*TERMINATION

The keyword *TERMINATION provides an alternative way of stopping the calculation before the termination time is reached. The termination time is specified on the *CONTROL_TERMINATION input and will terminate the calculation whether or not the options available in this section are active. Different types of termination may be defined:

    *TERMINATION_BODY

    *TERMINATION_CONTACT

    *TERMINATION_CURVE

    *TERMINATION_DELETED_SHELLS

    *TERMINATION_DELETED_SOLIDS

    *TERMINATION_NODE

    *TERMINATION_SENSOR

*TERMINATION_BODY

Purpose: Terminate calculation based on rigid body <u>displacements</u>. For *TERMINATION_BODY the analysis terminates when the center of mass displacement of the rigid body specified reaches either the maximum or minimum value (stops 1, 2 or 3) or the displacement magnitude of the center of mass is exceeded (stop 4). If more than one condition is input, the analysis stops when any of the conditions is satisfied. Termination by other means than *TERMINATION input is controlled by the *CONTROL_TERMINATION control card. Note that this type of termination is not active during dynamic relaxation.

Part Cards. Add one card for each part having termination criterion. Include as many cards as necessary. This input terminates at the next keyword ("*") card.

Card 1	1	2	3	4	5	6	7	8
Variable	PID	STOP	MAXC	MINC				
Type	I	I	F	F				
Default	none	none	-	-				

VARIABLE	DESCRIPTION
PID	Part ID of rigid body, see *PART_*OPTION*.
STOP	Stop criterion:

        EQ.1: global x direction,

        EQ.2: global y direction,

        EQ.3: global z direction,

        EQ.4: stop if displacement magnitude is exceeded.

| MAXC | Maximum (most positive) displacement, options 1, 2, 3 and 4: |

        EQ.0.0: MAXC set to 1.0e21.

| MINC | Minimum (most negative) displacement, options 1, 2 and 3 above only: |

        EQ.0.0: MINC set to -1.0e21.

*TERMINATION_CONTACT

Purpose: The analysis terminates when the magnitude of the contact interface resultant force is either zero or less than or equal to a threshold value. If more than one contact condition is input, the analysis stops when any of the conditions is satisfied. Termination by means other than *TERMINATION input is controlled by the *CONTROL_TERMI-NATION control card. Note that this type of termination is not active during dynamic relaxation and does not apply to 2D contact types.

Contact ID Cards. Add one card for each contact ID having a termination criterion. Include as many cards as necessary. This input terminates at the next keyword ("*") card.

Card 1	1	2	3	4	5	6	7	8
Variable	CID	ACTIM	DUR	THRES	DOF			
Type	I	F	F	F	I			
Default	none	none	↓	0.0	0			

VARIABLE	DESCRIPTION
CID	Contact ID. The contact ID is defined by the ordering of the contact input unless the TITLE option which allows the CID to be defined is used in the *CONTACT section.
ACTIM	Activation time
DUR	Time duration of null resultant force prior to termination. This time is tracked only after the activation time is reached and the contact resultant forces are zero. EQ.0.0: Immediate termination after null force is detected.
THRES	Any measured force magnitude below or equal to this specified threshold is taken as a null force.
DOF	Option to consider only the force magnitude in the x, y, or z global directions corresponding to DOF = 1, 2, and 3, respectively.

*TERMINATION_CURVE

Purpose: Terminate the calculation when the load curve value returns to zero. This termination can be used with the contact option *CONTACT_AUTO_MOVE. With this option, the load curve is modified to account for the movement of the SURFB surface.

Load Curve Card. For each load curve used as a termination criterion add a card. Include as many cards as necessary. This input ends at the next keyword ("*") card.

Card 1	1	2	3	4	5	6	7	8
Variable	LCID	ATIME						
Type	I	F						
Default	none	↓						

VARIABLE	DESCRIPTION
LCID	Load curve ID governing termination.
ATIME	Activation time. After this time the load curve is checked.
	EQ.0.0: termination will occur after the load curve value becomes nonzero and then returns to zero

TERMINATION_DELETED_SHELLS_*{OPTION}

Available options include:

        <BLANK>

        SET

Purpose: Terminate the calculation when the number of deleted shells for a specified part ID exceeds the value defined here. This input has no effect for a part ID that is left undefined. Generally, this option should be used with the NFAIL1 and NFAIL4 parameters that are defined in the *CONTROL_SHELL control information.

