_Clutch_Open = FALSE
THEN
        act1 :Clutch_Open ≔ TRUE
END

    Error_Clutch_Open ≙
        STATUS
        ordinary
REFINES
        Error_Clutch_Open
WHEN
        grd1 :Clutch_Request_Open = TRUE
        grd2 :Clutch_Open = FALSE
        grd3 :Error_Clutch_Open = FALSE
THEN
        act1 :Error_Clutch_Open ≔ TRUE
END

    Clutch_Request_Close ≙
        STATUS
        ordinary
WHEN
        grd1 :FromNeu_SetGear_Clutch = TRUE ∨ ToNeu_Release_Clutch = TRUE ∨
              NoNeu_SetGear_ReleasingClutch = TRUE ∨ NoNeu_SetGear_SettingClutch= TRUE
        grd2 :Clutch_Request_Close = FALSE
THEN
        act1 :Clutch_Request_Close ≔ TRUE
END

    Clutch_Close ≙
        STATUS
        ordinary
REFINES
        Clutch_Close
WHEN
        grd1 :Clutch_Request_Close = TRUE
        grd2 :Clutch_Close = FALSE
        grd3 :Error_Clutch_Close = FALSE
THEN
        act1 :Clutch_Close ≔ TRUE
END

    Error_Clutch_Close ≙
        STATUS
        ordinary
REFINES
        Error_Clutch_Close
WHEN
        grd1 :Clutch_Request_Close = TRUE
        grd2 :Clutch_Close = FALSE
```

```
        grd3 :Error_Clutch_Close = FALSE
THEN
        act1 :Error_Clutch_Close ≔ TRUE
END

    Gear_Request_Release ≙
        STATUS
        ordinary
WHEN
        grd1 :ToNeu_ZeroTorque = TRUE ∨ ToNeu_OpenClutch = TRUE ∨
              NoNeu_ZeroTorque = TRUE ∨ NoNeu_OpenClutch_Releasing= TRUE
        grd2 :Gear_Request_Release = FALSE
THEN
        act1 :Gear_Request_Release ≔ TRUE
END

    Gear_Release ≙
        STATUS
        ordinary
REFINES
        Gear_Release
WHEN
        grd1 :Gear_Request_Release = TRUE
        grd2 :Gear_Release = FALSE
        grd3 :Error_Gear_Release = FALSE
THEN
        act1 :Gear_Release ≔ TRUE
END

    Error_Gear_Release ≙
        STATUS
        ordinary
REFINES
        Error_Gear_Release
WHEN
        grd1 :Gear_Request_Release = TRUE
        grd2 :Gear_Release = FALSE
        grd3 :Error_Gear_Release = FALSE
THEN
        act1 :Error_Gear_Release ≔ TRUE
END

    Gear_Request_Set ≙
        STATUS
        ordinary
WHEN
              FromNeu_SyncSpeed = TRUE ∨ FromNeu_OpenClutch = TRUE ∨
        grd1 :NoNeu_Release_Clutch = TRUE ∨ NoNeu_SyncSpeed = TRUE ∨
              NoNeu_OpenClutch_Setting = TRUE
        grd2 :Gear_Request_Set = FALSE
THEN
        act1 :Gear_Request_Set ≔ TRUE
END

    Gear_Set ≙
        STATUS
        ordinary
REFINES
        Gear_Set
WHEN
        grd1 :Gear_Request_Set = TRUE
        grd2 :Gear_Set = FALSE
        grd3 :Error_Gear_Set = FALSE
THEN
        act1 :Gear_Set ≔ TRUE
END

    Error_Gear_Set ≙
        STATUS
        ordinary
REFINES
        Error_Gear_Set
WHEN
        grd1 :Gear_Request_Set = TRUE
        grd2 :Gear_Set = FALSE
        grd3 :Error_Gear_Set = FALSE
THEN
        act1 :Error_Gear_Set ≔ TRUE
END
```

```
    FINAL ≙
      extended
        STATUS
      ordinary
REFINES
      FINAL
WHEN
            FromNeu_SetGear_NoClutch = TRUE ∨ NoNeu_SetGear_NoClutch = TRUE ∨
      grd1 : ToNeu_Release_NoClutch = TRUE ∨ FromNeu_CloseClutch = TRUE ∨
            NoNeu_CloseClutch_Setting = TRUE ∨ NoNeu_CloseClutch_Releasing = TRUE ∨
            ToNeu_CloseClutch = TRUE
THEN
      act1 : RequestFromNeu ≔ FALSE
      act2 : RequestNoNeu ≔ FALSE
      act3 : RequestToNeu ≔ FALSE
      act4 : FromNeu_SyncSpeed ≔ FALSE
      act5 : FromNeu_OpenClutch ≔ FALSE
      act6 : FromNeu_SetGear_NoClutch ≔ FALSE
      act7 : FromNeu_SetGear_Clutch ≔ FALSE
      act8 : FromNeu_CloseClutch ≔ FALSE
      act9 : ToNeu_Release_NoClutch ≔ FALSE
      act10 : ToNeu_CloseClutch ≔ FALSE
      act11 : ToNeu_ZeroTorque ≔ FALSE      // Senario3 Flage
      act12 : ToNeu_OpenClutch ≔ FALSE      // Senario3 Flage
      act13 : ToNeu_Release_Clutch ≔ FALSE      // Senario3 Flage
      act14 : NoNeu_ZeroTorque ≔ FALSE      // Senario2 Flage
      act15 : NoNeu_OpenClutch_Releasing ≔ FALSE
      act16 : NoNeu_Release_NoClutch ≔ FALSE      // Senario2 Flage
      act17 : NoNeu_Release_Clutch ≔ FALSE      // Senario2 Flage
      act18 : NoNeu_SyncSpeed ≔ FALSE      // Senario2 Flage
      act19 : NoNeu_OpenClutch_Setting ≔ FALSE      // Senario2 Flage
      act20 : NoNeu_SetGear_NoClutch ≔ FALSE      // Senario2 Flage
      act21 : NoNeu_SetGear_ReleasingClutch ≔ FALSE      // Senario2 Flage
      act22 : NoNeu_SetGear_SettingClutch ≔ FALSE      // Senario2 Flage
      act23 : NoNeu_CloseClutch_Setting ≔ FALSE      // Senario2 Flage
      act24 : NoNeu_CloseClutch_Releasing ≔ FALSE      // Senario2 Flage
      act25 : Engine_SyncSpeed ≔ FALSE
      act26 : Engine_WaitForSyncClutch ≔ FALSE
      act27 : Engine_ZeroTorque ≔ FALSE
      act28 : Engine_WaitForZeroClutch ≔ FALSE
      act29 : Clutch_Open ≔ FALSE      // Clutch Flags
      act30 : Clutch_Close ≔ FALSE      // Clutch Flags
      act31 : Gear_Release ≔ FALSE      // Gear Flags
      act32 : Gear_Set ≔ FALSE      // Gear Flags
      act33 : FromNeu_RequestOpenClutch ≔ FALSE      // Senario1 Flag
      act34 : ToNeu_RequestOpenClutch ≔ FALSE      // Senario3 Flag
      act35 : NoNeu_RequestOpenClutch_Releasing ≔ FALSE      // Senario2 Flag
      act36 : NoNeu_RequestOpenClutch_Setting ≔ FALSE      // Senario2 Flag
      act37 : Engine_Request_SyncSpeed ≔ FALSE      // Engine Flgas
      act38 : Engine_Request_ZeroTorque ≔ FALSE      // Engine Flgas
      act39 : Clutch_Request_Open ≔ FALSE      // Clutch Flags
      act40 : Clutch_Request_Close ≔ FALSE      // Clutch Flags
      act41 : Gear_Request_Release ≔ FALSE      // Gear Flags
      act42 : Gear_Request_Set ≔ FALSE      // Gear Flags
END

    Tick_Tock ≙
      extended
        STATUS
      ordinary
REFINES
      Tick_Tock
ANY
      tick
WHERE
      tick : tick > 0
      Deadline10 : FromNeu_SyncSpeed = TRUE ∧ FromNeu_SetGear_NoClutch = FALSE ∧ Error_FromNeu_SetGear_NoClutch = FALSE ⇒
            time + tick ≤ tFromNeu_SyncSpeed + SetGear_DL
      Deadline11 : FromNeu_OpenClutch = TRUE ∧ Error_FromNeu_SetGear_Clutch = FALSE ∧ FromNeu_SetGear_Clutch = FALSE ⇒ time +
            tick ≤ tFromNeu_OpenClutch + SetGear_DL
      Deadline12 : FromNeu_SetGear_Clutch = TRUE ∧ Error_FromNeu_CloseClutch = FALSE ∧ FromNeu_CloseClutch = FALSE ⇒ time + tick
            ≤ tFromNeu_SetGear_Clutch + CloseClutch_DL
      Deadline14 : ToNeu_ZeroTorque = TRUE ∧ ToNeu_Release_NoClutch = FALSE ∧ Error_ToNeu_Release_NoClutch = FALSE ⇒ time + tick
            ≤ tToNeu_ZeroTorque + Release_DL
      Deadline15 : ToNeu_OpenClutch = TRUE ∧ ToNeu_Release_Clutch = FALSE ∧ Error_ToNeu_Release_Clutch = FALSE ⇒ time + tick ≤
            tToNeu_OpenClutch + Release_DL
      Deadline16 : ToNeu_Release_Clutch = TRUE ∧ Error_ToNeu_CloseClutch = FALSE ∧ ToNeu_CloseClutch = FALSE ⇒ time + tick ≤
            tToNeu_Release_Clutch + CloseClutch_DL
```

Deadline18 : NoNeu_OpenClutch_Releasing = TRUE ∧ NoNeu_Release_Clutch = FALSE ∧ Error_NoNeu_Release_Clutch = FALSE ⇒ time + tick ≤ tNoNeu_OpenClutch_Releasing + Release_DL
Deadline19 : NoNeu_ZeroTorque = TRUE ∧ NoNeu_Release_NoClutch = FALSE ∧ Error_NoNeu_Release_NoClutch = FALSE ⇒ time + tick ≤ tNoNeu_ZeroTorque + Release_DL
Deadline21 : NoNeu_SyncSpeed = TRUE ∧ NoNeu_SetGear_NoClutch = FALSE ∧ Error_NoNeu_SetGear_NoClutch = FALSE ⇒ time + tick ≤ tNoNeu_SyncSpeed + SetGear_DL
Deadline22 : NoNeu_OpenClutch_Setting = TRUE ∧ NoNeu_SetGear_SettingClutch = FALSE ∧ Error_NoNeu_SetGear_SettingClutch = FALSE ⇒ time + tick ≤ tNoNeu_OpenClutch_Setting + SetGear_DL
Deadline23 : NoNeu_SetGear_SettingClutch = TRUE ∧ NoNeu_CloseClutch_Setting = FALSE ∧ Error_NoNeu_CloseClutch_Setting = FALSE ⇒ time + tick ≤ tNoNeu_SetGear_SettingClutch + CloseClutch_DL
Deadline24 : NoNeu_Release_Clutch = TRUE ∧ Error_NoNeu_SetGear_ReleasingClutch = FALSE ∧ NoNeu_SetGear_ReleasingClutch = FALSE ⇒ time + tick ≤ tNoNeu_Release_Clutch + SetGear_DL
Deadline25 : NoNeu_SetGear_ReleasingClutch = TRUE ∧ NoNeu_CloseClutch_Releasing = FALSE ∧ Error_NoNeu_CloseClutch_Releasing = FALSE ⇒ time + tick ≤ tNoNeu_SetGear_ReleasingClutch + CloseClutch_DL
Deadline27 : FromNeu_RequestOpenClutch = TRUE ∧ FromNeu_OpenClutch = FALSE ∧ Error_FromNeu_OpenClutch = FALSE ⇒ time + tick ≤ tFromNeu_RequestOpenClutch + OpenClutch_DL
Deadline28 : RequestToNeu = TRUE ∧ ToNeu_ZeroTorque = FALSE ∧ ToNeu_RequestOpenClutch = FALSE ⇒ time + tick ≤ tRequestToNeu + Zero_DL
Deadline29 : ToNeu_RequestOpenClutch = TRUE ∧ ToNeu_OpenClutch = FALSE ∧ Error_ToNeu_OpenClutch = FALSE ⇒ time + tick ≤ tToNeu_RequestOpenClutch + OpenClutch_DL
Deadline30 : RequestNoNeu = TRUE ∧ NoNeu_RequestOpenClutch_Releasing = FALSE ∧ NoNeu_ZeroTorque = FALSE ⇒ time + tick ≤ tRequestNoNeu + Zero_DL
Deadline31 : NoNeu_RequestOpenClutch_Releasing = TRUE ∧ NoNeu_OpenClutch_Releasing = FALSE ∧ Error_NoNeu_OpenClutch_Releasing = FALSE ⇒ time + tick ≤ tNoNeu_RequestOpenClutch_Releasing + OpenClutch_DL
Deadline32 : NoNeu_Release_NoClutch = TRUE ∧ NoNeu_RequestOpenClutch_Setting = FALSE ∧ NoNeu_SyncSpeed = FALSE ⇒ time + tick ≤ tNoNeu_Release_NoClutch + Sync_DL
Deadline33 : NoNeu_RequestOpenClutch_Setting = TRUE ∧ NoNeu_OpenClutch_Setting = FALSE ∧ Error_NoNeu_OpenClutch_Setting = FALSE ⇒ time + tick ≤ tNoNeu_RequestOpenClutch_Setting + OpenClutch_DL
Deadline34 : RequestFromNeu = TRUE ∧ FromNeu_RequestOpenClutch = FALSE ∧ FromNeu_SyncSpeed = FALSE ⇒ time + tick ≤ tRequestFromNeu + Sync_DL
Deadline35 : RequestFromNeu = TRUE ∧ Engine_Request_SyncSpeed = FALSE ⇒ time + tick ≤ tRequestFromNeu + Channel_DL
Deadline36 : NoNeu_Release_NoClutch = TRUE ∧ Engine_Request_SyncSpeed = FALSE ⇒ time + tick ≤ tNoNeu_Release_NoClutch + Channel_DL
Deadline37 : RequestToNeu = TRUE ∧ Engine_Request_ZeroTorque = FALSE ⇒ time + tick ≤ tRequestToNeu + Channel_DL
Deadline38 : RequestNoNeu = TRUE ∧ Engine_Request_ZeroTorque = FALSE ⇒ time + tick ≤ tRequestNoNeu + Channel_DL
Deadline39 : Engine_ZeroTorque = TRUE ∧ NoNeu_ZeroTorque = FALSE ∧ ToNeu_ZeroTorque = FALSE ⇒ time + tick ≤ tEngine_ZeroTorque + Channel_DL
Deadline40 : Engine_SyncSpeed = TRUE ∧ FromNeu_SyncSpeed = FALSE ∧ NoNeu_SyncSpeed = FALSE ⇒ time + tick ≤ tEngine_SyncSpeed + Channel_DL
Deadline41 : Engine_Request_SyncSpeed = TRUE ∧ Engine_SyncSpeed = FALSE ∧ Engine_WaitForSyncClutch = FALSE ⇒ time + tick ≤ tEngine_Request_SyncSpeed + Engine_Sync_DL
Deadline42 : Engine_Request_ZeroTorque = TRUE ∧ Engine_WaitForZeroClutch = FALSE ∧ Engine_ZeroTorque = FALSE ⇒ time + tick ≤ tEngine_Request_ZeroTorque + Engine_Zero_DL

THEN

act1 : time := time+tick

END

END

Machine m10

MACHINE
m10
REFINES
m9
SEES
c6
VARIABLES
isNeu *// Gear Status*
RequestFromNeu *// Flags*
RequestNoNeu *// Flags*
RequestToNeu *// Flags*
FromNeu_SyncSpeed *// Senario1*
FromNeu_OpenClutch *// Flage*
FromNeu_SetGear_NoClutch *// Flage*
FromNeu_SetGear_Clutch *// Flage*
FromNeu_CloseClutch *// Flage*
Error_FromNeu_OpenClutch *// Flage*
Error_FromNeu_SetGear_NoClutch *// Flage*
Error_FromNeu_SetGear_Clutch *// Flage*
Error_FromNeu_CloseClutch *// Senario1*
ToNeu_ZeroTorque *// Senario3 Flage*
ToNeu_OpenClutch *// Senario3 Flage*
Error_ToNeu_OpenClutch *// Senario3 Flage*
ToNeu_Release_NoClutch *// Senario3 Flage*
Error_ToNeu_Release_NoClutch *// Senario3 Flage*
ToNeu_Release_Clutch *// Senario3 Flage*
Error_ToNeu_Release_Clutch *// Senario3 Flage*
ToNeu_CloseClutch *// Senario3 Flage*
Error_ToNeu_CloseClutch *// Senario3 Flage*
NoNeu_ZeroTorque *// Senario2 Flage*
NoNeu_Release_NoClutch *// Senario2 Flage*
NoNeu_OpenClutch_Releasing *// Senario2 Flage*
NoNeu_Release_Clutch *// Senario2 Flage*
NoNeu_SyncSpeed *// Senario2 Flage*
NoNeu_OpenClutch_Setting *// Senario2 Flage*
NoNeu_SetGear_NoClutch *// Senario2 Flage*
NoNeu_SetGear_ReleasingClutch *// Senario2 Flage*
NoNeu_SetGear_SettingClutch *// Senario2 Flage*
NoNeu_CloseClutch_Releasing *// Senario2 Flage*
NoNeu_CloseClutch_Setting *// Senario2 Flage*
Error_NoNeu_OpenClutch_Releasing *// Senario2 Flage*
Error_NoNeu_Release_Clutch *// Senario2 Flage*
Error_NoNeu_Release_NoClutch *// Senario2 Flage*
Error_NoNeu_OpenClutch_Setting *// Senario2 Flage*
Error_NoNeu_SetGear_NoClutch *// Senario2 Flage*
Error_NoNeu_SetGear_ReleasingClutch *// Senario2 Flage*
Error_NoNeu_SetGear_SettingClutch *// Senario2 Flage*
Error_NoNeu_CloseClutch_Releasing *// Senario2 Flage*
Error_NoNeu_CloseClutch_Setting *// Senario2 Flage*
Engine_SyncSpeed *// Engine Flags*
Engine_WaitForSyncClutch *// Engine Flgas*
Engine_ZeroTorque *// Engine Flgas*
Engine_WaitForZeroClutch *// Engine Flgas*
Clutch_Open *// Clutch Flags*
Error_Clutch_Open *// Clutch Flags*
Clutch_Close *// Clutch Flags*
Error_Clutch_Close *// Clutch Flags*
Gear_Release *// Gear Flags*
Error_Gear_Release *// Gear Flags*
Gear_Set *// Gear Flags*
Error_Gear_Set *// Gear Flags*
FromNeu_RequestOpenClutch *// Senario1 Flag*
ToNeu_RequestOpenClutch *// Senario3 Flag*
NoNeu_RequestOpenClutch_Releasing *// Senario2 Flag*
NoNeu_RequestOpenClutch_Setting *// Senario2 Flag*
Engine_Request_SyncSpeed *// Engine Flgas*
Engine_Request_ZeroTorque *// Engine Flgas*
Clutch_Request_Open *// Clutch Flags*
Clutch_Request_Close *// Clutch Flags*
Gear_Request_Release *// Gear Flags*
Gear_Request_Set *// Gear Flags*
time
tRequestFromNeu
tFromNeu_SyncSpeed
tFromNeu_SetGear_NoClutch

tError_FromNeu_SetGear_NoClutch
tFromNeu_OpenClutch
tError_FromNeu_SetGear_Clutch
tFromNeu_SetGear_Clutch
tError_FromNeu_CloseClutch
tFromNeu_CloseClutch
tRequestToNeu
tToNeu_ZeroTorque
tToNeu_Release_NoClutch
tError_ToNeu_Release_NoClutch
tToNeu_OpenClutch
tToNeu_Release_Clutch
tError_ToNeu_Release_Clutch
tError_ToNeu_CloseClutch
tToNeu_CloseClutch
tRequestNoNeu
tNoNeu_ZeroTorque
tNoNeu_OpenClutch_Releasing
tNoNeu_Release_Clutch
tError_NoNeu_Release_Clutch
tNoNeu_Release_NoClutch
tError_NoNeu_Release_NoClutch
tNoNeu_SyncSpeed
tNoNeu_SetGear_NoClutch
tError_NoNeu_SetGear_NoClutch
tNoNeu_OpenClutch_Setting
tNoNeu_SetGear_SettingClutch
tError_NoNeu_SetGear_SettingClutch
tNoNeu_CloseClutch_Setting
tError_NoNeu_CloseClutch_Setting
tError_NoNeu_SetGear_ReleasingClutch
tNoNeu_SetGear_ReleasingClutch
tNoNeu_CloseClutch_Releasing
tError_NoNeu_CloseClutch_Releasing
tFromNeu_RequestOpenClutch
tError_FromNeu_OpenClutch
tToNeu_RequestOpenClutch
tError_ToNeu_OpenClutch
tNoNeu_RequestOpenClutch_Releasing
tError_NoNeu_OpenClutch_Releasing
tNoNeu_RequestOpenClutch_Setting
tError_NoNeu_OpenClutch_Setting
tEngine_Request_SyncSpeed
tEngine_Request_ZeroTorque
tEngine_ZeroTorque
tEngine_SyncSpeed
tEngine_WaitForSyncClutch
tEngine_WaitForZeroClutch
tClutch_Request_Open
tClutch_Request_Close
tClutch_Open
tClutch_Close
tError_Clutch_Open
tError_Clutch_Close

INVARIANTS

tClutch_Request_Open :tClutch_Request_Open ∈ ℕ

Deadline43 : FromNeu_RequestOpenClutch = TRUE ∧ Clutch_Request_Open = FALSE ⇒ time ≤ tFromNeu_RequestOpenClutch + Channel_DL

Clutch_Request_OpenDurationDeadline43 : FromNeu_RequestOpenClutch = TRUE ∧ Clutch_Request_Open = TRUE ⇒ tClutch_Request_Open ≤ tFromNeu_RequestOpenClutch + Channel_DL

Deadline44 :ToNeu_RequestOpenClutch = TRUE ∧ Clutch_Request_Open = FALSE ⇒ time ≤ tToNeu_RequestOpenClutch + Channel_DL

Clutch_Request_OpenDurationDeadline44 : ToNeu_RequestOpenClutch = TRUE ∧ Clutch_Request_Open = TRUE ⇒ tClutch_Request_Open ≤ tToNeu_RequestOpenClutch + Channel_DL

Deadline45 : NoNeu_RequestOpenClutch_Releasing = TRUE ∧ Clutch_Request_Open = FALSE ⇒ time ≤ tNoNeu_RequestOpenClutch_Releasing + Channel_DL

Clutch_Request_OpenDurationDeadline45 : NoNeu_RequestOpenClutch_Releasing = TRUE ∧ Clutch_Request_Open = TRUE ⇒ tClutch_Request_Open ≤ tNoNeu_RequestOpenClutch_Releasing + Channel_DL

Deadline46 : NoNeu_RequestOpenClutch_Setting = TRUE ∧ Clutch_Request_Open = FALSE ⇒ time ≤ tNoNeu_RequestOpenClutch_Setting + Channel_DL

Clutch_Request_OpenDurationDeadline46 : NoNeu_RequestOpenClutch_Setting = TRUE ∧ Clutch_Request_Open = TRUE ⇒ tClutch_Request_Open ≤ tNoNeu_RequestOpenClutch_Setting + Channel_DL

tClutch_Request_Close :tClutch_Request_Close ∈ ℕ

Deadline47 :FromNeu_SetGear_Clutch = TRUE ∧ Clutch_Request_Close = FALSE ⇒ time ≤ tFromNeu_SetGear_Clutch + Channel_DL

Clutch_Request_CloseDurationDeadline47 : FromNeu_SetGear_Clutch = TRUE ∧ Clutch_Request_Close = TRUE ⇒ tClutch_Request_Close ≤ tFromNeu_SetGear_Clutch + Channel_DL

Deadline48 : NoNeu_SetGear_ReleasingClutch = TRUE ∧ Clutch_Request_Close = FALSE ⇒ time ≤ tNoNeu_SetGear_ReleasingClutch + Channel_DL

Clutch_Request_CloseDurationDeadline48 : NoNeu_SetGear_ReleasingClutch = TRUE ∧ Clutch_Request_Close = TRUE ⇒ tClutch_Request_Close ≤ tNoNeu_SetGear_ReleasingClutch + Channel_DL

Deadline49 : NoNeu_SetGear_SettingClutch = TRUE ∧ Clutch_Request_Close = FALSE ⇒ time ≤ tNoNeu_SetGear_SettingClutch + Channel_DL
Clutch_Request_CloseDurationDeadline49 : NoNeu_SetGear_SettingClutch = TRUE ∧ Clutch_Request_Close = TRUE ⇒ tClutch_Request_Close ≤ tNoNeu_SetGear_SettingClutch + Channel_DL
Deadline50 :ToNeu_Release_Clutch = TRUE ∧ Clutch_Request_Close = FALSE ⇒ time ≤ tToNeu_Release_Clutch + Channel_DL
Clutch_Request_CloseDurationDeadline50 : ToNeu_Release_Clutch = TRUE ∧ Clutch_Request_Close = TRUE ⇒ tClutch_Request_Close ≤ tToNeu_Release_Clutch + Channel_DL
tClutch_Open :tClutch_Open ∈ ℕ
Deadline51 : Clutch_Open = TRUE ∧ FromNeu_OpenClutch = FALSE ∧ NoNeu_OpenClutch_Releasing = FALSE ∧ NoNeu_OpenClutch_Setting = FALSE ∧ ToNeu_OpenClutch = FALSE ⇒ time ≤ tClutch_Open + Channel_DL
FromNeu_OpenClutchDurationDeadline51 : Clutch_Open = TRUE ∧ FromNeu_OpenClutch = TRUE ⇒ tFromNeu_OpenClutch ≤ tClutch_Open + Channel_DL
NoNeu_OpenClutch_ReleasingDurationDeadline51 : Clutch_Open = TRUE ∧ NoNeu_OpenClutch_Releasing = TRUE ⇒ tNoNeu_OpenClutch_Releasing ≤ tClutch_Open + Channel_DL
NoNeu_OpenClutch_SettingDurationDeadline51 : Clutch_Open = TRUE ∧ NoNeu_OpenClutch_Setting = TRUE ⇒ tNoNeu_OpenClutch_Setting ≤ tClutch_Open + Channel_DL
ToNeu_OpenClutchDurationDeadline51 : Clutch_Open = TRUE ∧ ToNeu_OpenClutch = TRUE ⇒ tToNeu_OpenClutch ≤ tClutch_Open + Channel_DL
tClutch_Close :tClutch_Close ∈ ℕ
Deadline52 : Clutch_Close = TRUE ∧ FromNeu_CloseClutch = FALSE ∧ NoNeu_CloseClutch_Releasing = FALSE ∧ NoNeu_CloseClutch_Setting = FALSE ∧ ToNeu_CloseClutch = FALSE ⇒ time ≤ tClutch_Close + Channel_DL
FromNeu_CloseClutchDurationDeadline52 : Clutch_Close = TRUE ∧ FromNeu_CloseClutch = TRUE ⇒ tFromNeu_CloseClutch ≤ tClutch_Close + Channel_DL
NoNeu_CloseClutch_ReleasingDurationDeadline52 : Clutch_Close = TRUE ∧ NoNeu_CloseClutch_Releasing = TRUE ⇒ tNoNeu_CloseClutch_Releasing ≤ tClutch_Close + Channel_DL
NoNeu_CloseClutch_SettingDurationDeadline52 : Clutch_Close = TRUE ∧ NoNeu_CloseClutch_Setting = TRUE ⇒ tNoNeu_CloseClutch_Setting ≤ tClutch_Close + Channel_DL
ToNeu_CloseClutchDurationDeadline52 : Clutch_Close = TRUE ∧ ToNeu_CloseClutch = TRUE ⇒ tToNeu_CloseClutch ≤ tClutch_Close + Channel_DL
tError_Clutch_Open :tError_Clutch_Open ∈ ℕ
Deadline53 : Clutch_Request_Open = TRUE ∧ Clutch_Open = FALSE ∧ Error_Clutch_Open = FALSE ⇒ time ≤ tClutch_Request_Open + Clutch_Open_DL
Clutch_OpenDurationDeadline53 : Clutch_Request_Open = TRUE ∧ Clutch_Open = TRUE ⇒ tClutch_Open ≤ tClutch_Request_Open + Clutch_Open_DL
Error_Clutch_OpenDurationDeadline53 : Clutch_Request_Open = TRUE ∧ Error_Clutch_Open = TRUE ⇒ tError_Clutch_Open ≤ tClutch_Request_Open + Clutch_Open_DL
tError_Clutch_Close :tError_Clutch_Close ∈ ℕ
Deadline54 : Clutch_Request_Close = TRUE ∧ Clutch_Close = FALSE ∧ Error_Clutch_Close = FALSE ⇒ time ≤ tClutch_Request_Close + Clutch_Close_DL
Clutch_CloseDurationDeadline54 : Clutch_Request_Close = TRUE ∧ Clutch_Close = TRUE ⇒ tClutch_Close ≤ tClutch_Request_Close + Clutch_Close_DL
Error_Clutch_CloseDurationDeadline54 : Clutch_Request_Close = TRUE ∧ Error_Clutch_Close = TRUE ⇒ tError_Clutch_Close ≤ tClutch_Request_Close + Clutch_Close_DL

TIMING

Expiry2 :Expiry (RequestFromNeu, FromNeu_SyncSpeed, Sync_EX)
Deadline10 :Deadline (FromNeu_SyncSpeed, FromNeu_SetGear_NoClutch ∨ Error_FromNeu_SetGear_NoClutch, SetGear_DL)
Deadline11 :Deadline (FromNeu_OpenClutch, Error_FromNeu_SetGear_Clutch ∨ FromNeu_SetGear_Clutch, SetGear_DL)
Deadline12 :Deadline (FromNeu_SetGear_Clutch, Error_FromNeu_CloseClutch ∨ FromNeu_CloseClutch, CloseClutch_DL)
Expiry3 :Expiry (RequestToNeu, ToNeu_ZeroTorque, Zero_EX)
Deadline14 :Deadline (ToNeu_ZeroTorque, ToNeu_Release_NoClutch ∨ Error_ToNeu_Release_NoClutch, Release_DL)
Deadline15 :Deadline (ToNeu_OpenClutch, ToNeu_Release_Clutch ∨ Error_ToNeu_Release_Clutch, Release_DL)
Deadline16 :Deadline (ToNeu_Release_Clutch, Error_ToNeu_CloseClutch ∨ ToNeu_CloseClutch, CloseClutch_DL)
Expiry4 :Expiry (RequestNoNeu, NoNeu_ZeroTorque, Zero_EX)
Deadline18 :Deadline (NoNeu_OpenClutch_Releasing, NoNeu_Release_Clutch ∨ Error_NoNeu_Release_Clutch, Release_DL)
Deadline19 :Deadline (NoNeu_ZeroTorque, NoNeu_Release_NoClutch ∨ Error_NoNeu_Release_NoClutch, Release_DL)
Expiry5 :Expiry (NoNeu_Release_NoClutch, NoNeu_SyncSpeed, Sync_EX)
Deadline21 :Deadline (NoNeu_SyncSpeed, NoNeu_SetGear_NoClutch ∨ Error_NoNeu_SetGear_NoClutch, SetGear_DL)
Deadline22 :Deadline (NoNeu_OpenClutch_Setting, NoNeu_SetGear_SettingClutch ∨ Error_NoNeu_SetGear_SettingClutch, SetGear_DL)
Deadline23 :Deadline (NoNeu_SetGear_SettingClutch, NoNeu_CloseClutch_Setting ∨ Error_NoNeu_CloseClutch_Setting, CloseClutch_DL)
Deadline24 :Deadline (NoNeu_Release_Clutch, Error_NoNeu_SetGear_ReleasingClutch ∨ NoNeu_SetGear_ReleasingClutch, SetGear_DL)
Deadline25 : Deadline (NoNeu_SetGear_ReleasingClutch, NoNeu_CloseClutch_Releasing ∨ Error_NoNeu_CloseClutch_Releasing, CloseClutch_DL)
Delay1 :Delay (RequestFromNeu, FromNeu_RequestOpenClutch, OpenClutch_Sync_DE)
Deadline27 :Deadline (FromNeu_RequestOpenClutch, FromNeu_OpenClutch ∨ Error_FromNeu_OpenClutch, OpenClutch_DL)
Deadline28 :Deadline (RequestToNeu, ToNeu_ZeroTorque ∨ ToNeu_RequestOpenClutch, Zero_DL)
Delay2 :Delay (RequestToNeu, ToNeu_RequestOpenClutch, OpenClutch_Zero_DE)
Deadline29 :Deadline (ToNeu_RequestOpenClutch, ToNeu_OpenClutch ∨ Error_ToNeu_OpenClutch, OpenClutch_DL)
Deadline30 :Deadline (RequestNoNeu, NoNeu_RequestOpenClutch_Releasing ∨ NoNeu_ZeroTorque, Zero_DL)
Delay3 :Delay (RequestNoNeu, NoNeu_RequestOpenClutch_Releasing, OpenClutch_Zero_DE)
Deadline31 : Deadline (NoNeu_RequestOpenClutch_Releasing, NoNeu_OpenClutch_Releasing ∨ Error_NoNeu_OpenClutch_Releasing, OpenClutch_DL)
Deadline32 :Deadline (NoNeu_Release_NoClutch, NoNeu_RequestOpenClutch_Setting ∨ NoNeu_SyncSpeed, Sync_DL)
Delay4 :Delay (NoNeu_Release_NoClutch, NoNeu_RequestOpenClutch_Setting, OpenClutch_Sync_DE)
Deadline33 : Deadline (NoNeu_RequestOpenClutch_Setting, NoNeu_OpenClutch_Setting ∨ Error_NoNeu_OpenClutch_Setting, OpenClutch_DL)
Deadline34 :Deadline (RequestFromNeu, FromNeu_RequestOpenClutch ∨ FromNeu_SyncSpeed, Sync_DL)
Deadline35 :Deadline (RequestFromNeu, Engine_Request_SyncSpeed, Channel_DL)
Deadline36 :Deadline (NoNeu_Release_NoClutch, Engine_Request_SyncSpeed, Channel_DL)

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Deadline37 :Deadline (RequestToNeu, Engine_Request_ZeroTorque, Channel_DL)
Deadline38 :Deadline (RequestNoNeu, Engine_Request_ZeroTorque, Channel_DL)
Deadline39 :Deadline (Engine_ZeroTorque, NoNeu_ZeroTorque ∨ ToNeu_ZeroTorque, Channel_DL)
Deadline40 :Deadline (Engine_SyncSpeed, FromNeu_SyncSpeed ∨ NoNeu_SyncSpeed, Channel_DL)
Deadline41 :Deadline (Engine_Request_SyncSpeed, Engine_SyncSpeed ∨ Engine_WaitForSyncClutch, Engine_Sync_DL)
Deadline42 :Deadline (Engine_Request_ZeroTorque, Engine_WaitForZeroClutch ∨ Engine_ZeroTorque, Engine_Zero_DL)
Deadline43 :Deadline (FromNeu_RequestOpenClutch, Clutch_Request_Open, Channel_DL)
Deadline44 :Deadline (ToNeu_RequestOpenClutch, Clutch_Request_Open, Channel_DL)
Deadline45 :Deadline (NoNeu_RequestOpenClutch_Releasing, Clutch_Request_Open, Channel_DL)
Deadline46 :Deadline (NoNeu_RequestOpenClutch_Setting, Clutch_Request_Open, Channel_DL)
Deadline47 :Deadline (FromNeu_SetGear_Clutch, Clutch_Request_Close, Channel_DL)
Deadline48 :Deadline (NoNeu_SetGear_ReleasingClutch, Clutch_Request_Close, Channel_DL)
Deadline49 :Deadline (NoNeu_SetGear_SettingClutch, Clutch_Request_Close, Channel_DL)
Deadline50 :Deadline (ToNeu_Release_Clutch, Clutch_Request_Close, Channel_DL)
Deadline51 :Deadline (Clutch_Open, FromNeu_OpenClutch ∨ NoNeu_OpenClutch_Releasing ∨ NoNeu_OpenClutch_Setting ∨
            ToNeu_OpenClutch, Channel_DL)
Deadline52 :Deadline (Clutch_Close, FromNeu_CloseClutch ∨ NoNeu_CloseClutch_Releasing ∨ NoNeu_CloseClutch_Setting ∨
            ToNeu_CloseClutch, Channel_DL)
Deadline53 :Deadline (Clutch_Request_Open, Clutch_Open ∨ Error_Clutch_Open, Clutch_Open_DL)
Deadline54 :Deadline (Clutch_Request_Close, Clutch_Close ∨ Error_Clutch_Close, Clutch_Close_DL)
EVENTS
  INITIALISATION ≙
    extended
      STATUS
    ordinary
BEGIN
    act1 :isNeu ≔ TRUE
    act2 :RequestNoNeu ≔ FALSE
    act3 :RequestToNeu ≔ FALSE
    act4 :RequestFromNeu ≔ FALSE
    act5 :FromNeu_SyncSpeed ≔ FALSE
    act6 :FromNeu_OpenClutch ≔ FALSE
    act7 :FromNeu_SetGear_NoClutch ≔ FALSE
    act8 :FromNeu_SetGear_Clutch ≔ FALSE
    act9 :FromNeu_CloseClutch ≔ FALSE
    act10 :Error_FromNeu_OpenClutch ≔ FALSE
    act11 :Error_FromNeu_SetGear_NoClutch ≔ FALSE
    act12 :Error_FromNeu_SetGear_Clutch ≔ FALSE
    act13 :Error_FromNeu_CloseClutch ≔ FALSE
    act14 :ToNeu_ZeroTorque≔ FALSE      // Senario3 Flage
    act15 :ToNeu_OpenClutch ≔ FALSE      // Senario3 Flage
    act16 :Error_ToNeu_OpenClutch ≔ FALSE      // Senario3 Flage
    act17 :ToNeu_Release_NoClutch≔ FALSE      // Senario3 Flage
    act18 :Error_ToNeu_Release_NoClutch≔ FALSE      // Senario3 Flage
    act19 :ToNeu_Release_Clutch≔ FALSE      // Senario3 Flage
    act20 :Error_ToNeu_Release_Clutch ≔ FALSE      // Senario3 Flage
    act21 :ToNeu_CloseClutch≔ FALSE      // Senario3 Flage
    act22 :Error_ToNeu_CloseClutch≔ FALSE      // Senario3 Flage
    act23 :NoNeu_ZeroTorque≔ FALSE      // Senario2 Flage
    act24 :NoNeu_OpenClutch_Releasing≔ FALSE      // Senario2 Flage
    act25 :NoNeu_Release_NoClutch≔ FALSE      // Senario2 Flage
    act26 :NoNeu_Release_Clutch≔ FALSE      // Senario2 Flage
    act27 :NoNeu_SyncSpeed ≔ FALSE      // Senario2 Flage
    act28 :NoNeu_OpenClutch_Setting ≔ FALSE      // Senario2 Flage
    act29 :NoNeu_SetGear_NoClutch≔ FALSE      // Senario2 Flage
    act30 :NoNeu_SetGear_ReleasingClutch≔ FALSE      // Senario2 Flage
    act31 :NoNeu_SetGear_SettingClutch≔ FALSE      // Senario2 Flage
    act32 :NoNeu_CloseClutch_Releasing≔ FALSE      // Senario2 Flage
    act33 :NoNeu_CloseClutch_Setting≔ FALSE      // Senario2 Flage
    act34 :Error_NoNeu_OpenClutch_Releasing≔ FALSE      // Senario2 Flage
    act35 :Error_NoNeu_Release_NoClutch≔ FALSE      // Senario2 Flage
    act36 :Error_NoNeu_Release_Clutch≔ FALSE      // Senario2 Flage
    act37 :Error_NoNeu_OpenClutch_Setting ≔ FALSE      // Senario2 Flage
    act38 :Error_NoNeu_SetGear_NoClutch≔ FALSE      // Senario2 Flage
    act39 :Error_NoNeu_SetGear_ReleasingClutch≔ FALSE      // Senario2 Flage
    act40 :Error_NoNeu_SetGear_SettingClutch≔ FALSE      // Senario2 Flage
    act41 :Error_NoNeu_CloseClutch_Releasing ≔ FALSE      // Senario2 Flage
    act42 :Error_NoNeu_CloseClutch_Setting ≔ FALSE      // Senario2 Flage
    act43 :Engine_SyncSpeed ≔ FALSE
    act44 :Engine_WaitForSyncClutch ≔ FALSE
    act45 :Engine_ZeroTorque ≔ FALSE
    act46 :Engine_WaitForZeroClutch ≔ FALSE
    act47 :Clutch_Open ≔ FALSE      // Clutch Flags
    act48 :Error_Clutch_Open ≔ FALSE      // Clutch Flags
    act49 :Clutch_Close ≔ FALSE      // Clutch Flags
    act50 :Error_Clutch_Close ≔ FALSE      // Clutch Flags
    act51 :Gear_Release ≔ FALSE      // Gear Flags
    act52 :Error_Gear_Release ≔ FALSE      // Gear Flags
    act53 :Gear_Set ≔ FALSE      // Gear Flags
```

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        act54 :Error_Gear_Set ≔ FALSE      // Gear Flags
        act55 :FromNeu_RequestOpenClutch ≔ FALSE      // Senario1 Flag
        act56 :ToNeu_RequestOpenClutch ≔ FALSE      // Senario3 Flag
        act57 :NoNeu_RequestOpenClutch_Releasing ≔ FALSE      // Senario2 Flag
        act58 :NoNeu_RequestOpenClutch_Setting ≔ FALSE      // Senario2 Flag
        act81 :Engine_Request_SyncSpeed ≔ FALSE      // Engine Flgas
        act82 :Engine_Request_ZeroTorque ≔ FALSE      // Engine Flgas
        act83 :Clutch_Request_Open ≔ FALSE      // Clutch Flags
        act84 :Clutch_Request_Close ≔ FALSE      // Clutch Flags
        act85 :Gear_Request_Release ≔ FALSE      // Gear Flags
        act86 :Gear_Request_Set ≔ FALSE      // Gear Flags
        time :time ≔ 0
        tRequestFromNeu :tRequestFromNeu ≔ 0
        tFromNeu_SyncSpeed :tFromNeu_SyncSpeed ≔ 0
        tFromNeu_SetGear_NoClutch :tFromNeu_SetGear_NoClutch ≔ 0
        tError_FromNeu_SetGear_NoClutch :tError_FromNeu_SetGear_NoClutch ≔ 0
        tFromNeu_OpenClutch :tFromNeu_OpenClutch ≔ 0
        tError_FromNeu_SetGear_Clutch :tError_FromNeu_SetGear_Clutch ≔ 0
        tFromNeu_SetGear_Clutch :tFromNeu_SetGear_Clutch ≔ 0
        tError_FromNeu_CloseClutch :tError_FromNeu_CloseClutch ≔ 0
        tFromNeu_CloseClutch :tFromNeu_CloseClutch ≔ 0
        tRequestToNeu :tRequestToNeu ≔ 0
        tToNeu_ZeroTorque :tToNeu_ZeroTorque ≔ 0
        tToNeu_Release_NoClutch :tToNeu_Release_NoClutch ≔ 0
        tError_ToNeu_Release_NoClutch :tError_ToNeu_Release_NoClutch ≔ 0
        tToNeu_OpenClutch :tToNeu_OpenClutch ≔ 0
        tToNeu_Release_Clutch :tToNeu_Release_Clutch ≔ 0
        tError_ToNeu_Release_Clutch :tError_ToNeu_Release_Clutch ≔ 0
        tError_ToNeu_CloseClutch :tError_ToNeu_CloseClutch ≔ 0
        tToNeu_CloseClutch :tToNeu_CloseClutch ≔ 0
        tRequestNoNeu :tRequestNoNeu ≔ 0
        tNoNeu_ZeroTorque :tNoNeu_ZeroTorque ≔ 0
        tNoNeu_OpenClutch_Releasing :tNoNeu_OpenClutch_Releasing ≔ 0
        tNoNeu_Release_Clutch :tNoNeu_Release_Clutch ≔ 0
        tError_NoNeu_Release_Clutch :tError_NoNeu_Release_Clutch ≔ 0
        tNoNeu_Release_NoClutch :tNoNeu_Release_NoClutch ≔ 0
        tError_NoNeu_Release_NoClutch :tError_NoNeu_Release_NoClutch ≔ 0
        tNoNeu_SyncSpeed :tNoNeu_SyncSpeed ≔ 0
        tNoNeu_SetGear_NoClutch :tNoNeu_SetGear_NoClutch ≔ 0
        tError_NoNeu_SetGear_NoClutch :tError_NoNeu_SetGear_NoClutch ≔ 0
        tNoNeu_OpenClutch_Setting :tNoNeu_OpenClutch_Setting ≔ 0
        tNoNeu_SetGear_SettingClutch :tNoNeu_SetGear_SettingClutch ≔ 0
        tError_NoNeu_SetGear_SettingClutch :tError_NoNeu_SetGear_SettingClutch ≔ 0
        tNoNeu_CloseClutch_Setting :tNoNeu_CloseClutch_Setting ≔ 0
        tError_NoNeu_CloseClutch_Setting :tError_NoNeu_CloseClutch_Setting ≔ 0
        tError_NoNeu_SetGear_ReleasingClutch :tError_NoNeu_SetGear_ReleasingClutch ≔ 0
        tNoNeu_SetGear_ReleasingClutch :tNoNeu_SetGear_ReleasingClutch ≔ 0
        tNoNeu_CloseClutch_Releasing :tNoNeu_CloseClutch_Releasing ≔ 0
        tError_NoNeu_CloseClutch_Releasing :tError_NoNeu_CloseClutch_Releasing ≔ 0
        tFromNeu_RequestOpenClutch :tFromNeu_RequestOpenClutch ≔ 0
        tError_FromNeu_OpenClutch :tError_FromNeu_OpenClutch ≔ 0
        tToNeu_RequestOpenClutch :tToNeu_RequestOpenClutch ≔ 0
        tError_ToNeu_OpenClutch :tError_ToNeu_OpenClutch ≔ 0
        tNoNeu_RequestOpenClutch_Releasing :tNoNeu_RequestOpenClutch_Releasing ≔ 0
        tError_NoNeu_OpenClutch_Releasing :tError_NoNeu_OpenClutch_Releasing ≔ 0
        tNoNeu_RequestOpenClutch_Setting :tNoNeu_RequestOpenClutch_Setting ≔ 0
        tError_NoNeu_OpenClutch_Setting :tError_NoNeu_OpenClutch_Setting ≔ 0
        tEngine_Request_SyncSpeed :tEngine_Request_SyncSpeed ≔ 0
        tEngine_Request_ZeroTorque :tEngine_Request_ZeroTorque ≔ 0
        tEngine_ZeroTorque :tEngine_ZeroTorque ≔ 0
        tEngine_SyncSpeed :tEngine_SyncSpeed ≔ 0
        tEngine_WaitForSyncClutch :tEngine_WaitForSyncClutch ≔ 0
        tEngine_WaitForZeroClutch :tEngine_WaitForZeroClutch ≔ 0
        tClutch_Request_Open :tClutch_Request_Open ≔ 0
        tClutch_Request_Close :tClutch_Request_Close ≔ 0
        tClutch_Open :tClutch_Open ≔ 0
        tClutch_Close :tClutch_Close ≔ 0
        tError_Clutch_Open :tError_Clutch_Open ≔ 0
        tError_Clutch_Close :tError_Clutch_Close ≔ 0
END

    RequestFromNeu ≙
      extended
        STATUS
      ordinary
REFINES
      RequestFromNeu
WHEN
      grd1 :RequestFromNeu = FALSE
```

```
        grd2 :RequestNoNeu = FALSE
        grd3 :RequestToNeu = FALSE
        grd4 :isNeu = TRUE
THEN
        act1 :RequestFromNeu ≔ TRUE
        tRequestFromNeu :tRequestFromNeu ≔ time
END

    RequestNoNeu ≙
      extended
          STATUS
      ordinary
REFINES
        RequestNoNeu
WHEN
        grd1 :RequestFromNeu = FALSE
        grd2 :RequestNoNeu = FALSE
        grd3 :RequestToNeu = FALSE
        grd4 :isNeu = FALSE
THEN
        act1 :RequestNoNeu ≔ TRUE
        tRequestNoNeu :tRequestNoNeu ≔ time
END

    RequestToNeu ≙
      extended
          STATUS
      ordinary
REFINES
        RequestToNeu
WHEN
        grd1 :RequestFromNeu = FALSE
        grd2 :RequestNoNeu = FALSE
        grd3 :RequestToNeu = FALSE
        grd4 :isNeu = FALSE
THEN
        act1 :RequestToNeu ≔ TRUE
        tRequestToNeu :tRequestToNeu ≔ time
END

    FromNeu_SyncSpeed ≙
      extended
          STATUS
      ordinary
REFINES
        FromNeu_SyncSpeed
WHEN
        grd1 :RequestFromNeu = TRUE
        grd2 :FromNeu_SyncSpeed = FALSE
        grd3 :FromNeu_RequestOpenClutch = FALSE
        grd4 :Engine_SyncSpeed = TRUE
        Expiry2 :time ≤ tRequestFromNeu + Sync_EX
THEN
        act1 :FromNeu_SyncSpeed ≔ TRUE
        tFromNeu_SyncSpeed :tFromNeu_SyncSpeed ≔ time
END

    FromNeu_RequestOpenClutch ≙
      extended
          STATUS
      ordinary
REFINES
        FromNeu_RequestOpenClutch
WHEN
        grd1 :RequestFromNeu = TRUE
        grd2 :FromNeu_SyncSpeed = FALSE
        grd3 :FromNeu_RequestOpenClutch = FALSE
        Delay1 :time ≥ tRequestFromNeu + OpenClutch_Sync_DE
THEN
        act1 :FromNeu_RequestOpenClutch ≔ TRUE
        tFromNeu_RequestOpenClutch :tFromNeu_RequestOpenClutch ≔ time
END

    FromNeu_OpenClutch ≙
      extended
          STATUS
      ordinary
REFINES
        FromNeu_OpenClutch
```

WHEN
grd1 :FromNeu_RequestOpenClutch = TRUE
grd2 :Error_FromNeu_OpenClutch = FALSE
grd3 :FromNeu_OpenClutch = FALSE
grd4 :Clutch_Open = TRUE
THEN
act1 :FromNeu_OpenClutch ≔ TRUE
tFromNeu_OpenClutch :tFromNeu_OpenClutch ≔ time
END

Error_FromNeu_OpenClutch ≙
extended
STATUS
ordinary
REFINES
Error_FromNeu_OpenClutch
WHEN
grd1 :FromNeu_RequestOpenClutch = TRUE
grd2 :Error_FromNeu_OpenClutch = FALSE
grd3 :FromNeu_OpenClutch = FALSE
THEN
act1 :Error_FromNeu_OpenClutch ≔ TRUE
tError_FromNeu_OpenClutch :tError_FromNeu_OpenClutch ≔ time
END

FromNeu_SetGear_NoClutch ≙
extended
STATUS
ordinary
REFINES
FromNeu_SetGear_NoClutch
WHEN
grd1 :FromNeu_SyncSpeed = TRUE
grd2 :Error_FromNeu_SetGear_NoClutch = FALSE
grd3 :FromNeu_SetGear_NoClutch = FALSE
grd4 :Gear_Set = TRUE
THEN
act1 :FromNeu_SetGear_NoClutch ≔ TRUE
act2 :isNeu ≔ FALSE
tFromNeu_SetGear_NoClutch :tFromNeu_SetGear_NoClutch ≔ time
END

Error_FromNeu_SetGear_NoClutch ≙
extended
STATUS
ordinary
REFINES
Error_FromNeu_SetGear_NoClutch
WHEN
grd1 :FromNeu_SyncSpeed = TRUE
grd2 :Error_FromNeu_SetGear_NoClutch = FALSE
grd3 :FromNeu_SetGear_NoClutch = FALSE
grd4 :Gear_Set= TRUE
THEN
act1 :Error_FromNeu_SetGear_NoClutch ≔ TRUE
tError_FromNeu_SetGear_NoClutch :tError_FromNeu_SetGear_NoClutch ≔ time
END

FromNeu_SetGear_Clutch ≙
extended
STATUS
ordinary
REFINES
FromNeu_SetGear_Clutch
WHEN
grd1 :FromNeu_OpenClutch = TRUE
grd2 :Error_FromNeu_SetGear_Clutch = FALSE
grd3 :FromNeu_SetGear_Clutch = FALSE
grd4 :Gear_Set= TRUE
THEN
act1 :FromNeu_SetGear_Clutch ≔ TRUE
tFromNeu_SetGear_Clutch :tFromNeu_SetGear_Clutch ≔ time
END

Error_FromNeu_SetGear_Clutch ≙
extended
STATUS
ordinary
REFINES

```
        Error_FromNeu_SetGear_Clutch
WHEN
        grd1 :FromNeu_OpenClutch = TRUE
        grd2 :Error_FromNeu_SetGear_Clutch = FALSE
        grd3 :FromNeu_SetGear_Clutch = FALSE
THEN
        act1 :Error_FromNeu_SetGear_Clutch ≔ TRUE
        tError_FromNeu_SetGear_Clutch :tError_FromNeu_SetGear_Clutch ≔ time
END

    FromNeu_CloseClutch ≙
        extended
            STATUS
        ordinary
REFINES
        FromNeu_CloseClutch
WHEN
        grd1 :FromNeu_SetGear_Clutch = TRUE
        grd2 :Error_FromNeu_CloseClutch = FALSE
        grd3 :FromNeu_CloseClutch = FALSE
        grd4 :Clutch_Close = TRUE
THEN
        act1 :FromNeu_CloseClutch ≔ TRUE
        act2 :isNeu ≔ FALSE
        tFromNeu_CloseClutch :tFromNeu_CloseClutch ≔ time
END

    Error_FromNeu_CloseClutch ≙
        extended
            STATUS
        ordinary
REFINES
        Error_FromNeu_CloseClutch
WHEN
        grd1 :FromNeu_SetGear_Clutch = TRUE
        grd2 :Error_FromNeu_CloseClutch = FALSE
        grd3 :FromNeu_CloseClutch = FALSE
THEN
        act1 :Error_FromNeu_CloseClutch ≔ TRUE
        tError_FromNeu_CloseClutch :tError_FromNeu_CloseClutch ≔ time
END

    ToNeu_ZeroTorque ≙      // First Event of Senarion3
        extended
            STATUS
        ordinary
REFINES
        ToNeu_ZeroTorque
WHEN
        grd1 :RequestToNeu = TRUE
        grd2 :ToNeu_ZeroTorque = FALSE
        grd3 :ToNeu_RequestOpenClutch = FALSE
        grd4 :Engine_ZeroTorque = TRUE
        Expiry3 :time ≤ tRequestToNeu + Zero_EX
THEN
        act1 :ToNeu_ZeroTorque ≔ TRUE
        tToNeu_ZeroTorque :tToNeu_ZeroTorque ≔ time
END

    ToNeu_RequestOpenClutch ≙
        extended
            STATUS
        ordinary
REFINES
        ToNeu_RequestOpenClutch
WHEN
        grd1 :RequestToNeu = TRUE
        grd2 :ToNeu_ZeroTorque = FALSE
        grd3 :ToNeu_RequestOpenClutch = FALSE
        Delay2 :time ≥ tRequestToNeu + OpenClutch_Zero_DE
THEN
        act1 :ToNeu_RequestOpenClutch ≔ TRUE
        tToNeu_RequestOpenClutch :tToNeu_RequestOpenClutch ≔ time
END

    ToNeu_OpenClutch ≙
        extended
            STATUS
        ordinary
```

REFINES
ToNeu_OpenClutch
WHEN
grd1 :*ToNeu_RequestOpenClutch = TRUE*
grd2 :*ToNeu_OpenClutch = FALSE*
grd3 :*Error_ToNeu_OpenClutch = FALSE*
grd4 :*Clutch_Open = TRUE*
THEN
act1 :*ToNeu_OpenClutch ≔ TRUE*
tToNeu_OpenClutch :*tToNeu_OpenClutch ≔ time*
END

Error_ToNeu_OpenClutch ≙
extended
STATUS
ordinary
REFINES
Error_ToNeu_OpenClutch
WHEN
grd1 :*ToNeu_RequestOpenClutch = TRUE*
grd2 :*ToNeu_OpenClutch = FALSE*
grd3 :*Error_ToNeu_OpenClutch = FALSE*
THEN
act1 :*Error_ToNeu_OpenClutch ≔ TRUE*
tError_ToNeu_OpenClutch :*tError_ToNeu_OpenClutch ≔ time*
END

ToNeu_Release_NoClutch ≙
extended
STATUS
ordinary
REFINES
ToNeu_Release_NoClutch
WHEN
grd1 :*ToNeu_ZeroTorque = TRUE*
grd2 :*ToNeu_Release_NoClutch = FALSE*
grd3 :*Error_ToNeu_Release_NoClutch = FALSE*
grd4 :*Gear_Release = TRUE*
THEN
act1 :*ToNeu_Release_NoClutch ≔ TRUE*
act2 :*isNeu ≔ TRUE*
tToNeu_Release_NoClutch :*tToNeu_Release_NoClutch ≔ time*
END

Error_ToNeu_Release_NoClutch ≙
extended
STATUS
ordinary
REFINES
Error_ToNeu_Release_NoClutch
WHEN
grd1 :*ToNeu_ZeroTorque = TRUE*
grd2 :*ToNeu_Release_NoClutch = FALSE*
grd3 :*Error_ToNeu_Release_NoClutch = FALSE*
THEN
act1 :*Error_ToNeu_Release_NoClutch ≔ TRUE*
tError_ToNeu_Release_NoClutch :*tError_ToNeu_Release_NoClutch ≔ time*
END

ToNeu_Release_Clutch ≙
extended
STATUS
ordinary
REFINES
ToNeu_Release_Clutch
WHEN
grd1 :*ToNeu_OpenClutch = TRUE*
grd2 :*ToNeu_Release_Clutch = FALSE*
grd3 :*Error_ToNeu_Release_Clutch = FALSE*
grd4 :*Gear_Release = TRUE*
THEN
act1 :*ToNeu_Release_Clutch ≔ TRUE*
tToNeu_Release_Clutch :*tToNeu_Release_Clutch ≔ time*
END

Error_ToNeu_Release_Clutch ≙
extended
STATUS
ordinary

```
REFINES
        Error_ToNeu_Release_Clutch
WHEN
        grd1 :ToNeu_OpenClutch = TRUE
        grd2 :ToNeu_Release_Clutch = FALSE
        grd3 :Error_ToNeu_Release_Clutch = FALSE
THEN
        act1 :Error_ToNeu_Release_Clutch ≔ TRUE
        tError_ToNeu_Release_Clutch :tError_ToNeu_Release_Clutch ≔ time
END

    ToNeu_CloseClutch ≙
        extended
            STATUS
        ordinary
REFINES
        ToNeu_CloseClutch
WHEN
        grd1 :ToNeu_Release_Clutch = TRUE
        grd2 :ToNeu_CloseClutch = FALSE
        grd3 :Error_ToNeu_CloseClutch = FALSE
        grd4 :Clutch_Close = TRUE
THEN
        act1 :ToNeu_CloseClutch ≔ TRUE
        act2 :isNeu ≔ TRUE
        tToNeu_CloseClutch :tToNeu_CloseClutch ≔ time
END

    Error_ToNeu_CloseClutch ≙      // Last Event of Senarion3
        extended
            STATUS
        ordinary
REFINES
        Error_ToNeu_CloseClutch
WHEN
        grd1 :ToNeu_Release_Clutch = TRUE
        grd2 :ToNeu_CloseClutch = FALSE
        grd3 :Error_ToNeu_CloseClutch = FALSE
THEN
        act1 :Error_ToNeu_CloseClutch ≔ TRUE
        tError_ToNeu_CloseClutch :tError_ToNeu_CloseClutch ≔ time
END

    NoNeu_ZeroTorque ≙      // First Event of Senarion2
        extended
            STATUS
        ordinary
REFINES
        NoNeu_ZeroTorque
WHEN
        grd1 :RequestNoNeu = TRUE
        grd2 :NoNeu_ZeroTorque = FALSE
        grd3 :NoNeu_RequestOpenClutch_Releasing = FALSE
        grd4 :Engine_ZeroTorque = TRUE
        Expiry4 :time ≤ tRequestNoNeu + Zero_EX
THEN
        act1 :NoNeu_ZeroTorque ≔ TRUE
        tNoNeu_ZeroTorque :tNoNeu_ZeroTorque ≔ time
END

    NoNeu_RequestOpenClutch_Releasing ≙
        extended
            STATUS
        ordinary
REFINES
        NoNeu_RequestOpenClutch_Releasing
WHEN
        grd1 :RequestNoNeu = TRUE
        grd2 :NoNeu_ZeroTorque = FALSE
        grd3 :NoNeu_RequestOpenClutch_Releasing = FALSE
        Delay3 :time ≥ tRequestNoNeu + OpenClutch_Zero_DE
THEN
        act1 :NoNeu_RequestOpenClutch_Releasing ≔ TRUE
        tNoNeu_RequestOpenClutch_Releasing :tNoNeu_RequestOpenClutch_Releasing ≔ time
END

    NoNeu_OpenClutch_Releasing ≙
        extended
            STATUS
```

ordinary
REFINES
NoNeu_OpenClutch_Releasing
WHEN
grd1 :NoNeu_OpenClutch_Releasing = TRUE
grd2 :NoNeu_OpenClutch_Releasing = FALSE
grd3 :Error_NoNeu_OpenClutch_Releasing = FALSE
grd4 :Clutch_Open = TRUE
THEN
act1 :NoNeu_OpenClutch_Releasing ≔ TRUE
tNoNeu_OpenClutch_Releasing :tNoNeu_OpenClutch_Releasing ≔ time
END

Error_NoNeu_OpenClutch_Releasing ≙
extended
STATUS
ordinary
REFINES
Error_NoNeu_OpenClutch_Releasing
WHEN
grd1 :NoNeu_RequestOpenClutch_Releasing = TRUE
grd2 :NoNeu_OpenClutch_Releasing = FALSE
grd3 :Error_NoNeu_OpenClutch_Releasing = FALSE
THEN
act1 :Error_NoNeu_OpenClutch_Releasing ≔ TRUE
tError_NoNeu_OpenClutch_Releasing :tError_NoNeu_OpenClutch_Releasing ≔ time
END

NoNeu_Release_NoClutch ≙
extended
STATUS
ordinary
REFINES
NoNeu_Release_NoClutch
WHEN
grd1 :NoNeu_ZeroTorque = TRUE
grd2 :NoNeu_Release_NoClutch = FALSE
grd3 :Error_NoNeu_Release_NoClutch = FALSE
grd4 :Gear_Release = TRUE
THEN
act1 :NoNeu_Release_NoClutch ≔ TRUE
tNoNeu_Release_NoClutch :tNoNeu_Release_NoClutch ≔ time
END

Error_NoNeu_Release_NoClutch ≙
extended
STATUS
ordinary
REFINES
Error_NoNeu_Release_NoClutch
WHEN
grd1 :NoNeu_ZeroTorque = TRUE
grd2 :NoNeu_Release_NoClutch = FALSE
grd3 :Error_NoNeu_Release_NoClutch = FALSE
THEN
act1 :Error_NoNeu_Release_NoClutch ≔ TRUE
tError_NoNeu_Release_NoClutch :tError_NoNeu_Release_NoClutch ≔ time
END

NoNeu_Release_Clutch ≙
extended
STATUS
ordinary
REFINES
NoNeu_Release_Clutch
WHEN
grd1 :NoNeu_OpenClutch_Releasing = TRUE
grd2 :NoNeu_Release_Clutch = FALSE
grd3 :Error_NoNeu_Release_Clutch = FALSE
grd4 :Gear_Release = TRUE
THEN
act1 :NoNeu_Release_Clutch ≔ TRUE
tNoNeu_Release_Clutch :tNoNeu_Release_Clutch ≔ time
END

Error_NoNeu_Release_Clutch ≙
extended
STATUS
ordinary

REFINES
Error_NoNeu_Release_Clutch
WHEN
grd1 :*NoNeu_OpenClutch_Releasing = TRUE*
grd2 :*NoNeu_Release_Clutch = FALSE*
grd3 :*Error_NoNeu_Release_Clutch = FALSE*
THEN
act1 :*Error_NoNeu_Release_Clutch* ≔ *TRUE*
tError_NoNeu_Release_Clutch :*tError_NoNeu_Release_Clutch* ≔ *time*
END

NoNeu_SyncSpeed ≙
extended
STATUS
ordinary
REFINES
NoNeu_SyncSpeed
WHEN
grd1 :*NoNeu_Release_NoClutch = TRUE*
grd2 :*NoNeu_SyncSpeed = FALSE*
grd3 :*NoNeu_RequestOpenClutch_Setting = FALSE*
grd4 :*Engine_SyncSpeed= TRUE*
Expiry5 :*time* ≤ *tNoNeu_Release_NoClutch + Sync_EX*
THEN
act1 :*NoNeu_SyncSpeed* ≔ *TRUE*
tNoNeu_SyncSpeed :*tNoNeu_SyncSpeed* ≔ *time*
END

NoNeu_RequestOpenClutch_Setting ≙
extended
STATUS
ordinary
REFINES
NoNeu_RequestOpenClutch_Setting
WHEN
grd1 :*NoNeu_Release_NoClutch = TRUE*
grd2 :*NoNeu_SyncSpeed = FALSE*
grd3 :*NoNeu_RequestOpenClutch_Setting = FALSE*
Delay4 :*time* ≥ *tNoNeu_Release_NoClutch + OpenClutch_Sync_DE*
THEN
act1 :*NoNeu_RequestOpenClutch_Setting* ≔ *TRUE*
tNoNeu_RequestOpenClutch_Setting :*tNoNeu_RequestOpenClutch_Setting* ≔ *time*
END

NoNeu_OpenClutch_Setting ≙
extended
STATUS
ordinary
REFINES
NoNeu_OpenClutch_Setting
WHEN
grd1 :*NoNeu_RequestOpenClutch_Setting = TRUE*
grd2 :*Error_NoNeu_OpenClutch_Setting = FALSE*
grd3 :*NoNeu_OpenClutch_Setting = FALSE*
grd4 :*Clutch_Open = TRUE*
THEN
act1 :*NoNeu_OpenClutch_Setting* ≔ *TRUE*
tNoNeu_OpenClutch_Setting :*tNoNeu_OpenClutch_Setting* ≔ *time*
END

Error_NoNeu_OpenClutch_Setting ≙
extended
STATUS
ordinary
REFINES
Error_NoNeu_OpenClutch_Setting
WHEN
grd1 :*NoNeu_RequestOpenClutch_Setting = TRUE*
grd2 :*Error_NoNeu_OpenClutch_Setting = FALSE*
grd3 :*NoNeu_OpenClutch_Setting = FALSE*
THEN
act1 :*Error_NoNeu_OpenClutch_Setting* ≔ *TRUE*
tError_NoNeu_OpenClutch_Setting :*tError_NoNeu_OpenClutch_Setting* ≔ *time*
END

NoNeu_SetGear_NoClutch ≙
extended
STATUS
ordinary

REFINES
NoNeu_SetGear_NoClutch
WHEN
grd1 :*NoNeu_SyncSpeed = TRUE*
grd2 :*Error_NoNeu_SetGear_NoClutch = FALSE*
grd3 :*NoNeu_SetGear_NoClutch = FALSE*
grd4 :*Gear_Set = TRUE*
THEN
act1 :*NoNeu_SetGear_NoClutch* ≔ *TRUE*
tNoNeu_SetGear_NoClutch :*tNoNeu_SetGear_NoClutch* ≔ *time*
END

Error_NoNeu_SetGear_NoClutch ≙
extended
STATUS
ordinary
REFINES
Error_NoNeu_SetGear_NoClutch
WHEN
grd1 :*NoNeu_SyncSpeed = TRUE*
grd2 :*Error_NoNeu_SetGear_NoClutch = FALSE*
grd3 :*NoNeu_SetGear_NoClutch = FALSE*
THEN
act1 :*Error_NoNeu_SetGear_NoClutch* ≔ *TRUE*
tError_NoNeu_SetGear_NoClutch :*tError_NoNeu_SetGear_NoClutch* ≔ *time*
END

NoNeu_SetGear_ReleasingClutch ≙
extended
STATUS
ordinary
REFINES
NoNeu_SetGear_ReleasingClutch
WHEN
grd1 :*NoNeu_Release_Clutch = TRUE*
grd2 :*Error_NoNeu_SetGear_ReleasingClutch = FALSE*
grd3 :*NoNeu_SetGear_ReleasingClutch = FALSE*
grd4 :*Gear_Set = TRUE*
THEN
act1 :*NoNeu_SetGear_ReleasingClutch* ≔ *TRUE*
tNoNeu_SetGear_ReleasingClutch :*tNoNeu_SetGear_ReleasingClutch* ≔ *time*
END

Error_NoNeu_SetGear_ReleasingClutch ≙
extended
STATUS
ordinary
REFINES
Error_NoNeu_SetGear_ReleasingClutch
WHEN
grd1 :*NoNeu_Release_Clutch = TRUE*
grd2 :*Error_NoNeu_SetGear_ReleasingClutch = FALSE*
grd3 :*NoNeu_SetGear_ReleasingClutch = FALSE*
THEN
act1 :*Error_NoNeu_SetGear_ReleasingClutch* ≔ *TRUE*
tError_NoNeu_SetGear_ReleasingClutch :*tError_NoNeu_SetGear_ReleasingClutch* ≔ *time*
END

NoNeu_SetGear_SettingClutch ≙
extended
STATUS
ordinary
REFINES
NoNeu_SetGear_SettingClutch
WHEN
grd1 :*NoNeu_OpenClutch_Setting = TRUE*
grd2 :*Error_NoNeu_SetGear_SettingClutch = FALSE*
grd3 :*NoNeu_SetGear_SettingClutch = FALSE*
grd4 :*Gear_Set = TRUE*
THEN
act1 :*NoNeu_SetGear_SettingClutch* ≔ *TRUE*
tNoNeu_SetGear_SettingClutch :*tNoNeu_SetGear_SettingClutch* ≔ *time*
END

Error_NoNeu_SetGear_SettingClutch ≙
extended
STATUS
ordinary
REFINES

Error_NoNeu_SetGear_SettingClutch
WHEN
grd1 :NoNeu_OpenClutch_Setting = TRUE
grd2 :Error_NoNeu_SetGear_SettingClutch = FALSE
grd3 :NoNeu_SetGear_SettingClutch = FALSE
THEN
act1 :Error_NoNeu_SetGear_SettingClutch ≔ TRUE
tError_NoNeu_SetGear_SettingClutch :tError_NoNeu_SetGear_SettingClutch ≔ time
END

NoNeu_CloseClutch_Setting ≙
extended
STATUS
ordinary
REFINES
NoNeu_CloseClutch_Setting
WHEN
grd1 :NoNeu_SetGear_SettingClutch = TRUE
grd2 :Error_NoNeu_CloseClutch_Setting = FALSE
grd3 :NoNeu_CloseClutch_Setting = FALSE
grd4 :Clutch_Close = TRUE
THEN
act1 :NoNeu_CloseClutch_Setting ≔ TRUE
tNoNeu_CloseClutch_Setting :tNoNeu_CloseClutch_Setting ≔ time
END

Error_NoNeu_CloseClutch_Setting ≙
extended
STATUS
ordinary
REFINES
Error_NoNeu_CloseClutch_Setting
WHEN
grd1 :NoNeu_SetGear_SettingClutch = TRUE
grd2 :Error_NoNeu_CloseClutch_Setting = FALSE
grd3 :NoNeu_CloseClutch_Setting = FALSE
THEN
act1 :Error_NoNeu_CloseClutch_Setting ≔ TRUE
tError_NoNeu_CloseClutch_Setting :tError_NoNeu_CloseClutch_Setting ≔ time
END

NoNeu_CloseClutch_Releasing ≙
extended
STATUS
ordinary
REFINES
NoNeu_CloseClutch_Releasing
WHEN
grd1 :NoNeu_SetGear_ReleasingClutch = TRUE
grd2 :Error_NoNeu_CloseClutch_Releasing = FALSE
grd3 :NoNeu_CloseClutch_Releasing = FALSE
grd4 :Clutch_Close = TRUE
THEN
act1 :NoNeu_CloseClutch_Releasing ≔ TRUE
tNoNeu_CloseClutch_Releasing :tNoNeu_CloseClutch_Releasing ≔ time
END

Error_NoNeu_CloseClutch_Releasing ≙
extended
STATUS
ordinary
REFINES
Error_NoNeu_CloseClutch_Releasing
WHEN
grd1 :NoNeu_SetGear_ReleasingClutch = TRUE
grd2 :Error_NoNeu_CloseClutch_Releasing = FALSE
grd3 :NoNeu_CloseClutch_Releasing = FALSE
THEN
act1 :Error_NoNeu_CloseClutch_Releasing ≔ TRUE
tError_NoNeu_CloseClutch_Releasing :tError_NoNeu_CloseClutch_Releasing ≔ time
END

Engine_Request_SyncSpeed ≙
extended
STATUS
ordinary
REFINES
Engine_Request_SyncSpeed
WHEN

```
        grd1 :RequestFromNeu = TRUE ∨ NoNeu_Release_NoClutch = TRUE
        grd2 :Engine_Request_SyncSpeed = FALSE
THEN
        act1 :Engine_Request_SyncSpeed ≔ TRUE
        tEngine_Request_SyncSpeed :tEngine_Request_SyncSpeed ≔ time
END

    Engine_SyncSpeed ≙
      extended
          STATUS
      ordinary
REFINES
        Engine_SyncSpeed
WHEN
        grd1 :Engine_Request_SyncSpeed = TRUE
        grd2 :Engine_SyncSpeed = FALSE
        grd3 :Engine_WaitForSyncClutch = FALSE
THEN
        act1 :Engine_SyncSpeed ≔ TRUE
        tEngine_SyncSpeed :tEngine_SyncSpeed ≔ time
END

    Engine_WaitForSyncClutch ≙
      extended
          STATUS
      ordinary
REFINES
        Engine_WaitForSyncClutch
WHEN
        grd1 :Engine_Request_SyncSpeed = TRUE
        grd2 :Engine_SyncSpeed = FALSE
        grd3 :Engine_WaitForSyncClutch = FALSE
THEN
        act1 :Engine_WaitForSyncClutch ≔ TRUE
        tEngine_WaitForSyncClutch :tEngine_WaitForSyncClutch ≔ time
END

    Engine_Request_ZeroTorque ≙
      extended
          STATUS
      ordinary
REFINES
        Engine_Request_ZeroTorque
WHEN
        grd1 :RequestToNeu = TRUE ∨ RequestNoNeu = TRUE
        grd2 :Engine_Request_ZeroTorque = FALSE
THEN
        act1 :Engine_Request_ZeroTorque ≔ TRUE
        tEngine_Request_ZeroTorque :tEngine_Request_ZeroTorque ≔ time
END

    Engine_ZeroTorque ≙
      extended
          STATUS
      ordinary
REFINES
        Engine_ZeroTorque
WHEN
        grd1 :Engine_Request_ZeroTorque = TRUE
        grd2 :Engine_ZeroTorque = FALSE
        grd3 :Engine_WaitForZeroClutch = FALSE
THEN
        act1 :Engine_ZeroTorque ≔ TRUE
        tEngine_ZeroTorque :tEngine_ZeroTorque ≔ time
END

    Engine_WaitForZeroClutch ≙
      extended
          STATUS
      ordinary
REFINES
        Engine_WaitForZeroClutch
WHEN
        grd1 :Engine_Request_ZeroTorque = TRUE
        grd2 :Engine_ZeroTorque = FALSE
        grd3 :Engine_WaitForZeroClutch = FALSE
THEN
        act1 :Engine_WaitForZeroClutch ≔ TRUE
        tEngine_WaitForZeroClutch :tEngine_WaitForZeroClutch ≔ time
```

```
END

    Clutch_Request_Open ≙
      extended
        STATUS
      ordinary
REFINES
    Clutch_Request_Open
WHEN
    grd1 :FromNeu_RequestOpenClutch = TRUE ∨ ToNeu_RequestOpenClutch = TRUE ∨
          NoNeu_RequestOpenClutch_Releasing = TRUE ∨ NoNeu_RequestOpenClutch_Setting = TRUE
    grd2 :Clutch_Request_Open = FALSE
THEN
    act1 :Clutch_Request_Open ≔ TRUE
    tClutch_Request_Open :tClutch_Request_Open ≔ time
END

    Clutch_Open ≙
      extended
        STATUS
      ordinary
REFINES
    Clutch_Open
WHEN
    grd1 :Clutch_Request_Open = TRUE
    grd2 :Clutch_Open = FALSE
    grd3 :Error_Clutch_Open = FALSE
THEN
    act1 :Clutch_Open ≔ TRUE
    tClutch_Open :tClutch_Open ≔ time
END

    Error_Clutch_Open ≙
      extended
        STATUS
      ordinary
REFINES
    Error_Clutch_Open
WHEN
    grd1 :Clutch_Request_Open = TRUE
    grd2 :Clutch_Open = FALSE
    grd3 :Error_Clutch_Open = FALSE
THEN
    act1 :Error_Clutch_Open ≔ TRUE
    tError_Clutch_Open :tError_Clutch_Open ≔ time
END

    Clutch_Request_Close ≙
      extended
        STATUS
      ordinary
REFINES
    Clutch_Request_Close
WHEN
    grd1 :FromNeu_SetGear_Clutch = TRUE ∨ ToNeu_Release_Clutch = TRUE ∨
          NoNeu_SetGear_ReleasingClutch = TRUE ∨ NoNeu_SetGear_SettingClutch= TRUE
    grd2 :Clutch_Request_Close = FALSE
THEN
    act1 :Clutch_Request_Close ≔ TRUE
    tClutch_Request_Close :tClutch_Request_Close ≔ time
END

    Clutch_Close ≙
      extended
        STATUS
      ordinary
REFINES
    Clutch_Close
WHEN
    grd1 :Clutch_Request_Close = TRUE
    grd2 :Clutch_Close = FALSE
    grd3 :Error_Clutch_Close = FALSE
THEN
    act1 :Clutch_Close ≔ TRUE
    tClutch_Close :tClutch_Close ≔ time
END

    Error_Clutch_Close ≙
      extended
```

```
        STATUS
    ordinary
REFINES
    Error_Clutch_Close
WHEN
    grd1 :Clutch_Request_Close = TRUE
    grd2 :Clutch_Close = FALSE
    grd3 :Error_Clutch_Close = FALSE
THEN
    act1 :Error_Clutch_Close ≔ TRUE
    tError_Clutch_Close :tError_Clutch_Close ≔ time
END

  Gear_Request_Release ≙
    extended
        STATUS
    ordinary
REFINES
    Gear_Request_Release
WHEN
    grd1 :ToNeu_ZeroTorque = TRUE ∨ToNeu_OpenClutch = TRUE ∨
          NoNeu_ZeroTorque = TRUE ∨NoNeu_OpenClutch_Releasing= TRUE
    grd2 :Gear_Request_Release = FALSE
THEN
    act1 :Gear_Request_Release ≔ TRUE
END

  Gear_Release ≙
    extended
        STATUS
    ordinary
REFINES
    Gear_Release
WHEN
    grd1 :Gear_Request_Release = TRUE
    grd2 :Gear_Release = FALSE
    grd3 :Error_Gear_Release = FALSE
THEN
    act1 :Gear_Release ≔ TRUE
END

  Error_Gear_Release ≙
    extended
        STATUS
    ordinary
REFINES
    Error_Gear_Release
WHEN
    grd1 :Gear_Request_Release = TRUE
    grd2 :Gear_Release = FALSE
    grd3 :Error_Gear_Release = FALSE
THEN
    act1 :Error_Gear_Release ≔ TRUE
END

  Gear_Request_Set ≙
    extended
        STATUS
    ordinary
REFINES
    Gear_Request_Set
WHEN
          FromNeu_SyncSpeed = TRUE ∨FromNeu_OpenClutch = TRUE ∨
    grd1 :NoNeu_Release_Clutch = TRUE ∨NoNeu_SyncSpeed = TRUE ∨
          NoNeu_OpenClutch_Setting = TRUE
    grd2 :Gear_Request_Set = FALSE
THEN
    act1 :Gear_Request_Set ≔ TRUE
END

  Gear_Set ≙
    extended
        STATUS
    ordinary
REFINES
    Gear_Set
WHEN
    grd1 :Gear_Request_Set = TRUE
    grd2 :Gear_Set = FALSE
```

```
        grd3 :Error_Gear_Set = FALSE
THEN
        act1 :Gear_Set ≔ TRUE
END

    Error_Gear_Set ≙
      extended
          STATUS
      ordinary
REFINES
        Error_Gear_Set
WHEN
        grd1 :Gear_Request_Set = TRUE
        grd2 :Gear_Set = FALSE
        grd3 :Error_Gear_Set = FALSE
THEN
        act1 :Error_Gear_Set ≔ TRUE
END

    FINAL ≙
      extended
          STATUS
      ordinary
REFINES
        FINAL
WHEN
            FromNeu_SetGear_NoClutch = TRUE ∨ NoNeu_SetGear_NoClutch = TRUE ∨
        grd1 : ToNeu_Release_NoClutch = TRUE ∨ FromNeu_CloseClutch = TRUE ∨
            NoNeu_CloseClutch_Setting = TRUE ∨ NoNeu_CloseClutch_Releasing = TRUE ∨
            ToNeu_CloseClutch = TRUE
THEN
        act1 :RequestFromNeu ≔ FALSE
        act2 :RequestNoNeu ≔ FALSE
        act3 :RequestToNeu ≔ FALSE
        act4 :FromNeu_SyncSpeed ≔ FALSE
        act5 :FromNeu_OpenClutch ≔ FALSE
        act6 :FromNeu_SetGear_NoClutch ≔ FALSE
        act7 :FromNeu_SetGear_Clutch ≔ FALSE
        act8 :FromNeu_CloseClutch ≔ FALSE
        act9 :ToNeu_Release_NoClutch ≔ FALSE
        act10 :ToNeu_CloseClutch ≔ FALSE
        act11 :ToNeu_ZeroTorque≔ FALSE      // Senario3 Flage
        act12 :ToNeu_OpenClutch ≔ FALSE      // Senario3 Flage
        act13 :ToNeu_Release_Clutch≔ FALSE      // Senario3 Flage
        act14 :NoNeu_ZeroTorque≔ FALSE      // Senario2 Flage
        act15 :NoNeu_OpenClutch_Releasing ≔ FALSE
        act16 :NoNeu_Release_NoClutch≔ FALSE      // Senario2 Flage
        act17 :NoNeu_Release_Clutch≔ FALSE      // Senario2 Flage
        act18 :NoNeu_SyncSpeed ≔ FALSE      // Senario2 Flage
        act19 :NoNeu_OpenClutch_Setting ≔ FALSE      // Senario2 Flage
        act20 :NoNeu_SetGear_NoClutch≔ FALSE      // Senario2 Flage
        act21 :NoNeu_SetGear_ReleasingClutch≔ FALSE      // Senario2 Flage
        act22 :NoNeu_SetGear_SettingClutch≔ FALSE      // Senario2 Flage
        act23 :NoNeu_CloseClutch_Setting≔ FALSE      // Senario2 Flage
        act24 :NoNeu_CloseClutch_Releasing≔ FALSE      // Senario2 Flage
        act25 :Engine_SyncSpeed ≔ FALSE
        act26 :Engine_WaitForSyncClutch ≔ FALSE
        act27 :Engine_ZeroTorque ≔ FALSE
        act28 :Engine_WaitForZeroClutch ≔ FALSE
        act29 :Clutch_Open ≔ FALSE      // Clutch Flags
        act30 :Clutch_Close ≔ FALSE      // Clutch Flags
        act31 :Gear_Release ≔ FALSE      // Gear Flags
        act32 :Gear_Set ≔ FALSE      // Gear Flags
        act33 :FromNeu_RequestOpenClutch ≔ FALSE      // Senario1 Flag
        act34 :ToNeu_RequestOpenClutch ≔ FALSE      // Senario3 Flag
        act35 :NoNeu_RequestOpenClutch_Releasing ≔ FALSE      // Senario2 Flag
        act36 :NoNeu_RequestOpenClutch_Setting ≔ FALSE      // Senario2 Flag
        act37 :Engine_Request_SyncSpeed ≔ FALSE      // Engine Flgas
        act38 :Engine_Request_ZeroTorque ≔ FALSE      // Engine Flgas
        act39 :Clutch_Request_Open ≔ FALSE      // Clutch Flags
        act40 :Clutch_Request_Close ≔ FALSE      // Clutch Flags
        act41 :Gear_Request_Release ≔ FALSE      // Gear Flags
        act42 :Gear_Request_Set ≔ FALSE      // Gear Flags
END

    Tick_Tock ≙
      extended
          STATUS
      ordinary
```

REFINES
Tick_Tock
ANY
tick
WHERE
tick :*tick* > 0
Deadline10 : *FromNeu_SyncSpeed = TRUE ∧ FromNeu_SetGear_NoClutch = FALSE ∧ Error_FromNeu_SetGear_NoClutch = FALSE ⇒ time + tick ≤ tFromNeu_SyncSpeed + SetGear_DL*
Deadline11 : *FromNeu_OpenClutch = TRUE ∧ Error_FromNeu_SetGear_Clutch = FALSE ∧ FromNeu_SetGear_Clutch = FALSE ⇒ time + tick ≤ tFromNeu_OpenClutch + SetGear_DL*
Deadline12 : *FromNeu_SetGear_Clutch = TRUE ∧ Error_FromNeu_CloseClutch = FALSE ∧ FromNeu_CloseClutch = FALSE ⇒ time + tick ≤ tFromNeu_SetGear_Clutch + CloseClutch_DL*
Deadline14 : *ToNeu_ZeroTorque = TRUE ∧ ToNeu_Release_NoClutch = FALSE ∧ Error_ToNeu_Release_NoClutch = FALSE ⇒ time + tick ≤ tToNeu_ZeroTorque + Release_DL*
Deadline15 : *ToNeu_OpenClutch = TRUE ∧ ToNeu_Release_Clutch = FALSE ∧ Error_ToNeu_Release_Clutch = FALSE ⇒ time + tick ≤ tToNeu_OpenClutch + Release_DL*
Deadline16 : *ToNeu_Release_Clutch = TRUE ∧ Error_ToNeu_CloseClutch = FALSE ∧ ToNeu_CloseClutch = FALSE ⇒ time + tick ≤ tToNeu_Release_Clutch + CloseClutch_DL*
Deadline18 : *NoNeu_OpenClutch_Releasing = TRUE ∧ NoNeu_Release_Clutch = FALSE ∧ Error_NoNeu_Release_Clutch = FALSE ⇒ time + tick ≤ tNoNeu_OpenClutch_Releasing + Release_DL*
Deadline19 : *NoNeu_ZeroTorque = TRUE ∧ NoNeu_Release_NoClutch = FALSE ∧ Error_NoNeu_Release_NoClutch = FALSE ⇒ time + tick ≤ tNoNeu_ZeroTorque + Release_DL*
Deadline21 : *NoNeu_SyncSpeed = TRUE ∧ NoNeu_SetGear_NoClutch = FALSE ∧ Error_NoNeu_SetGear_NoClutch = FALSE ⇒ time + tick ≤ tNoNeu_SyncSpeed + SetGear_DL*
Deadline22 : *NoNeu_OpenClutch_Setting = TRUE ∧ NoNeu_SetGear_SettingClutch = FALSE ∧ Error_NoNeu_SetGear_SettingClutch = FALSE ⇒ time + tick ≤ tNoNeu_OpenClutch_Setting + SetGear_DL*
Deadline23 : *NoNeu_SetGear_SettingClutch = TRUE ∧ NoNeu_CloseClutch_Setting = FALSE ∧ Error_NoNeu_CloseClutch_Setting = FALSE ⇒ time + tick ≤ tNoNeu_SetGear_SettingClutch + CloseClutch_DL*
Deadline24 : *NoNeu_Release_Clutch = TRUE ∧ Error_NoNeu_SetGear_ReleasingClutch = FALSE ∧ NoNeu_SetGear_ReleasingClutch = FALSE ⇒ time + tick ≤ tNoNeu_Release_Clutch + SetGear_DL*
Deadline25 : *NoNeu_SetGear_ReleasingClutch = TRUE ∧ NoNeu_CloseClutch_Releasing = FALSE ∧ Error_NoNeu_CloseClutch_Releasing = FALSE ⇒ time + tick ≤ tNoNeu_SetGear_ReleasingClutch + CloseClutch_DL*
Deadline27 : *FromNeu_RequestOpenClutch = TRUE ∧ FromNeu_OpenClutch = FALSE ∧ Error_FromNeu_OpenClutch = FALSE ⇒ time + tick ≤ tFromNeu_RequestOpenClutch + OpenClutch_DL*
Deadline28 : *RequestToNeu = TRUE ∧ ToNeu_ZeroTorque = FALSE ∧ ToNeu_RequestOpenClutch = FALSE ⇒ time + tick ≤ tRequestToNeu + Zero_DL*
Deadline29 : *ToNeu_RequestOpenClutch = TRUE ∧ ToNeu_OpenClutch = FALSE ∧ Error_ToNeu_OpenClutch = FALSE ⇒ time + tick ≤ tToNeu_RequestOpenClutch + OpenClutch_DL*
Deadline30 : *RequestNoNeu = TRUE ∧ NoNeu_RequestOpenClutch_Releasing = FALSE ∧ NoNeu_ZeroTorque = FALSE ⇒ time + tick ≤ tRequestNoNeu + Zero_DL*
Deadline31 : *NoNeu_RequestOpenClutch_Releasing = TRUE ∧ NoNeu_OpenClutch_Releasing = FALSE ∧ Error_NoNeu_OpenClutch_Releasing = FALSE ⇒ time + tick ≤ tNoNeu_RequestOpenClutch_Releasing + OpenClutch_DL*
Deadline32 : *NoNeu_Release_NoClutch = TRUE ∧ NoNeu_RequestOpenClutch_Setting = FALSE ∧ NoNeu_SyncSpeed = FALSE ⇒ time + tick ≤ tNoNeu_Release_NoClutch + Sync_DL*
Deadline33 : *NoNeu_RequestOpenClutch_Setting = TRUE ∧ NoNeu_OpenClutch_Setting = FALSE ∧ Error_NoNeu_OpenClutch_Setting = FALSE ⇒ time + tick ≤ tNoNeu_RequestOpenClutch_Setting + OpenClutch_DL*
Deadline34 : *RequestFromNeu = TRUE ∧ FromNeu_RequestOpenClutch = FALSE ∧ FromNeu_SyncSpeed = FALSE ⇒ time + tick ≤ tRequestFromNeu + Sync_DL*
Deadline35 : *RequestFromNeu = TRUE ∧ Engine_Request_SyncSpeed = FALSE ⇒ time + tick ≤ tRequestFromNeu + Channel_DL*
Deadline36 : *NoNeu_Release_NoClutch = TRUE ∧ Engine_Request_SyncSpeed = FALSE ⇒ time + tick ≤ tNoNeu_Release_NoClutch + Channel_DL*
Deadline37 : *RequestToNeu = TRUE ∧ Engine_Request_ZeroTorque = FALSE ⇒ time + tick ≤ tRequestToNeu + Channel_DL*
Deadline38 : *RequestNoNeu = TRUE ∧ Engine_Request_ZeroTorque = FALSE ⇒ time + tick ≤ tRequestNoNeu + Channel_DL*
Deadline39 : *Engine_ZeroTorque = TRUE ∧ NoNeu_ZeroTorque = FALSE ∧ ToNeu_ZeroTorque = FALSE ⇒ time + tick ≤ tEngine_ZeroTorque + Channel_DL*
Deadline40 : *Engine_SyncSpeed = TRUE ∧ FromNeu_SyncSpeed = FALSE ∧ NoNeu_SyncSpeed = FALSE ⇒ time + tick ≤ tEngine_SyncSpeed + Channel_DL*
Deadline41 : *Engine_Request_SyncSpeed = TRUE ∧ Engine_SyncSpeed = FALSE ∧ Engine_WaitForSyncClutch = FALSE ⇒ time + tick ≤ tEngine_Request_SyncSpeed + Engine_Sync_DL*
Deadline42 : *Engine_Request_ZeroTorque = TRUE ∧ Engine_WaitForZeroClutch = FALSE ∧ Engine_ZeroTorque = FALSE ⇒ time + tick ≤ tEngine_Request_ZeroTorque + Engine_Zero_DL*
Deadline43 : FromNeu_RequestOpenClutch = TRUE ∧ Clutch_Request_Open = FALSE ⇒ time + tick ≤ tFromNeu_RequestOpenClutch + Channel_DL
Deadline44 : ToNeu_RequestOpenClutch = TRUE ∧ Clutch_Request_Open = FALSE ⇒ time + tick ≤ tToNeu_RequestOpenClutch + Channel_DL
Deadline45 : NoNeu_RequestOpenClutch_Releasing = TRUE ∧ Clutch_Request_Open = FALSE ⇒ time + tick ≤ tNoNeu_RequestOpenClutch_Releasing + Channel_DL
Deadline46 : NoNeu_RequestOpenClutch_Setting = TRUE ∧ Clutch_Request_Open = FALSE ⇒ time + tick ≤ tNoNeu_RequestOpenClutch_Setting + Channel_DL
Deadline47 : FromNeu_SetGear_Clutch = TRUE ∧ Clutch_Request_Close = FALSE ⇒ time + tick ≤ tFromNeu_SetGear_Clutch + Channel_DL
Deadline48 : NoNeu_SetGear_ReleasingClutch = TRUE ∧ Clutch_Request_Close = FALSE ⇒ time + tick ≤ tNoNeu_SetGear_ReleasingClutch + Channel_DL
Deadline49 : NoNeu_SetGear_SettingClutch = TRUE ∧ Clutch_Request_Close = FALSE ⇒ time + tick ≤ tNoNeu_SetGear_SettingClutch + Channel_DL
Deadline50 : ToNeu_Release_Clutch = TRUE ∧ Clutch_Request_Close = FALSE ⇒ time + tick ≤ tToNeu_Release_Clutch + Channel_DL
Deadline51 : Clutch_Open = TRUE ∧ FromNeu_OpenClutch = FALSE ∧ NoNeu_OpenClutch_Releasing = FALSE ∧ NoNeu_OpenClutch_Setting = FALSE ∧ ToNeu_OpenClutch = FALSE ⇒ time + tick ≤ tClutch_Open + Channel_DL
Deadline52 : Clutch_Close = TRUE ∧ FromNeu_CloseClutch = FALSE ∧ NoNeu_CloseClutch_Releasing = FALSE ∧ NoNeu_CloseClutch_Setting = FALSE ∧ ToNeu_CloseClutch = FALSE ⇒ time + tick ≤ tClutch_Close + Channel_DL

```
        Deadline53  Clutch_Request_Open = TRUE ∧ Clutch_Open = FALSE ∧ Error_Clutch_Open = FALSE ⇒ time + tick ≤
        :           tClutch_Request_Open + Clutch_Open_DL
        Deadline54  Clutch_Request_Close = TRUE ∧ Clutch_Close = FALSE ∧ Error_Clutch_Close = FALSE ⇒ time + tick ≤
        :           tClutch_Request_Close + Clutch_Close_DL
THEN
        act1 :time := time+tick
END

END
```

Machine m11

MACHINE
m11
REFINES
m10
SEES
c6
VARIABLES
isNeu *// Gear Status*
RequestFromNeu *// Flags*
RequestNoNeu *// Flags*
RequestToNeu *// Flags*
FromNeu_SyncSpeed *// Senario1*
FromNeu_OpenClutch *// Flage*
FromNeu_SetGear_NoClutch *// Flage*
FromNeu_SetGear_Clutch *// Flage*
FromNeu_CloseClutch *// Flage*
Error_FromNeu_OpenClutch *// Flage*
Error_FromNeu_SetGear_NoClutch *// Flage*
Error_FromNeu_SetGear_Clutch *// Flage*
Error_FromNeu_CloseClutch *// Senario1*
ToNeu_ZeroTorque *// Senario3 Flage*
ToNeu_OpenClutch *// Senario3 Flage*
Error_ToNeu_OpenClutch *// Senario3 Flage*
ToNeu_Release_NoClutch *// Senario3 Flage*
Error_ToNeu_Release_NoClutch *// Senario3 Flage*
ToNeu_Release_Clutch *// Senario3 Flage*
Error_ToNeu_Release_Clutch *// Senario3 Flage*
ToNeu_CloseClutch *// Senario3 Flage*
Error_ToNeu_CloseClutch *// Senario3 Flage*
NoNeu_ZeroTorque *// Senario2 Flage*
NoNeu_Release_NoClutch *// Senario2 Flage*
NoNeu_OpenClutch_Releasing *// Senario2 Flage*
NoNeu_Release_Clutch *// Senario2 Flage*
NoNeu_SyncSpeed *// Senario2 Flage*
NoNeu_OpenClutch_Setting *// Senario2 Flage*
NoNeu_SetGear_NoClutch *// Senario2 Flage*
NoNeu_SetGear_ReleasingClutch *// Senario2 Flage*
NoNeu_SetGear_SettingClutch *// Senario2 Flage*
NoNeu_CloseClutch_Releasing *// Senario2 Flage*
NoNeu_CloseClutch_Setting *// Senario2 Flage*
Error_NoNeu_OpenClutch_Releasing *// Senario2 Flage*
Error_NoNeu_Release_Clutch *// Senario2 Flage*
Error_NoNeu_Release_NoClutch *// Senario2 Flage*
Error_NoNeu_OpenClutch_Setting *// Senario2 Flage*
Error_NoNeu_SetGear_NoClutch *// Senario2 Flage*
Error_NoNeu_SetGear_ReleasingClutch *// Senario2 Flage*
Error_NoNeu_SetGear_SettingClutch *// Senario2 Flage*
Error_NoNeu_CloseClutch_Releasing *// Senario2 Flage*
Error_NoNeu_CloseClutch_Setting *// Senario2 Flage*
Engine_SyncSpeed *// Engine Flags*
Engine_WaitForSyncClutch *// Engine Flgas*
Engine_ZeroTorque *// Engine Flgas*
Engine_WaitForZeroClutch *// Engine Flgas*
Clutch_Open *// Clutch Flags*
Error_Clutch_Open *// Clutch Flags*
Clutch_Close *// Clutch Flags*
Error_Clutch_Close *// Clutch Flags*
Gear_Release *// Gear Flags*
Error_Gear_Release *// Gear Flags*
Gear_Set *// Gear Flags*
Error_Gear_Set *// Gear Flags*
FromNeu_RequestOpenClutch *// Senario1 Flag*
ToNeu_RequestOpenClutch *// Senario3 Flag*
NoNeu_RequestOpenClutch_Releasing *// Senario2 Flag*
NoNeu_RequestOpenClutch_Setting *// Senario2 Flag*
Engine_Request_SyncSpeed *// Engine Flgas*
Engine_Request_ZeroTorque *// Engine Flgas*
Clutch_Request_Open *// Clutch Flags*
Clutch_Request_Close *// Clutch Flags*
Gear_Request_Release *// Gear Flags*
Gear_Request_Set *// Gear Flags*
time
tRequestFromNeu
tFromNeu_SyncSpeed
tFromNeu_SetGear_NoClutch

tError_FromNeu_SetGear_NoClutch
tFromNeu_OpenClutch
tError_FromNeu_SetGear_Clutch
tFromNeu_SetGear_Clutch
tError_FromNeu_CloseClutch
tFromNeu_CloseClutch
tRequestToNeu
tToNeu_ZeroTorque
tToNeu_Release_NoClutch
tError_ToNeu_Release_NoClutch
tToNeu_OpenClutch
tToNeu_Release_Clutch
tError_ToNeu_Release_Clutch
tError_ToNeu_CloseClutch
tToNeu_CloseClutch
tRequestNoNeu
tNoNeu_ZeroTorque
tNoNeu_OpenClutch_Releasing
tNoNeu_Release_Clutch
tError_NoNeu_Release_Clutch
tNoNeu_Release_NoClutch
tError_NoNeu_Release_NoClutch
tNoNeu_SyncSpeed
tNoNeu_SetGear_NoClutch
tError_NoNeu_SetGear_NoClutch
tNoNeu_OpenClutch_Setting
tNoNeu_SetGear_SettingClutch
tError_NoNeu_SetGear_SettingClutch
tNoNeu_CloseClutch_Setting
tError_NoNeu_CloseClutch_Setting
tError_NoNeu_SetGear_ReleasingClutch
tNoNeu_SetGear_ReleasingClutch
tNoNeu_CloseClutch_Releasing
tError_NoNeu_CloseClutch_Releasing
tFromNeu_RequestOpenClutch
tError_FromNeu_OpenClutch
tToNeu_RequestOpenClutch
tError_ToNeu_OpenClutch
tNoNeu_RequestOpenClutch_Releasing
tError_NoNeu_OpenClutch_Releasing
tNoNeu_RequestOpenClutch_Setting
tError_NoNeu_OpenClutch_Setting
tEngine_Request_SyncSpeed
tEngine_Request_ZeroTorque
tEngine_ZeroTorque
tEngine_SyncSpeed
tEngine_WaitForSyncClutch
tEngine_WaitForZeroClutch
tClutch_Request_Open
tClutch_Request_Close
tClutch_Open
tClutch_Close
tError_Clutch_Open
tError_Clutch_Close
tGear_Request_Release
tGear_Request_Set
tGear_Release
tGear_Set
tError_Gear_Release
tError_Gear_Set

INVARIANTS

tGear_Request_Release :tGear_Request_Release ∈ ℕ
Deadline55 :ToNeu_ZeroTorque = TRUE ∧ Gear_Request_Release = FALSE ⇒ time ≤ tToNeu_ZeroTorque + Channel_DL
Gear_Request_ReleaseDurationDeadline55 : ToNeu_ZeroTorque = TRUE ∧ Gear_Request_Release = TRUE ⇒ tGear_Request_Release ≤ tToNeu_ZeroTorque + Channel_DL
Deadline56 :ToNeu_OpenClutch = TRUE ∧ Gear_Request_Release = FALSE ⇒ time ≤ tToNeu_OpenClutch + Channel_DL
Gear_Request_ReleaseDurationDeadline56 : ToNeu_OpenClutch = TRUE ∧ Gear_Request_Release = TRUE ⇒ tGear_Request_Release ≤ tToNeu_OpenClutch + Channel_DL
Deadline57 :NoNeu_ZeroTorque = TRUE ∧ Gear_Request_Release = FALSE ⇒ time ≤ tNoNeu_ZeroTorque + Channel_DL
Gear_Request_ReleaseDurationDeadline57 : NoNeu_ZeroTorque = TRUE ∧ Gear_Request_Release = TRUE ⇒ tGear_Request_Release ≤ tNoNeu_ZeroTorque + Channel_DL
Deadline58 : NoNeu_OpenClutch_Releasing = TRUE ∧ Gear_Request_Release = FALSE ⇒ time ≤ tNoNeu_OpenClutch_Releasing + Channel_DL
Gear_Request_ReleaseDurationDeadline58 : NoNeu_OpenClutch_Releasing = TRUE ∧ Gear_Request_Release = TRUE ⇒ tGear_Request_Release ≤ tNoNeu_OpenClutch_Releasing + Channel_DL
tGear_Request_Set :tGear_Request_Set ∈ ℕ
Deadline59 :NoNeu_SyncSpeed = TRUE ∧ Gear_Request_Set = FALSE ⇒ time ≤ tNoNeu_SyncSpeed + Channel_DL
Gear_Request_SetDurationDeadline59 : NoNeu_SyncSpeed = TRUE ∧ Gear_Request_Set = TRUE ⇒ tGear_Request_Set ≤ tNoNeu_SyncSpeed + Channel_DL
Deadline60 :NoNeu_Release_Clutch = TRUE ∧ Gear_Request_Set = FALSE ⇒ time ≤ tNoNeu_Release_Clutch + Channel_DL

Gear_Request_SetDurationDeadline60 : NoNeu_Release_Clutch = TRUE ∧ Gear_Request_Set = TRUE ⇒ tGear_Request_Set ≤ tNoNeu_Release_Clutch + Channel_DL
Deadline61 : NoNeu_OpenClutch_Setting = TRUE ∧ Gear_Request_Set = FALSE ⇒ time ≤ tNoNeu_OpenClutch_Setting + Channel_DL
Gear_Request_SetDurationDeadline61 : NoNeu_OpenClutch_Setting = TRUE ∧ Gear_Request_Set = TRUE ⇒ tGear_Request_Set ≤ tNoNeu_OpenClutch_Setting + Channel_DL
Deadline62 : FromNeu_SyncSpeed = TRUE ∧ Gear_Request_Set = FALSE ⇒ time ≤ tFromNeu_SyncSpeed + Channel_DL
Gear_Request_SetDurationDeadline62 : FromNeu_SyncSpeed = TRUE ∧ Gear_Request_Set = TRUE ⇒ tGear_Request_Set ≤ tFromNeu_SyncSpeed + Channel_DL
Deadline63 : FromNeu_OpenClutch = TRUE ∧ Gear_Request_Set = FALSE ⇒ time ≤ tFromNeu_OpenClutch + Channel_DL
Gear_Request_SetDurationDeadline63 : FromNeu_OpenClutch = TRUE ∧ Gear_Request_Set = TRUE ⇒ tGear_Request_Set ≤ tFromNeu_OpenClutch + Channel_DL
tGear_Release : tGear_Release ∈ ℕ
Deadline64 : Gear_Release = TRUE ∧ NoNeu_Release_Clutch = FALSE ∧ NoNeu_Release_NoClutch = FALSE ∧ ToNeu_Release_Clutch = FALSE ∧ ToNeu_Release_NoClutch = FALSE ⇒ time ≤ tGear_Release + Channel_DL
NoNeu_Release_ClutchDurationDeadline64 : Gear_Release = TRUE ∧ NoNeu_Release_Clutch = TRUE ⇒ tNoNeu_Release_Clutch ≤ tGear_Release + Channel_DL
NoNeu_Release_NoClutchDurationDeadline64 : Gear_Release = TRUE ∧ NoNeu_Release_NoClutch = TRUE ⇒ tNoNeu_Release_NoClutch ≤ tGear_Release + Channel_DL
ToNeu_Release_ClutchDurationDeadline64 : Gear_Release = TRUE ∧ ToNeu_Release_Clutch = TRUE ⇒ tToNeu_Release_Clutch ≤ tGear_Release + Channel_DL
ToNeu_Release_NoClutchDurationDeadline64 : Gear_Release = TRUE ∧ ToNeu_Release_NoClutch = TRUE ⇒ tToNeu_Release_NoClutch ≤ tGear_Release + Channel_DL
tGear_Set : tGear_Set ∈ ℕ
Deadline65 : Gear_Set = TRUE ∧ FromNeu_SetGear_Clutch = FALSE ∧ FromNeu_SetGear_NoClutch = FALSE ∧ NoNeu_SetGear_NoClutch = FALSE ∧ NoNeu_SetGear_ReleasingClutch = FALSE ∧ NoNeu_SetGear_SettingClutch = FALSE ⇒ time ≤ tGear_Set + Channel_DL
FromNeu_SetGear_ClutchDurationDeadline65 : Gear_Set = TRUE ∧ FromNeu_SetGear_Clutch = TRUE ⇒ tFromNeu_SetGear_Clutch ≤ tGear_Set + Channel_DL
FromNeu_SetGear_NoClutchDurationDeadline65 : Gear_Set = TRUE ∧ FromNeu_SetGear_NoClutch = TRUE ⇒ tFromNeu_SetGear_NoClutch ≤ tGear_Set + Channel_DL
NoNeu_SetGear_NoClutchDurationDeadline65 : Gear_Set = TRUE ∧ NoNeu_SetGear_NoClutch = TRUE ⇒ tNoNeu_SetGear_NoClutch ≤ tGear_Set + Channel_DL
NoNeu_SetGear_ReleasingClutchDurationDeadline65 : Gear_Set = TRUE ∧ NoNeu_SetGear_ReleasingClutch = TRUE ⇒ tNoNeu_SetGear_ReleasingClutch ≤ tGear_Set + Channel_DL
NoNeu_SetGear_SettingClutchDurationDeadline65 : Gear_Set = TRUE ∧ NoNeu_SetGear_SettingClutch = TRUE ⇒ tNoNeu_SetGear_SettingClutch ≤ tGear_Set + Channel_DL
tError_Gear_Release : tError_Gear_Release ∈ ℕ
Deadline66 : Gear_Request_Release = TRUE ∧ Error_Gear_Release = FALSE ∧ Gear_Release = FALSE ⇒ time ≤ tGear_Request_Release + Gear_Release_DL
Error_Gear_ReleaseDurationDeadline66 : Gear_Request_Release = TRUE ∧ Error_Gear_Release = TRUE ⇒ tError_Gear_Release ≤ tGear_Request_Release + Gear_Release_DL
Gear_ReleaseDurationDeadline66 : Gear_Request_Release = TRUE ∧ Gear_Release = TRUE ⇒ tGear_Release ≤ tGear_Request_Release + Gear_Release_DL
tError_Gear_Set : tError_Gear_Set ∈ ℕ
Deadline67 : Gear_Request_Set = TRUE ∧ Error_Gear_Set = FALSE ∧ Gear_Set = FALSE ⇒ time ≤ tGear_Request_Set + Gear_Set_DL
Error_Gear_SetDurationDeadline67 : Gear_Request_Set = TRUE ∧ Error_Gear_Set = TRUE ⇒ tError_Gear_Set ≤ tGear_Request_Set + Gear_Set_DL
Gear_SetDurationDeadline67 : Gear_Request_Set = TRUE ∧ Gear_Set = TRUE ⇒ tGear_Set ≤ tGear_Request_Set + Gear_Set_DL

TIMING

Expiry2 : Expiry (RequestFromNeu, FromNeu_SyncSpeed, Sync_EX)
Deadline10 : Deadline (FromNeu_SyncSpeed, FromNeu_SetGear_NoClutch ∨ Error_FromNeu_SetGear_NoClutch, SetGear_DL)
Deadline11 : Deadline (FromNeu_OpenClutch, Error_FromNeu_SetGear_Clutch ∨ FromNeu_SetGear_Clutch, SetGear_DL)
Deadline12 : Deadline (FromNeu_SetGear_Clutch, Error_FromNeu_CloseClutch ∨ FromNeu_CloseClutch, CloseClutch_DL)
Expiry3 : Expiry (RequestToNeu, ToNeu_ZeroTorque, Zero_EX)
Deadline14 : Deadline (ToNeu_ZeroTorque, ToNeu_Release_NoClutch ∨ Error_ToNeu_Release_NoClutch, Release_DL)
Deadline15 : Deadline (ToNeu_OpenClutch, ToNeu_Release_Clutch ∨ Error_ToNeu_Release_Clutch, Release_DL)
Deadline16 : Deadline (ToNeu_Release_Clutch, Error_ToNeu_CloseClutch ∨ ToNeu_CloseClutch, CloseClutch_DL)
Expiry4 : Expiry (RequestNoNeu, NoNeu_ZeroTorque, Zero_EX)
Deadline18 : Deadline (NoNeu_OpenClutch_Releasing, NoNeu_Release_Clutch ∨ Error_NoNeu_Release_Clutch, Release_DL)
Deadline19 : Deadline (NoNeu_ZeroTorque, NoNeu_Release_NoClutch ∨ Error_NoNeu_Release_NoClutch, Release_DL)
Expiry5 : Expiry (NoNeu_Release_NoClutch, NoNeu_SyncSpeed, Sync_EX)
Deadline21 : Deadline (NoNeu_SyncSpeed, NoNeu_SetGear_NoClutch ∨ Error_NoNeu_SetGear_NoClutch, SetGear_DL)
Deadline22 : Deadline (NoNeu_OpenClutch_Setting, NoNeu_SetGear_SettingClutch ∨ Error_NoNeu_SetGear_SettingClutch, SetGear_DL)
Deadline23 : Deadline (NoNeu_SetGear_SettingClutch, NoNeu_CloseClutch_Setting ∨ Error_NoNeu_CloseClutch_Setting, CloseClutch_DL)
Deadline24 : Deadline (NoNeu_Release_Clutch, Error_NoNeu_SetGear_ReleasingClutch ∨ NoNeu_SetGear_ReleasingClutch, SetGear_DL)
Deadline25 : Deadline (NoNeu_SetGear_ReleasingClutch, NoNeu_CloseClutch_Releasing ∨ Error_NoNeu_CloseClutch_Releasing, CloseClutch_DL)
Delay1 : Delay (RequestFromNeu, FromNeu_RequestOpenClutch, OpenClutch_Sync_DE)
Deadline27 : Deadline (FromNeu_RequestOpenClutch, FromNeu_OpenClutch ∨ Error_FromNeu_OpenClutch, OpenClutch_DL)
Deadline28 : Deadline (RequestToNeu, ToNeu_ZeroTorque ∨ ToNeu_RequestOpenClutch, Zero_DL)
Delay2 : Delay (RequestToNeu, ToNeu_RequestOpenClutch, OpenClutch_Zero_DE)
Deadline29 : Deadline (ToNeu_RequestOpenClutch, ToNeu_OpenClutch ∨ Error_ToNeu_OpenClutch, OpenClutch_DL)
Deadline30 : Deadline (RequestNoNeu, NoNeu_RequestOpenClutch_Releasing ∨ NoNeu_ZeroTorque, Zero_DL)
Delay3 : Delay (RequestNoNeu, NoNeu_RequestOpenClutch_Releasing, OpenClutch_Zero_DE)
Deadline31 : Deadline (NoNeu_RequestOpenClutch_Releasing, NoNeu_OpenClutch_Releasing ∨ Error_NoNeu_OpenClutch_Releasing, OpenClutch_DL)
Deadline32 : Deadline (NoNeu_Release_NoClutch, NoNeu_RequestOpenClutch_Setting ∨ NoNeu_SyncSpeed, Sync_DL)
Delay4 : Delay (NoNeu_Release_NoClutch, NoNeu_RequestOpenClutch_Setting, OpenClutch_Sync_DE)

Deadline33 : Deadline (NoNeu_RequestOpenClutch_Setting, NoNeu_OpenClutch_Setting ∨ Error_NoNeu_OpenClutch_Setting, OpenClutch_DL)
Deadline34 :Deadline (RequestFromNeu, FromNeu_RequestOpenClutch ∨ FromNeu_SyncSpeed, Sync_DL)
Deadline35 :Deadline (RequestFromNeu, Engine_Request_SyncSpeed, Channel_DL)
Deadline36 :Deadline (NoNeu_Release_NoClutch, Engine_Request_SyncSpeed, Channel_DL)
Deadline37 :Deadline (RequestToNeu, Engine_Request_ZeroTorque, Channel_DL)
Deadline38 :Deadline (RequestNoNeu, Engine_Request_ZeroTorque, Channel_DL)
Deadline39 :Deadline (Engine_ZeroTorque, NoNeu_ZeroTorque ∨ ToNeu_ZeroTorque, Channel_DL)
Deadline40 :Deadline (Engine_SyncSpeed, FromNeu_SyncSpeed ∨ NoNeu_SyncSpeed, Channel_DL)
Deadline41 :Deadline (Engine_Request_SyncSpeed, Engine_SyncSpeed ∨ Engine_WaitForSyncClutch, Engine_Sync_DL)
Deadline42 :Deadline (Engine_Request_ZeroTorque, Engine_WaitForZeroClutch ∨ Engine_ZeroTorque, Engine_Zero_DL)
Deadline43 :Deadline (FromNeu_RequestOpenClutch, Clutch_Request_Open, Channel_DL)
Deadline44 :Deadline (ToNeu_RequestOpenClutch, Clutch_Request_Open, Channel_DL)
Deadline45 :Deadline (NoNeu_RequestOpenClutch_Releasing, Clutch_Request_Open, Channel_DL)
Deadline46 :Deadline (NoNeu_RequestOpenClutch_Setting, Clutch_Request_Open, Channel_DL)
Deadline47 :Deadline (FromNeu_SetGear_Clutch, Clutch_Request_Close, Channel_DL)
Deadline48 :Deadline (NoNeu_SetGear_ReleasingClutch, Clutch_Request_Close, Channel_DL)
Deadline49 :Deadline (NoNeu_SetGear_SettingClutch, Clutch_Request_Close, Channel_DL)
Deadline50 :Deadline (ToNeu_Release_Clutch, Clutch_Request_Close, Channel_DL)
Deadline51 : Deadline (Clutch_Open, FromNeu_OpenClutch ∨ NoNeu_OpenClutch_Releasing ∨ NoNeu_OpenClutch_Setting ∨ ToNeu_OpenClutch, Channel_DL)
Deadline52 : Deadline (Clutch_Close, FromNeu_CloseClutch ∨ NoNeu_CloseClutch_Releasing ∨ NoNeu_CloseClutch_Setting ∨ ToNeu_CloseClutch, Channel_DL)
Deadline53 :Deadline (Clutch_Request_Open, Clutch_Open ∨ Error_Clutch_Open, Clutch_Open_DL)
Deadline54 :Deadline (Clutch_Request_Close, Clutch_Close ∨ Error_Clutch_Close, Clutch_Close_DL)
Deadline55 :Deadline (ToNeu_ZeroTorque, Gear_Request_Release, Channel_DL)
Deadline56 :Deadline (ToNeu_OpenClutch, Gear_Request_Release, Channel_DL)
Deadline57 :Deadline (NoNeu_ZeroTorque, Gear_Request_Release, Channel_DL)
Deadline58 :Deadline (NoNeu_OpenClutch_Releasing, Gear_Request_Release, Channel_DL)
Deadline59 :Deadline (NoNeu_SyncSpeed, Gear_Request_Set, Channel_DL)
Deadline60 :Deadline (NoNeu_Release_Clutch, Gear_Request_Set, Channel_DL)
Deadline61 :Deadline (NoNeu_OpenClutch_Setting, Gear_Request_Set, Channel_DL)
Deadline62 :Deadline (FromNeu_SyncSpeed, Gear_Request_Set, Channel_DL)
Deadline63 :Deadline (FromNeu_OpenClutch, Gear_Request_Set, Channel_DL)
Deadline64 : Deadline (Gear_Release, NoNeu_Release_Clutch ∨ NoNeu_Release_NoClutch ∨ ToNeu_Release_Clutch ∨ ToNeu_Release_NoClutch, Channel_DL)
Deadline65 Deadline (Gear_Set, FromNeu_SetGear_Clutch ∨ FromNeu_SetGear_NoClutch ∨ NoNeu_SetGear_NoClutch ∨ NoNeu_SetGear_ReleasingClutch ∨ NoNeu_SetGear_SettingClutch, Channel_DL)
Deadline66 :Deadline (Gear_Request_Release, Error_Gear_Release ∨ Gear_Release, Gear_Release_DL)
Deadline67 :Deadline (Gear_Request_Set, Error_Gear_Set ∨ Gear_Set, Gear_Set_DL)

EVENTS

INITIALISATION ≙

extended

STATUS

ordinary

BEGIN

act1 :isNeu ≔ TRUE
act2 :RequestNoNeu ≔ FALSE
act3 :RequestToNeu ≔ FALSE
act4 :RequestFromNeu ≔ FALSE
act5 :FromNeu_SyncSpeed ≔ FALSE
act6 :FromNeu_OpenClutch ≔ FALSE
act7 :FromNeu_SetGear_NoClutch ≔ FALSE
act8 :FromNeu_SetGear_Clutch ≔ FALSE
act9 :FromNeu_CloseClutch ≔ FALSE
act10 :Error_FromNeu_OpenClutch ≔ FALSE
act11 :Error_FromNeu_SetGear_NoClutch ≔ FALSE
act12 :Error_FromNeu_SetGear_Clutch ≔ FALSE
act13 :Error_FromNeu_CloseClutch ≔ FALSE
act14 :ToNeu_ZeroTorque≔ FALSE // Senario3 Flage
act15 :ToNeu_OpenClutch ≔ FALSE // Senario3 Flage
act16 :Error_ToNeu_OpenClutch ≔ FALSE // Senario3 Flage
act17 :ToNeu_Release_NoClutch≔ FALSE // Senario3 Flage
act18 :Error_ToNeu_Release_NoClutch≔ FALSE // Senario3 Flage
act19 :ToNeu_Release_Clutch≔ FALSE // Senario3 Flage
act20 :Error_ToNeu_Release_Clutch ≔ FALSE // Senario3 Flage
act21 :ToNeu_CloseClutch≔ FALSE // Senario3 Flage
act22 :Error_ToNeu_CloseClutch≔ FALSE // Senario3 Flage
act23 :NoNeu_ZeroTorque≔ FALSE // Senario2 Flage
act24 :NoNeu_OpenClutch_Releasing≔ FALSE // Senario2 Flage
act25 :NoNeu_Release_NoClutch≔ FALSE // Senario2 Flage
act26 :NoNeu_Release_Clutch≔ FALSE // Senario2 Flage
act27 :NoNeu_SyncSpeed ≔ FALSE // Senario2 Flage
act28 :NoNeu_OpenClutch_Setting ≔ FALSE // Senario2 Flage
act29 :NoNeu_SetGear_NoClutch≔ FALSE // Senario2 Flage
act30 :NoNeu_SetGear_ReleasingClutch≔ FALSE // Senario2 Flage
act31 :NoNeu_SetGear_SettingClutch≔ FALSE // Senario2 Flage
act32 :NoNeu_CloseClutch_Releasing≔ FALSE // Senario2 Flage
act33 :NoNeu_CloseClutch_Setting≔ FALSE // Senario2 Flage

act34 :Error_NoNeu_OpenClutch_Releasing := FALSE // Senario2 Flage
act35 :Error_NoNeu_Release_NoClutch := FALSE // Senario2 Flage
act36 :Error_NoNeu_Release_Clutch := FALSE // Senario2 Flage
act37 :Error_NoNeu_OpenClutch_Setting := FALSE // Senario2 Flage
act38 :Error_NoNeu_SetGear_NoClutch := FALSE // Senario2 Flage
act39 :Error_NoNeu_SetGear_ReleasingClutch := FALSE // Senario2 Flage
act40 :Error_NoNeu_SetGear_SettingClutch := FALSE // Senario2 Flage
act41 :Error_NoNeu_CloseClutch_Releasing := FALSE // Senario2 Flage
act42 :Error_NoNeu_CloseClutch_Setting := FALSE // Senario2 Flage
act43 :Engine_SyncSpeed := FALSE
act44 :Engine_WaitForSyncClutch := FALSE
act45 :Engine_ZeroTorque := FALSE
act46 :Engine_WaitForZeroClutch := FALSE
act47 :Clutch_Open := FALSE // Clutch Flags
act48 :Error_Clutch_Open := FALSE // Clutch Flags
act49 :Clutch_Close := FALSE // Clutch Flags
act50 :Error_Clutch_Close := FALSE // Clutch Flags
act51 :Gear_Release := FALSE // Gear Flags
act52 :Error_Gear_Release := FALSE // Gear Flags
act53 :Gear_Set := FALSE // Gear Flags
act54 :Error_Gear_Set := FALSE // Gear Flags
act55 :FromNeu_RequestOpenClutch := FALSE // Senario1 Flag
act56 :ToNeu_RequestOpenClutch := FALSE // Senario3 Flag
act57 :NoNeu_RequestOpenClutch_Releasing := FALSE // Senario2 Flag
act58 :NoNeu_RequestOpenClutch_Setting := FALSE // Senario2 Flag
act81 :Engine_Request_SyncSpeed := FALSE // Engine Flgas
act82 :Engine_Request_ZeroTorque := FALSE // Engine Flgas
act83 :Clutch_Request_Open := FALSE // Clutch Flags
act84 :Clutch_Request_Close := FALSE // Clutch Flags
act85 :Gear_Request_Release := FALSE // Gear Flags
act86 :Gear_Request_Set := FALSE // Gear Flags
time :time := 0
tRequestFromNeu :tRequestFromNeu := 0
tFromNeu_SyncSpeed :tFromNeu_SyncSpeed := 0
tFromNeu_SetGear_NoClutch :tFromNeu_SetGear_NoClutch := 0
tError_FromNeu_SetGear_NoClutch :tError_FromNeu_SetGear_NoClutch := 0
tFromNeu_OpenClutch :tFromNeu_OpenClutch := 0
tError_FromNeu_SetGear_Clutch :tError_FromNeu_SetGear_Clutch := 0
tFromNeu_SetGear_Clutch :tFromNeu_SetGear_Clutch := 0
tError_FromNeu_CloseClutch :tError_FromNeu_CloseClutch := 0
tFromNeu_CloseClutch :tFromNeu_CloseClutch := 0
tRequestToNeu :tRequestToNeu := 0
tToNeu_ZeroTorque :tToNeu_ZeroTorque := 0
tToNeu_Release_NoClutch :tToNeu_Release_NoClutch := 0
tError_ToNeu_Release_NoClutch :tError_ToNeu_Release_NoClutch := 0
tToNeu_OpenClutch :tToNeu_OpenClutch := 0
tToNeu_Release_Clutch :tToNeu_Release_Clutch := 0
tError_ToNeu_Release_Clutch :tError_ToNeu_Release_Clutch := 0
tError_ToNeu_CloseClutch :tError_ToNeu_CloseClutch := 0
tToNeu_CloseClutch :tToNeu_CloseClutch := 0
tRequestNoNeu :tRequestNoNeu := 0
tNoNeu_ZeroTorque :tNoNeu_ZeroTorque := 0
tNoNeu_OpenClutch_Releasing :tNoNeu_OpenClutch_Releasing := 0
tNoNeu_Release_Clutch :tNoNeu_Release_Clutch := 0
tError_NoNeu_Release_Clutch :tError_NoNeu_Release_Clutch := 0
tNoNeu_Release_NoClutch :tNoNeu_Release_NoClutch := 0
tError_NoNeu_Release_NoClutch :tError_NoNeu_Release_NoClutch := 0
tNoNeu_SyncSpeed :tNoNeu_SyncSpeed := 0
tNoNeu_SetGear_NoClutch :tNoNeu_SetGear_NoClutch := 0
tError_NoNeu_SetGear_NoClutch :tError_NoNeu_SetGear_NoClutch := 0
tNoNeu_OpenClutch_Setting :tNoNeu_OpenClutch_Setting := 0
tNoNeu_SetGear_SettingClutch :tNoNeu_SetGear_SettingClutch := 0
tError_NoNeu_SetGear_SettingClutch :tError_NoNeu_SetGear_SettingClutch := 0
tNoNeu_CloseClutch_Setting :tNoNeu_CloseClutch_Setting := 0
tError_NoNeu_CloseClutch_Setting :tError_NoNeu_CloseClutch_Setting := 0
tError_NoNeu_SetGear_ReleasingClutch :tError_NoNeu_SetGear_ReleasingClutch := 0
tNoNeu_SetGear_ReleasingClutch :tNoNeu_SetGear_ReleasingClutch := 0
tNoNeu_CloseClutch_Releasing :tNoNeu_CloseClutch_Releasing := 0
tError_NoNeu_CloseClutch_Releasing :tError_NoNeu_CloseClutch_Releasing := 0
tFromNeu_RequestOpenClutch :tFromNeu_RequestOpenClutch := 0
tError_FromNeu_OpenClutch :tError_FromNeu_OpenClutch := 0
tToNeu_RequestOpenClutch :tToNeu_RequestOpenClutch := 0
tError_ToNeu_OpenClutch :tError_ToNeu_OpenClutch := 0
tNoNeu_RequestOpenClutch_Releasing :tNoNeu_RequestOpenClutch_Releasing := 0
tError_NoNeu_OpenClutch_Releasing :tError_NoNeu_OpenClutch_Releasing := 0
tNoNeu_RequestOpenClutch_Setting :tNoNeu_RequestOpenClutch_Setting := 0
tError_NoNeu_OpenClutch_Setting :tError_NoNeu_OpenClutch_Setting := 0
tEngine_Request_SyncSpeed :tEngine_Request_SyncSpeed := 0
tEngine_Request_ZeroTorque :tEngine_Request_ZeroTorque := 0

tEngine_ZeroTorque :tEngine_ZeroTorque ≔ 0
tEngine_SyncSpeed :tEngine_SyncSpeed ≔ 0
tEngine_WaitForSyncClutch :tEngine_WaitForSyncClutch ≔ 0
tEngine_WaitForZeroClutch :tEngine_WaitForZeroClutch ≔ 0
tClutch_Request_Open :tClutch_Request_Open ≔ 0
tClutch_Request_Close :tClutch_Request_Close ≔ 0
tClutch_Open :tClutch_Open ≔ 0
tClutch_Close :tClutch_Close ≔ 0
tError_Clutch_Open :tError_Clutch_Open ≔ 0
tError_Clutch_Close :tError_Clutch_Close ≔ 0
tGear_Request_Release :tGear_Request_Release ≔ 0
tGear_Request_Set :tGear_Request_Set ≔ 0
tGear_Release :tGear_Release ≔ 0
tGear_Set :tGear_Set ≔ 0
tError_Gear_Release :tError_Gear_Release ≔ 0
tError_Gear_Set :tError_Gear_Set ≔ 0
END

RequestFromNeu ≙
extended
STATUS
ordinary
REFINES
RequestFromNeu
WHEN
grd1 :RequestFromNeu = FALSE
grd2 :RequestNoNeu = FALSE
grd3 :RequestToNeu = FALSE
grd4 :isNeu = TRUE
THEN
act1 :RequestFromNeu ≔ TRUE
tRequestFromNeu :tRequestFromNeu ≔ time
END

RequestNoNeu ≙
extended
STATUS
ordinary
REFINES
RequestNoNeu
WHEN
grd1 :RequestFromNeu = FALSE
grd2 :RequestNoNeu = FALSE
grd3 :RequestToNeu = FALSE
grd4 :isNeu = FALSE
THEN
act1 :RequestNoNeu ≔ TRUE
tRequestNoNeu :tRequestNoNeu ≔ time
END

RequestToNeu ≙
extended
STATUS
ordinary
REFINES
RequestToNeu
WHEN
grd1 :RequestFromNeu = FALSE
grd2 :RequestNoNeu = FALSE
grd3 :RequestToNeu = FALSE
grd4 :isNeu = FALSE
THEN
act1 :RequestToNeu ≔ TRUE
tRequestToNeu :tRequestToNeu ≔ time
END

FromNeu_SyncSpeed ≙
extended
STATUS
ordinary
REFINES
FromNeu_SyncSpeed
WHEN
grd1 :RequestFromNeu = TRUE
grd2 :FromNeu_SyncSpeed = FALSE
grd3 :FromNeu_RequestOpenClutch = FALSE
grd4 :Engine_SyncSpeed = TRUE
Expiry2 :time ≤ tRequestFromNeu + Sync_EX
THEN

```
        act1 :FromNeu_SyncSpeed ≔ TRUE
        tFromNeu_SyncSpeed :tFromNeu_SyncSpeed ≔ time
END

    FromNeu_RequestOpenClutch ≙
        extended
            STATUS
        ordinary
REFINES
        FromNeu_RequestOpenClutch
WHEN
        grd1 :RequestFromNeu = TRUE
        grd2 :FromNeu_SyncSpeed = FALSE
        grd3 :FromNeu_RequestOpenClutch = FALSE
        Delay1 :time ≥ tRequestFromNeu + OpenClutch_Sync_DE
THEN
        act1 :FromNeu_RequestOpenClutch ≔ TRUE
        tFromNeu_RequestOpenClutch :tFromNeu_RequestOpenClutch ≔ time
END

    FromNeu_OpenClutch ≙
        extended
            STATUS
        ordinary
REFINES
        FromNeu_OpenClutch
WHEN
        grd1 :FromNeu_RequestOpenClutch = TRUE
        grd2 :Error_FromNeu_OpenClutch = FALSE
        grd3 :FromNeu_OpenClutch = FALSE
        grd4 :Clutch_Open = TRUE
THEN
        act1 :FromNeu_OpenClutch ≔ TRUE
        tFromNeu_OpenClutch :tFromNeu_OpenClutch ≔ time
END

    Error_FromNeu_OpenClutch ≙
        extended
            STATUS
        ordinary
REFINES
        Error_FromNeu_OpenClutch
WHEN
        grd1 :FromNeu_RequestOpenClutch = TRUE
        grd2 :Error_FromNeu_OpenClutch = FALSE
        grd3 :FromNeu_OpenClutch = FALSE
THEN
        act1 :Error_FromNeu_OpenClutch ≔ TRUE
        tError_FromNeu_OpenClutch :tError_FromNeu_OpenClutch ≔ time
END

    FromNeu_SetGear_NoClutch ≙
        extended
            STATUS
        ordinary
REFINES
        FromNeu_SetGear_NoClutch
WHEN
        grd1 :FromNeu_SyncSpeed = TRUE
        grd2 :Error_FromNeu_SetGear_NoClutch = FALSE
        grd3 :FromNeu_SetGear_NoClutch = FALSE
        grd4 :Gear_Set = TRUE
THEN
        act1 :FromNeu_SetGear_NoClutch ≔ TRUE
        act2 :isNeu ≔ FALSE
        tFromNeu_SetGear_NoClutch :tFromNeu_SetGear_NoClutch ≔ time
END

    Error_FromNeu_SetGear_NoClutch ≙
        extended
            STATUS
        ordinary
REFINES
        Error_FromNeu_SetGear_NoClutch
WHEN
        grd1 :FromNeu_SyncSpeed = TRUE
        grd2 :Error_FromNeu_SetGear_NoClutch = FALSE
        grd3 :FromNeu_SetGear_NoClutch = FALSE
        grd4 :Gear_Set= TRUE
```

```
THEN
        act1 :Error_FromNeu_SetGear_NoClutch ≔ TRUE
        tError_FromNeu_SetGear_NoClutch :tError_FromNeu_SetGear_NoClutch ≔ time
END

    FromNeu_SetGear_Clutch ≙
        extended
            STATUS
        ordinary
REFINES
        FromNeu_SetGear_Clutch
WHEN
        grd1 :FromNeu_OpenClutch = TRUE
        grd2 :Error_FromNeu_SetGear_Clutch = FALSE
        grd3 :FromNeu_SetGear_Clutch = FALSE
        grd4 :Gear_Set= TRUE
THEN
        act1 :FromNeu_SetGear_Clutch ≔ TRUE
        tFromNeu_SetGear_Clutch :tFromNeu_SetGear_Clutch ≔ time
END

    Error_FromNeu_SetGear_Clutch ≙
        extended
            STATUS
        ordinary
REFINES
        Error_FromNeu_SetGear_Clutch
WHEN
        grd1 :FromNeu_OpenClutch = TRUE
        grd2 :Error_FromNeu_SetGear_Clutch = FALSE
        grd3 :FromNeu_SetGear_Clutch = FALSE
THEN
        act1 :Error_FromNeu_SetGear_Clutch ≔ TRUE
        tError_FromNeu_SetGear_Clutch :tError_FromNeu_SetGear_Clutch ≔ time
END

    FromNeu_CloseClutch ≙
        extended
            STATUS
        ordinary
REFINES
        FromNeu_CloseClutch
WHEN
        grd1 :FromNeu_SetGear_Clutch = TRUE
        grd2 :Error_FromNeu_CloseClutch = FALSE
        grd3 :FromNeu_CloseClutch = FALSE
        grd4 :Clutch_Close = TRUE
THEN
        act1 :FromNeu_CloseClutch ≔ TRUE
        act2 :isNeu ≔ FALSE
        tFromNeu_CloseClutch :tFromNeu_CloseClutch ≔ time
END

    Error_FromNeu_CloseClutch ≙
        extended
            STATUS
        ordinary
REFINES
        Error_FromNeu_CloseClutch
WHEN
        grd1 :FromNeu_SetGear_Clutch = TRUE
        grd2 :Error_FromNeu_CloseClutch = FALSE
        grd3 :FromNeu_CloseClutch = FALSE
THEN
        act1 :Error_FromNeu_CloseClutch ≔ TRUE
        tError_FromNeu_CloseClutch :tError_FromNeu_CloseClutch ≔ time
END

    ToNeu_ZeroTorque ≙      // First Event of Senarion3
        extended
            STATUS
        ordinary
REFINES
        ToNeu_ZeroTorque
WHEN
        grd1 :RequestToNeu = TRUE
        grd2 :ToNeu_ZeroTorque = FALSE
        grd3 :ToNeu_RequestOpenClutch = FALSE
        grd4 :Engine_ZeroTorque = TRUE
```

```
        Expiry3 :time ≤ tRequestToNeu + Zero_EX
THEN
        act1 :ToNeu_ZeroTorque ≔ TRUE
        tToNeu_ZeroTorque :tToNeu_ZeroTorque ≔ time
END

    ToNeu_RequestOpenClutch ≙
        extended
            STATUS
        ordinary
REFINES
        ToNeu_RequestOpenClutch
WHEN
        grd1 :RequestToNeu = TRUE
        grd2 :ToNeu_ZeroTorque = FALSE
        grd3 :ToNeu_RequestOpenClutch = FALSE
        Delay2 :time ≥ tRequestToNeu + OpenClutch_Zero_DE
THEN
        act1 :ToNeu_RequestOpenClutch ≔ TRUE
        tToNeu_RequestOpenClutch :tToNeu_RequestOpenClutch ≔ time
END

    ToNeu_OpenClutch ≙
        extended
            STATUS
        ordinary
REFINES
        ToNeu_OpenClutch
WHEN
        grd1 :ToNeu_RequestOpenClutch = TRUE
        grd2 :ToNeu_OpenClutch = FALSE
        grd3 :Error_ToNeu_OpenClutch = FALSE
        grd4 :Clutch_Open = TRUE
THEN
        act1 :ToNeu_OpenClutch ≔ TRUE
        tToNeu_OpenClutch :tToNeu_OpenClutch ≔ time
END

    Error_ToNeu_OpenClutch ≙
        extended
            STATUS
        ordinary
REFINES
        Error_ToNeu_OpenClutch
WHEN
        grd1 :ToNeu_RequestOpenClutch = TRUE
        grd2 :ToNeu_OpenClutch = FALSE
        grd3 :Error_ToNeu_OpenClutch = FALSE
THEN
        act1 :Error_ToNeu_OpenClutch ≔ TRUE
        tError_ToNeu_OpenClutch :tError_ToNeu_OpenClutch ≔ time
END

    ToNeu_Release_NoClutch ≙
        extended
            STATUS
        ordinary
REFINES
        ToNeu_Release_NoClutch
WHEN
        grd1 :ToNeu_ZeroTorque = TRUE
        grd2 :ToNeu_Release_NoClutch = FALSE
        grd3 :Error_ToNeu_Release_NoClutch = FALSE
        grd4 :Gear_Release = TRUE
THEN
        act1 :ToNeu_Release_NoClutch ≔ TRUE
        act2 :isNeu ≔ TRUE
        tToNeu_Release_NoClutch :tToNeu_Release_NoClutch ≔ time
END

    Error_ToNeu_Release_NoClutch ≙
        extended
            STATUS
        ordinary
REFINES
        Error_ToNeu_Release_NoClutch
WHEN
        grd1 :ToNeu_ZeroTorque = TRUE
        grd2 :ToNeu_Release_NoClutch = FALSE
```

```
        grd3 :Error_ToNeu_Release_NoClutch = FALSE
THEN
        act1 :Error_ToNeu_Release_NoClutch := TRUE
        tError_ToNeu_Release_NoClutch :tError_ToNeu_Release_NoClutch := time
END

    ToNeu_Release_Clutch ≙
        extended
            STATUS
        ordinary
REFINES
        ToNeu_Release_Clutch
WHEN
        grd1 :ToNeu_OpenClutch = TRUE
        grd2 :ToNeu_Release_Clutch = FALSE
        grd3 :Error_ToNeu_Release_Clutch = FALSE
        grd4 :Gear_Release = TRUE
THEN
        act1 :ToNeu_Release_Clutch := TRUE
        tToNeu_Release_Clutch :tToNeu_Release_Clutch := time
END

    Error_ToNeu_Release_Clutch ≙
        extended
            STATUS
        ordinary
REFINES
        Error_ToNeu_Release_Clutch
WHEN
        grd1 :ToNeu_OpenClutch = TRUE
        grd2 :ToNeu_Release_Clutch = FALSE
        grd3 :Error_ToNeu_Release_Clutch = FALSE
THEN
        act1 :Error_ToNeu_Release_Clutch := TRUE
        tError_ToNeu_Release_Clutch :tError_ToNeu_Release_Clutch := time
END

    ToNeu_CloseClutch ≙
        extended
            STATUS
        ordinary
REFINES
        ToNeu_CloseClutch
WHEN
        grd1 :ToNeu_Release_Clutch = TRUE
        grd2 :ToNeu_CloseClutch = FALSE
        grd3 :Error_ToNeu_CloseClutch = FALSE
        grd4 :Clutch_Close = TRUE
THEN
        act1 :ToNeu_CloseClutch := TRUE
        act2 :isNeu := TRUE
        tToNeu_CloseClutch :tToNeu_CloseClutch := time
END

    Error_ToNeu_CloseClutch ≙      // Last Event of Senarion3
        extended
            STATUS
        ordinary
REFINES
        Error_ToNeu_CloseClutch
WHEN
        grd1 :ToNeu_Release_Clutch = TRUE
        grd2 :ToNeu_CloseClutch = FALSE
        grd3 :Error_ToNeu_CloseClutch = FALSE
THEN
        act1 :Error_ToNeu_CloseClutch := TRUE
        tError_ToNeu_CloseClutch :tError_ToNeu_CloseClutch := time
END

    NoNeu_ZeroTorque ≙      // First Event of Senarion2
        extended
            STATUS
        ordinary
REFINES
        NoNeu_ZeroTorque
WHEN
        grd1 :RequestNoNeu = TRUE
        grd2 :NoNeu_ZeroTorque = FALSE
        grd3 :NoNeu_RequestOpenClutch_Releasing = FALSE
```

grd4 :*Engine_ZeroTorque = TRUE*
Expiry4 :*time* ≤ *tRequestNoNeu + Zero_EX*
THEN
act1 :*NoNeu_ZeroTorque* ≔ *TRUE*
tNoNeu_ZeroTorque :*tNoNeu_ZeroTorque* ≔ *time*
END

NoNeu_RequestOpenClutch_Releasing ≙
extended
STATUS
ordinary
REFINES
NoNeu_RequestOpenClutch_Releasing
WHEN
grd1 :*RequestNoNeu = TRUE*
grd2 :*NoNeu_ZeroTorque = FALSE*
grd3 :*NoNeu_RequestOpenClutch_Releasing = FALSE*
Delay3 :*time* ≥ *tRequestNoNeu + OpenClutch_Zero_DE*
THEN
act1 :*NoNeu_RequestOpenClutch_Releasing* ≔ *TRUE*
tNoNeu_RequestOpenClutch_Releasing :*tNoNeu_RequestOpenClutch_Releasing* ≔ *time*
END

NoNeu_OpenClutch_Releasing ≙
extended
STATUS
ordinary
REFINES
NoNeu_OpenClutch_Releasing
WHEN
grd1 :*NoNeu_OpenClutch_Releasing = TRUE*
grd2 :*NoNeu_OpenClutch_Releasing = FALSE*
grd3 :*Error_NoNeu_OpenClutch_Releasing = FALSE*
grd4 :*Clutch_Open = TRUE*
THEN
act1 :*NoNeu_OpenClutch_Releasing* ≔ *TRUE*
tNoNeu_OpenClutch_Releasing :*tNoNeu_OpenClutch_Releasing* ≔ *time*
END

Error_NoNeu_OpenClutch_Releasing ≙
extended
STATUS
ordinary
REFINES
Error_NoNeu_OpenClutch_Releasing
WHEN
grd1 :*NoNeu_RequestOpenClutch_Releasing = TRUE*
grd2 :*NoNeu_OpenClutch_Releasing = FALSE*
grd3 :*Error_NoNeu_OpenClutch_Releasing = FALSE*
THEN
act1 :*Error_NoNeu_OpenClutch_Releasing* ≔ *TRUE*
tError_NoNeu_OpenClutch_Releasing :*tError_NoNeu_OpenClutch_Releasing* ≔ *time*
END

NoNeu_Release_NoClutch ≙
extended
STATUS
ordinary
REFINES
NoNeu_Release_NoClutch
WHEN
grd1 :*NoNeu_ZeroTorque = TRUE*
grd2 :*NoNeu_Release_NoClutch = FALSE*
grd3 :*Error_NoNeu_Release_NoClutch = FALSE*
grd4 :*Gear_Release = TRUE*
THEN
act1 :*NoNeu_Release_NoClutch* ≔ *TRUE*
tNoNeu_Release_NoClutch :*tNoNeu_Release_NoClutch* ≔ *time*
END

Error_NoNeu_Release_NoClutch ≙
extended
STATUS
ordinary
REFINES
Error_NoNeu_Release_NoClutch
WHEN
grd1 :*NoNeu_ZeroTorque = TRUE*
grd2 :*NoNeu_Release_NoClutch = FALSE*

grd3 :*Error_NoNeu_Release_NoClutch = FALSE*
THEN
act1 :*Error_NoNeu_Release_NoClutch* ≔ *TRUE*
tError_NoNeu_Release_NoClutch :*tError_NoNeu_Release_NoClutch* ≔ *time*
END

NoNeu_Release_Clutch ≙
extended
STATUS
ordinary
REFINES
NoNeu_Release_Clutch
WHEN
grd1 :*NoNeu_OpenClutch_Releasing = TRUE*
grd2 :*NoNeu_Release_Clutch = FALSE*
grd3 :*Error_NoNeu_Release_Clutch = FALSE*
grd4 :*Gear_Release = TRUE*
THEN
act1 :*NoNeu_Release_Clutch* ≔ *TRUE*
tNoNeu_Release_Clutch :*tNoNeu_Release_Clutch* ≔ *time*
END

Error_NoNeu_Release_Clutch ≙
extended
STATUS
ordinary
REFINES
Error_NoNeu_Release_Clutch
WHEN
grd1 :*NoNeu_OpenClutch_Releasing = TRUE*
grd2 :*NoNeu_Release_Clutch = FALSE*
grd3 :*Error_NoNeu_Release_Clutch = FALSE*
THEN
act1 :*Error_NoNeu_Release_Clutch* ≔ *TRUE*
tError_NoNeu_Release_Clutch :*tError_NoNeu_Release_Clutch* ≔ *time*
END

NoNeu_SyncSpeed ≙
extended
STATUS
ordinary
REFINES
NoNeu_SyncSpeed
WHEN
grd1 :*NoNeu_Release_NoClutch = TRUE*
grd2 :*NoNeu_SyncSpeed = FALSE*
grd3 :*NoNeu_RequestOpenClutch_Setting = FALSE*
grd4 :*Engine_SyncSpeed= TRUE*
Expiry5 :*time* ≤ *tNoNeu_Release_NoClutch + Sync_EX*
THEN
act1 :*NoNeu_SyncSpeed* ≔ *TRUE*
tNoNeu_SyncSpeed :*tNoNeu_SyncSpeed* ≔ *time*
END

NoNeu_RequestOpenClutch_Setting ≙
extended
STATUS
ordinary
REFINES
NoNeu_RequestOpenClutch_Setting
WHEN
grd1 :*NoNeu_Release_NoClutch = TRUE*
grd2 :*NoNeu_SyncSpeed = FALSE*
grd3 :*NoNeu_RequestOpenClutch_Setting = FALSE*
Delay4 :*time* ≥ *tNoNeu_Release_NoClutch + OpenClutch_Sync_DE*
THEN
act1 :*NoNeu_RequestOpenClutch_Setting* ≔ *TRUE*
tNoNeu_RequestOpenClutch_Setting :*tNoNeu_RequestOpenClutch_Setting* ≔ *time*
END

NoNeu_OpenClutch_Setting ≙
extended
STATUS
ordinary
REFINES
NoNeu_OpenClutch_Setting
WHEN
grd1 :*NoNeu_RequestOpenClutch_Setting = TRUE*
grd2 :*Error_NoNeu_OpenClutch_Setting = FALSE*

```
        grd3 :NoNeu_OpenClutch_Setting = FALSE
        grd4 :Clutch_Open = TRUE
THEN
        act1 :NoNeu_OpenClutch_Setting ≔ TRUE
        tNoNeu_OpenClutch_Setting :tNoNeu_OpenClutch_Setting ≔ time
END

    Error_NoNeu_OpenClutch_Setting ≙
        extended
            STATUS
        ordinary
REFINES
        Error_NoNeu_OpenClutch_Setting
WHEN
        grd1 :NoNeu_RequestOpenClutch_Setting = TRUE
        grd2 :Error_NoNeu_OpenClutch_Setting = FALSE
        grd3 :NoNeu_OpenClutch_Setting = FALSE
THEN
        act1 :Error_NoNeu_OpenClutch_Setting ≔ TRUE
        tError_NoNeu_OpenClutch_Setting :tError_NoNeu_OpenClutch_Setting ≔ time
END

    NoNeu_SetGear_NoClutch ≙
        extended
            STATUS
        ordinary
REFINES
        NoNeu_SetGear_NoClutch
WHEN
        grd1 :NoNeu_SyncSpeed = TRUE
        grd2 :Error_NoNeu_SetGear_NoClutch = FALSE
        grd3 :NoNeu_SetGear_NoClutch = FALSE
        grd4 :Gear_Set = TRUE
THEN
        act1 :NoNeu_SetGear_NoClutch ≔ TRUE
        tNoNeu_SetGear_NoClutch :tNoNeu_SetGear_NoClutch ≔ time
END

    Error_NoNeu_SetGear_NoClutch ≙
        extended
            STATUS
        ordinary
REFINES
        Error_NoNeu_SetGear_NoClutch
WHEN
        grd1 :NoNeu_SyncSpeed = TRUE
        grd2 :Error_NoNeu_SetGear_NoClutch = FALSE
        grd3 :NoNeu_SetGear_NoClutch = FALSE
THEN
        act1 :Error_NoNeu_SetGear_NoClutch ≔ TRUE
        tError_NoNeu_SetGear_NoClutch :tError_NoNeu_SetGear_NoClutch ≔ time
END

    NoNeu_SetGear_ReleasingClutch ≙
        extended
            STATUS
        ordinary
REFINES
        NoNeu_SetGear_ReleasingClutch
WHEN
        grd1 :NoNeu_Release_Clutch = TRUE
        grd2 :Error_NoNeu_SetGear_ReleasingClutch = FALSE
        grd3 :NoNeu_SetGear_ReleasingClutch = FALSE
        grd4 :Gear_Set = TRUE
THEN
        act1 :NoNeu_SetGear_ReleasingClutch ≔ TRUE
        tNoNeu_SetGear_ReleasingClutch :tNoNeu_SetGear_ReleasingClutch ≔ time
END

    Error_NoNeu_SetGear_ReleasingClutch ≙
        extended
            STATUS
        ordinary
REFINES
        Error_NoNeu_SetGear_ReleasingClutch
WHEN
        grd1 :NoNeu_Release_Clutch = TRUE
        grd2 :Error_NoNeu_SetGear_ReleasingClutch = FALSE
        grd3 :NoNeu_SetGear_ReleasingClutch = FALSE
```

```
THEN
    act1 :Error_NoNeu_SetGear_ReleasingClutch ≔ TRUE
    tError_NoNeu_SetGear_ReleasingClutch :tError_NoNeu_SetGear_ReleasingClutch ≔ time
END

  NoNeu_SetGear_SettingClutch ≙
    extended
      STATUS
    ordinary
REFINES
    NoNeu_SetGear_SettingClutch
WHEN
    grd1 :NoNeu_OpenClutch_Setting = TRUE
    grd2 :Error_NoNeu_SetGear_SettingClutch = FALSE
    grd3 :NoNeu_SetGear_SettingClutch = FALSE
    grd4 :Gear_Set = TRUE
THEN
    act1 :NoNeu_SetGear_SettingClutch ≔ TRUE
    tNoNeu_SetGear_SettingClutch :tNoNeu_SetGear_SettingClutch ≔ time
END

  Error_NoNeu_SetGear_SettingClutch ≙
    extended
      STATUS
    ordinary
REFINES
    Error_NoNeu_SetGear_SettingClutch
WHEN
    grd1 :NoNeu_OpenClutch_Setting = TRUE
    grd2 :Error_NoNeu_SetGear_SettingClutch = FALSE
    grd3 :NoNeu_SetGear_SettingClutch = FALSE
THEN
    act1 :Error_NoNeu_SetGear_SettingClutch ≔ TRUE
    tError_NoNeu_SetGear_SettingClutch :tError_NoNeu_SetGear_SettingClutch ≔ time
END

  NoNeu_CloseClutch_Setting ≙
    extended
      STATUS
    ordinary
REFINES
    NoNeu_CloseClutch_Setting
WHEN
    grd1 :NoNeu_SetGear_SettingClutch = TRUE
    grd2 :Error_NoNeu_CloseClutch_Setting = FALSE
    grd3 :NoNeu_CloseClutch_Setting = FALSE
    grd4 :Clutch_Close = TRUE
THEN
    act1 :NoNeu_CloseClutch_Setting ≔ TRUE
    tNoNeu_CloseClutch_Setting :tNoNeu_CloseClutch_Setting ≔ time
END

  Error_NoNeu_CloseClutch_Setting ≙
    extended
      STATUS
    ordinary
REFINES
    Error_NoNeu_CloseClutch_Setting
WHEN
    grd1 :NoNeu_SetGear_SettingClutch = TRUE
    grd2 :Error_NoNeu_CloseClutch_Setting = FALSE
    grd3 :NoNeu_CloseClutch_Setting = FALSE
THEN
    act1 :Error_NoNeu_CloseClutch_Setting ≔ TRUE
    tError_NoNeu_CloseClutch_Setting :tError_NoNeu_CloseClutch_Setting ≔ time
END

  NoNeu_CloseClutch_Releasing ≙
    extended
      STATUS
    ordinary
REFINES
    NoNeu_CloseClutch_Releasing
WHEN
    grd1 :NoNeu_SetGear_ReleasingClutch = TRUE
    grd2 :Error_NoNeu_CloseClutch_Releasing = FALSE
    grd3 :NoNeu_CloseClutch_Releasing = FALSE
    grd4 :Clutch_Close = TRUE
THEN
```

```
        act1 :NoNeu_CloseClutch_Releasing ≔ TRUE
        tNoNeu_CloseClutch_Releasing :tNoNeu_CloseClutch_Releasing ≔ time
END

    Error_NoNeu_CloseClutch_Releasing ≙
        extended
            STATUS
        ordinary
REFINES
        Error_NoNeu_CloseClutch_Releasing
WHEN
        grd1 :NoNeu_SetGear_ReleasingClutch = TRUE
        grd2 :Error_NoNeu_CloseClutch_Releasing = FALSE
        grd3 :NoNeu_CloseClutch_Releasing = FALSE
THEN
        act1 :Error_NoNeu_CloseClutch_Releasing ≔ TRUE
        tError_NoNeu_CloseClutch_Releasing :tError_NoNeu_CloseClutch_Releasing ≔ time
END

    Engine_Request_SyncSpeed ≙
        extended
            STATUS
        ordinary
REFINES
        Engine_Request_SyncSpeed
WHEN
        grd1 :RequestFromNeu = TRUE ∨ NoNeu_Release_NoClutch = TRUE
        grd2 :Engine_Request_SyncSpeed = FALSE
THEN
        act1 :Engine_Request_SyncSpeed ≔ TRUE
        tEngine_Request_SyncSpeed :tEngine_Request_SyncSpeed ≔ time
END

    Engine_SyncSpeed ≙
        extended
            STATUS
        ordinary
REFINES
        Engine_SyncSpeed
WHEN
        grd1 :Engine_Request_SyncSpeed = TRUE
        grd2 :Engine_SyncSpeed = FALSE
        grd3 :Engine_WaitForSyncClutch = FALSE
THEN
        act1 :Engine_SyncSpeed ≔ TRUE
        tEngine_SyncSpeed :tEngine_SyncSpeed ≔ time
END

    Engine_WaitForSyncClutch ≙
        extended
            STATUS
        ordinary
REFINES
        Engine_WaitForSyncClutch
WHEN
        grd1 :Engine_Request_SyncSpeed = TRUE
        grd2 :Engine_SyncSpeed = FALSE
        grd3 :Engine_WaitForSyncClutch = FALSE
THEN
        act1 :Engine_WaitForSyncClutch ≔ TRUE
        tEngine_WaitForSyncClutch :tEngine_WaitForSyncClutch ≔ time
END

    Engine_Request_ZeroTorque ≙
        extended
            STATUS
        ordinary
REFINES
        Engine_Request_ZeroTorque
WHEN
        grd1 :RequestToNeu = TRUE ∨ RequestNoNeu = TRUE
        grd2 :Engine_Request_ZeroTorque = FALSE
THEN
        act1 :Engine_Request_ZeroTorque ≔ TRUE
        tEngine_Request_ZeroTorque :tEngine_Request_ZeroTorque ≔ time
END

    Engine_ZeroTorque ≙
        extended
```

STATUS
ordinary
REFINES
Engine_ZeroTorque
WHEN
grd1 :*Engine_Request_ZeroTorque = TRUE*
grd2 :*Engine_ZeroTorque = FALSE*
grd3 :*Engine_WaitForZeroClutch = FALSE*
THEN
act1 :*Engine_ZeroTorque* ≔ *TRUE*
tEngine_ZeroTorque :*tEngine_ZeroTorque* ≔ *time*
END

Engine_WaitForZeroClutch ≙
extended
STATUS
ordinary
REFINES
Engine_WaitForZeroClutch
WHEN
grd1 :*Engine_Request_ZeroTorque = TRUE*
grd2 :*Engine_ZeroTorque = FALSE*
grd3 :*Engine_WaitForZeroClutch = FALSE*
THEN
act1 :*Engine_WaitForZeroClutch* ≔ *TRUE*
tEngine_WaitForZeroClutch :*tEngine_WaitForZeroClutch* ≔ *time*
END

Clutch_Request_Open ≙
extended
STATUS
ordinary
REFINES
Clutch_Request_Open
WHEN
grd1 :*FromNeu_RequestOpenClutch = TRUE* ∨ *ToNeu_RequestOpenClutch = TRUE* ∨ *NoNeu_RequestOpenClutch_Releasing = TRUE* ∨ *NoNeu_RequestOpenClutch_Setting = TRUE*
grd2 :*Clutch_Request_Open = FALSE*
THEN
act1 :*Clutch_Request_Open* ≔ *TRUE*
tClutch_Request_Open :*tClutch_Request_Open* ≔ *time*
END

Clutch_Open ≙
extended
STATUS
ordinary
REFINES
Clutch_Open
WHEN
grd1 :*Clutch_Request_Open = TRUE*
grd2 :*Clutch_Open = FALSE*
grd3 :*Error_Clutch_Open = FALSE*
THEN
act1 :*Clutch_Open* ≔ *TRUE*
tClutch_Open :*tClutch_Open* ≔ *time*
END

Error_Clutch_Open ≙
extended
STATUS
ordinary
REFINES
Error_Clutch_Open
WHEN
grd1 :*Clutch_Request_Open = TRUE*
grd2 :*Clutch_Open = FALSE*
grd3 :*Error_Clutch_Open = FALSE*
THEN
act1 :*Error_Clutch_Open* ≔ *TRUE*
tError_Clutch_Open :*tError_Clutch_Open* ≔ *time*
END

Clutch_Request_Close ≙
extended
STATUS
ordinary
REFINES
Clutch_Request_Close

WHEN
grd1 : *FromNeu_SetGear_Clutch = TRUE ∨ ToNeu_Release_Clutch = TRUE ∨ NoNeu_SetGear_ReleasingClutch = TRUE ∨ NoNeu_SetGear_SettingClutch= TRUE*
grd2 :*Clutch_Request_Close = FALSE*
THEN
act1 :*Clutch_Request_Close ≔ TRUE*
tClutch_Request_Close :*tClutch_Request_Close ≔ time*
END

Clutch_Close ≙
extended
STATUS
ordinary
REFINES
Clutch_Close
WHEN
grd1 :*Clutch_Request_Close = TRUE*
grd2 :*Clutch_Close = FALSE*
grd3 :*Error_Clutch_Close = FALSE*
THEN
act1 :*Clutch_Close ≔ TRUE*
tClutch_Close :*tClutch_Close ≔ time*
END

Error_Clutch_Close ≙
extended
STATUS
ordinary
REFINES
Error_Clutch_Close
WHEN
grd1 :*Clutch_Request_Close = TRUE*
grd2 :*Clutch_Close = FALSE*
grd3 :*Error_Clutch_Close = FALSE*
THEN
act1 :*Error_Clutch_Close ≔ TRUE*
tError_Clutch_Close :*tError_Clutch_Close ≔ time*
END

Gear_Request_Release ≙
extended
STATUS
ordinary
REFINES
Gear_Request_Release
WHEN
grd1 : *ToNeu_ZeroTorque = TRUE ∨ ToNeu_OpenClutch = TRUE ∨ NoNeu_ZeroTorque = TRUE ∨ NoNeu_OpenClutch_Releasing= TRUE*
grd2 :*Gear_Request_Release = FALSE*
THEN
act1 :*Gear_Request_Release ≔ TRUE*
tGear_Request_Release :tGear_Request_Release ≔ time
END

Gear_Release ≙
extended
STATUS
ordinary
REFINES
Gear_Release
WHEN
grd1 :*Gear_Request_Release = TRUE*
grd2 :*Gear_Release = FALSE*
grd3 :*Error_Gear_Release = FALSE*
THEN
act1 :*Gear_Release ≔ TRUE*
tGear_Release :tGear_Release ≔ time
END

Error_Gear_Release ≙
extended
STATUS
ordinary
REFINES
Error_Gear_Release
WHEN
grd1 :*Gear_Request_Release = TRUE*
grd2 :*Gear_Release = FALSE*
grd3 :*Error_Gear_Release = FALSE*

```
THEN
        act1 :Error_Gear_Release ≔ TRUE
        tError_Gear_Release :tError_Gear_Release ≔ time
END

    Gear_Request_Set ≙
      extended
          STATUS
      ordinary
REFINES
        Gear_Request_Set
WHEN
              FromNeu_SyncSpeed = TRUE ∨ FromNeu_OpenClutch = TRUE ∨
        grd1 :NoNeu_Release_Clutch = TRUE ∨ NoNeu_SyncSpeed = TRUE ∨
              NoNeu_OpenClutch_Setting = TRUE
        grd2 :Gear_Request_Set = FALSE
THEN
        act1 :Gear_Request_Set ≔ TRUE
        tGear_Request_Set :tGear_Request_Set ≔ time
END

    Gear_Set ≙
      extended
          STATUS
      ordinary
REFINES
        Gear_Set
WHEN
        grd1 :Gear_Request_Set = TRUE
        grd2 :Gear_Set = FALSE
        grd3 :Error_Gear_Set = FALSE
THEN
        act1 :Gear_Set ≔ TRUE
        tGear_Set :tGear_Set ≔ time
END

    Error_Gear_Set ≙
      extended
          STATUS
      ordinary
REFINES
        Error_Gear_Set
WHEN
        grd1 :Gear_Request_Set = TRUE
        grd2 :Gear_Set = FALSE
        grd3 :Error_Gear_Set = FALSE
THEN
        act1 :Error_Gear_Set ≔ TRUE
        tError_Gear_Set :tError_Gear_Set ≔ time
END

    FINAL ≙
      extended
          STATUS
      ordinary
REFINES
        FINAL
WHEN
              FromNeu_SetGear_NoClutch = TRUE ∨ NoNeu_SetGear_NoClutch = TRUE ∨
              ToNeu_Release_NoClutch = TRUE ∨ FromNeu_CloseClutch = TRUE ∨
        grd1 :NoNeu_CloseClutch_Setting = TRUE ∨ NoNeu_CloseClutch_Releasing = TRUE ∨
              ToNeu_CloseClutch = TRUE
THEN
        act1 :RequestFromNeu ≔ FALSE
        act2 :RequestNoNeu ≔ FALSE
        act3 :RequestToNeu ≔ FALSE
        act4 :FromNeu_SyncSpeed ≔ FALSE
        act5 :FromNeu_OpenClutch ≔ FALSE
        act6 :FromNeu_SetGear_NoClutch ≔ FALSE
        act7 :FromNeu_SetGear_Clutch ≔ FALSE
        act8 :FromNeu_CloseClutch ≔ FALSE
        act9 :ToNeu_Release_NoClutch ≔ FALSE
        act10 :ToNeu_CloseClutch ≔ FALSE
        act11 :ToNeu_ZeroTorque≔ FALSE      // Senario3 Flage
        act12 :ToNeu_OpenClutch ≔ FALSE      // Senario3 Flage
        act13 :ToNeu_Release_Clutch≔ FALSE      // Senario3 Flage
        act14 :NoNeu_ZeroTorque≔ FALSE      // Senario2 Flage
        act15 :NoNeu_OpenClutch_Releasing ≔ FALSE
```

act16 :NoNeu_Release_NoClutch≔ FALSE // Senario2 Flage
act17 :NoNeu_Release_Clutch≔ FALSE // Senario2 Flage
act18 :NoNeu_SyncSpeed ≔ FALSE // Senario2 Flage
act19 :NoNeu_OpenClutch_Setting ≔ FALSE // Senario2 Flage
act20 :NoNeu_SetGear_NoClutch≔ FALSE // Senario2 Flage
act21 :NoNeu_SetGear_ReleasingClutch≔ FALSE // Senario2 Flage
act22 :NoNeu_SetGear_SettingClutch≔ FALSE // Senario2 Flage
act23 :NoNeu_CloseClutch_Setting≔ FALSE // Senario2 Flage
act24 :NoNeu_CloseClutch_Releasing≔ FALSE // Senario2 Flage
act25 :Engine_SyncSpeed ≔ FALSE
act26 :Engine_WaitForSyncClutch ≔ FALSE
act27 :Engine_ZeroTorque ≔ FALSE
act28 :Engine_WaitForZeroClutch ≔ FALSE
act29 :Clutch_Open ≔ FALSE // Clutch Flags
act30 :Clutch_Close ≔ FALSE // Clutch Flags
act31 :Gear_Release ≔ FALSE // Gear Flags
act32 :Gear_Set ≔ FALSE // Gear Flags
act33 :FromNeu_RequestOpenClutch ≔ FALSE // Senario1 Flag
act34 :ToNeu_RequestOpenClutch ≔ FALSE // Senario3 Flag
act35 :NoNeu_RequestOpenClutch_Releasing ≔ FALSE // Senario2 Flag
act36 :NoNeu_RequestOpenClutch_Setting ≔ FALSE // Senario2 Flag
act37 :Engine_Request_SyncSpeed ≔ FALSE // Engine Flgas
act38 :Engine_Request_ZeroTorque ≔ FALSE // Engine Flgas
act39 :Clutch_Request_Open ≔ FALSE // Clutch Flags
act40 :Clutch_Request_Close ≔ FALSE // Clutch Flags
act41 :Gear_Request_Release ≔ FALSE // Gear Flags
act42 :Gear_Request_Set ≔ FALSE // Gear Flags

END

Tick_Tock ≙
extended
STATUS
ordinary

REFINES
Tick_Tock

ANY
tick

WHERE
tick :*tick* > 0
Deadline10 : FromNeu_SyncSpeed = TRUE ∧ FromNeu_SetGear_NoClutch = FALSE ∧ Error_FromNeu_SetGear_NoClutch = FALSE ⇒ time + tick ≤ tFromNeu_SyncSpeed + SetGear_DL
Deadline11 : FromNeu_OpenClutch = TRUE ∧ Error_FromNeu_SetGear_Clutch = FALSE ∧ FromNeu_SetGear_Clutch = FALSE ⇒ time + tick ≤ tFromNeu_OpenClutch + SetGear_DL
Deadline12 : FromNeu_SetGear_Clutch = TRUE ∧ Error_FromNeu_CloseClutch = FALSE ∧ FromNeu_CloseClutch = FALSE ⇒ time + tick ≤ tFromNeu_SetGear_Clutch + CloseClutch_DL
Deadline14 : ToNeu_ZeroTorque = TRUE ∧ ToNeu_Release_NoClutch = FALSE ∧ Error_ToNeu_Release_NoClutch = FALSE ⇒ time + tick ≤ tToNeu_ZeroTorque + Release_DL
Deadline15 : ToNeu_OpenClutch = TRUE ∧ ToNeu_Release_Clutch = FALSE ∧ Error_ToNeu_Release_Clutch = FALSE ⇒ time + tick ≤ tToNeu_OpenClutch + Release_DL
Deadline16 : ToNeu_Release_Clutch = TRUE ∧ Error_ToNeu_CloseClutch = FALSE ∧ ToNeu_CloseClutch = FALSE ⇒ time + tick ≤ tToNeu_Release_Clutch + CloseClutch_DL
Deadline18 : NoNeu_OpenClutch_Releasing = TRUE ∧ NoNeu_Release_Clutch = FALSE ∧ Error_NoNeu_Release_Clutch = FALSE ⇒ time + tick ≤ tNoNeu_OpenClutch_Releasing + Release_DL
Deadline19 : NoNeu_ZeroTorque = TRUE ∧ NoNeu_Release_NoClutch = FALSE ∧ Error_NoNeu_Release_NoClutch = FALSE ⇒ time + tick ≤ tNoNeu_ZeroTorque + Release_DL
Deadline21 : NoNeu_SyncSpeed = TRUE ∧ NoNeu_SetGear_NoClutch = FALSE ∧ Error_NoNeu_SetGear_NoClutch = FALSE ⇒ time + tick ≤ tNoNeu_SyncSpeed + SetGear_DL
Deadline22 : NoNeu_OpenClutch_Setting = TRUE ∧ NoNeu_SetGear_SettingClutch = FALSE ∧ Error_NoNeu_SetGear_SettingClutch = FALSE ⇒ time + tick ≤ tNoNeu_OpenClutch_Setting + SetGear_DL
Deadline23 : NoNeu_SetGear_SettingClutch = TRUE ∧ NoNeu_CloseClutch_Setting = FALSE ∧ Error_NoNeu_CloseClutch_Setting = FALSE ⇒ time + tick ≤ tNoNeu_SetGear_SettingClutch + CloseClutch_DL
Deadline24 : NoNeu_Release_Clutch = TRUE ∧ Error_NoNeu_SetGear_ReleasingClutch = FALSE ∧ NoNeu_SetGear_ReleasingClutch = FALSE ⇒ time + tick ≤ tNoNeu_Release_Clutch + SetGear_DL
Deadline25 : NoNeu_SetGear_ReleasingClutch = TRUE ∧ NoNeu_CloseClutch_Releasing = FALSE ∧ Error_NoNeu_CloseClutch_Releasing = FALSE ⇒ time + tick ≤ tNoNeu_SetGear_ReleasingClutch + CloseClutch_DL
Deadline27 : FromNeu_RequestOpenClutch = TRUE ∧ FromNeu_OpenClutch = FALSE ∧ Error_FromNeu_OpenClutch = FALSE ⇒ time + tick ≤ tFromNeu_RequestOpenClutch + OpenClutch_DL
Deadline28 : RequestToNeu = TRUE ∧ ToNeu_ZeroTorque = FALSE ∧ ToNeu_RequestOpenClutch = FALSE ⇒ time + tick ≤ tRequestToNeu + Zero_DL
Deadline29 : ToNeu_RequestOpenClutch = TRUE ∧ ToNeu_OpenClutch = FALSE ∧ Error_ToNeu_OpenClutch = FALSE ⇒ time + tick ≤ tToNeu_RequestOpenClutch + OpenClutch_DL
Deadline30 : RequestNoNeu = TRUE ∧ NoNeu_RequestOpenClutch_Releasing = FALSE ∧ NoNeu_ZeroTorque = FALSE ⇒ time + tick ≤ tRequestNoNeu + Zero_DL
Deadline31 : NoNeu_RequestOpenClutch_Releasing = TRUE ∧ NoNeu_OpenClutch_Releasing = FALSE ∧ Error_NoNeu_OpenClutch_Releasing = FALSE ⇒ time + tick ≤ tNoNeu_RequestOpenClutch_Releasing + OpenClutch_DL
Deadline32 : NoNeu_Release_NoClutch = TRUE ∧ NoNeu_RequestOpenClutch_Setting = FALSE ∧ NoNeu_SyncSpeed = FALSE ⇒ time + tick ≤ tNoNeu_Release_NoClutch + Sync_DL
Deadline33 : NoNeu_RequestOpenClutch_Setting = TRUE ∧ NoNeu_OpenClutch_Setting = FALSE ∧ Error_NoNeu_OpenClutch_Setting = FALSE ⇒ time + tick ≤ tNoNeu_RequestOpenClutch_Setting + OpenClutch_DL

Deadline34 : RequestFromNeu = TRUE ∧ FromNeu_RequestOpenClutch = FALSE ∧ FromNeu_SyncSpeed = FALSE ⇒ time + tick ≤ tRequestFromNeu + Sync_DL
Deadline35 : RequestFromNeu = TRUE ∧ Engine_Request_SyncSpeed = FALSE ⇒ time + tick ≤ tRequestFromNeu + Channel_DL
Deadline36 : NoNeu_Release_NoClutch = TRUE ∧ Engine_Request_SyncSpeed = FALSE ⇒ time + tick ≤ tNoNeu_Release_NoClutch + Channel_DL
Deadline37 : RequestToNeu = TRUE ∧ Engine_Request_ZeroTorque = FALSE ⇒ time + tick ≤ tRequestToNeu + Channel_DL
Deadline38 : RequestNoNeu = TRUE ∧ Engine_Request_ZeroTorque = FALSE ⇒ time + tick ≤ tRequestNoNeu + Channel_DL
Deadline39 : Engine_ZeroTorque = TRUE ∧ NoNeu_ZeroTorque = FALSE ∧ ToNeu_ZeroTorque = FALSE ⇒ time + tick ≤ tEngine_ZeroTorque + Channel_DL
Deadline40 : Engine_SyncSpeed = TRUE ∧ FromNeu_SyncSpeed = FALSE ∧ NoNeu_SyncSpeed = FALSE ⇒ time + tick ≤ tEngine_SyncSpeed + Channel_DL
Deadline41 : Engine_Request_SyncSpeed = TRUE ∧ Engine_SyncSpeed = FALSE ∧ Engine_WaitForSyncClutch = FALSE ⇒ time + tick ≤ tEngine_Request_SyncSpeed + Engine_Sync_DL
Deadline42 : Engine_Request_ZeroTorque = TRUE ∧ Engine_WaitForZeroClutch = FALSE ∧ Engine_ZeroTorque = FALSE ⇒ time + tick ≤ tEngine_Request_ZeroTorque + Engine_Zero_DL
Deadline43 : FromNeu_RequestOpenClutch = TRUE ∧ Clutch_Request_Open = FALSE ⇒ time + tick ≤ tFromNeu_RequestOpenClutch + Channel_DL
Deadline44 : ToNeu_RequestOpenClutch = TRUE ∧ Clutch_Request_Open = FALSE ⇒ time + tick ≤ tToNeu_RequestOpenClutch + Channel_DL
Deadline45 : NoNeu_RequestOpenClutch_Releasing = TRUE ∧ Clutch_Request_Open = FALSE ⇒ time + tick ≤ tNoNeu_RequestOpenClutch_Releasing + Channel_DL
Deadline46 : NoNeu_RequestOpenClutch_Setting = TRUE ∧ Clutch_Request_Open = FALSE ⇒ time + tick ≤ tNoNeu_RequestOpenClutch_Setting + Channel_DL
Deadline47 : FromNeu_SetGear_Clutch = TRUE ∧ Clutch_Request_Close = FALSE ⇒ time + tick ≤ tFromNeu_SetGear_Clutch + Channel_DL
Deadline48 : NoNeu_SetGear_ReleasingClutch = TRUE ∧ Clutch_Request_Close = FALSE ⇒ time + tick ≤ tNoNeu_SetGear_ReleasingClutch + Channel_DL
Deadline49 : NoNeu_SetGear_SettingClutch = TRUE ∧ Clutch_Request_Close = FALSE ⇒ time + tick ≤ tNoNeu_SetGear_SettingClutch + Channel_DL
Deadline50 : ToNeu_Release_Clutch = TRUE ∧ Clutch_Request_Close = FALSE ⇒ time + tick ≤ tToNeu_Release_Clutch + Channel_DL
Deadline51 : Clutch_Open = TRUE ∧ FromNeu_OpenClutch = FALSE ∧ NoNeu_OpenClutch_Releasing = FALSE ∧ NoNeu_OpenClutch_Setting = FALSE ∧ ToNeu_OpenClutch = FALSE ⇒ time + tick ≤ tClutch_Open + Channel_DL
Deadline52 : Clutch_Close = TRUE ∧ FromNeu_CloseClutch = FALSE ∧ NoNeu_CloseClutch_Releasing = FALSE ∧ NoNeu_CloseClutch_Setting = FALSE ∧ ToNeu_CloseClutch = FALSE ⇒ time + tick ≤ tClutch_Close + Channel_DL
Deadline53 : Clutch_Request_Open = TRUE ∧ Clutch_Open = FALSE ∧ Error_Clutch_Open = FALSE ⇒ time + tick ≤ tClutch_Request_Open + Clutch_Open_DL
Deadline54 : Clutch_Request_Close = TRUE ∧ Clutch_Close = FALSE ∧ Error_Clutch_Close = FALSE ⇒ time + tick ≤ tClutch_Request_Close + Clutch_Close_DL
Deadline55 : ToNeu_ZeroTorque = TRUE ∧ Gear_Request_Release = FALSE ⇒ time + tick ≤ tToNeu_ZeroTorque + Channel_DL
Deadline56 : ToNeu_OpenClutch = TRUE ∧ Gear_Request_Release = FALSE ⇒ time + tick ≤ tToNeu_OpenClutch + Channel_DL
Deadline57 : NoNeu_ZeroTorque = TRUE ∧ Gear_Request_Release = FALSE ⇒ time + tick ≤ tNoNeu_ZeroTorque + Channel_DL
Deadline58 : NoNeu_OpenClutch_Releasing = TRUE ∧ Gear_Request_Release = FALSE ⇒ time + tick ≤ tNoNeu_OpenClutch_Releasing + Channel_DL
Deadline59 : NoNeu_SyncSpeed = TRUE ∧ Gear_Request_Set = FALSE ⇒ time + tick ≤ tNoNeu_SyncSpeed + Channel_DL
Deadline60 : NoNeu_Release_Clutch = TRUE ∧ Gear_Request_Set = FALSE ⇒ time + tick ≤ tNoNeu_Release_Clutch + Channel_DL
Deadline61 : NoNeu_OpenClutch_Setting = TRUE ∧ Gear_Request_Set = FALSE ⇒ time + tick ≤ tNoNeu_OpenClutch_Setting + Channel_DL
Deadline62 : FromNeu_SyncSpeed = TRUE ∧ Gear_Request_Set = FALSE ⇒ time + tick ≤ tFromNeu_SyncSpeed + Channel_DL
Deadline63 : FromNeu_OpenClutch = TRUE ∧ Gear_Request_Set = FALSE ⇒ time + tick ≤ tFromNeu_OpenClutch + Channel_DL
Deadline64 : Gear_Release = TRUE ∧ NoNeu_Release_Clutch = FALSE ∧ NoNeu_Release_NoClutch = FALSE ∧ ToNeu_Release_Clutch = FALSE ∧ ToNeu_Release_NoClutch = FALSE ⇒ time + tick ≤ tGear_Release + Channel_DL
Deadline65 : Gear_Set = TRUE ∧ FromNeu_SetGear_Clutch = FALSE ∧ FromNeu_SetGear_NoClutch = FALSE ∧ NoNeu_SetGear_NoClutch = FALSE ∧ NoNeu_SetGear_ReleasingClutch = FALSE ∧ NoNeu_SetGear_SettingClutch = FALSE ⇒ time + tick ≤ tGear_Set + Channel_DL
Deadline66 : Gear_Request_Release = TRUE ∧ Error_Gear_Release = FALSE ∧ Gear_Release = FALSE ⇒ time + tick ≤ tGear_Request_Release + Gear_Release_DL
Deadline67 : Gear_Request_Set = TRUE ∧ Error_Gear_Set = FALSE ∧ Gear_Set = FALSE ⇒ time + tick ≤ tGear_Request_Set + Gear_Set_DL

THEN

act1 : time := time+tick

END

END