When using the SET option, termination will occur when NDS elements are deleted in any one of the parts in the part set PSID.

Part (set) Cards. Include one card for each part having a termination criterion based on shell deletion. Include as many cards as necessary. This input ends at the next keyword ("*") card.

Card 1	1	2	3	4	5	6	7	8
Variable	PID/PSID	NDS						
Type	I	I						
Default	none	none						

VARIABLE	DESCRIPTION
PID / PSID	Part ID or if option SET is active, part set ID.
NDS	Number of elements that must be deleted for the specified part ID's, before an error termination occurs.

TERMINATION_DELETED_SOLIDS_*{OPTION}

Available options include:

      <BLANK>

      SET

Purpose: Terminate the calculation when the number of deleted solids for a specified part ID exceeds the value defined here. This input has no effect for a part ID that is left undefined.

When using the SET option, termination will occur when NDS elements are deleted in any one of the parts in the part set PSID.

Part (set) Cards. Include one card for each part having a termination criterion based on solid element deletion. Include as many cards as necessary. This input ends at the next keyword ("*") card.

Card 1	1	2	3	4	5	6	7	8
Variable	PID/PSID	NDS						
Type	I	I						
Default	none	1						

VARIABLE	DESCRIPTION
PID/PSID	Part ID or if option SET is active, part set ID.
NDS	Number of elements that must be deleted for the specified part ID's, before an error termination occurs.

*TERMINATION_NODE

Purpose: Terminate calculation based on nodal point *coordinates*. The analysis terminates for *TERMINATION_NODE when the current position of the node specified reaches either the maximum or minimum value (stops 1, 2 or 3), or picks up force from any contact surface (stops 4). Termination by other means than *TERMINATION is controlled by the *CONTROL_TERMINATION control card. Note that this type of termination is not active during dynamic relaxation.

Node Cards. Include one card for each node having a termination criterion. Include as many cards as desired. This input terminates at the next keyword ("*") card.

Card 1	1	2	3	4	5	6	7	8
Variable	NID	STOP	MAXC	MINC				
Type	I	I	F	F				
Default	none	none	↓	↓				

VARIABLE	DESCRIPTION
NID	Node ID, see *NODE_*OPTION*.
STOP	Stop criterion:
	EQ.1: global *x*-direction,
	EQ.2: global *y*-direction,
	EQ.3: global *z*-direction,
	EQ.4: stop if node touches contact surface.
MAXC	Maximum (most positive) coordinate (options 1, 2 and 3) above only.
MINC	Minimum (most negative) coordinate (options 1, 2 and 3) above only.

*TERMINATION_SENSOR

Purpose: Terminates the calculation when the switch condition defined in *SENSOR_-
SWITCH is met.

Card 1	1	2	3	4	5	6	7	8
Variable	SWID							
Type	I							
Default	none							

VARIABLE	DESCRIPTION
SWID	ID of *SENSOR_SWITCH which will terminate the calculation when its condition is met. Only one *TERMINATION_SENSOR is allowed. If more than one *TERMINATION_SENSOR is defined; only the last one is effective.

Remarks:

An example allowing more than one sensor_switch to terminate calculation:

```
*SENSOR_DEFINE_ELEMENT
$ Axial force of beam element 1
44,BEAM,1,AXIAL,FORCE
*SENSOR_DEFINE_ELEMENT
$ Axial force of beam element 2
55,BEAM,21,AXIAL,FORCE
*SENSOR_SWITCH
$a switch condition is  met when the axial force of beam-1 >5.0
11,SENSOR,44,GT,5.
*SENSOR_SWITCH
$a switch condition is  met when the axial force of beam-2 >10.0
22,SENSOR,55,GT,10.
*SENSOR_SWITCH
$ a switch condition is  met when time >50.
33,TIME, , 50
*SENSOR_SWITCH_CALC-LOGIC
$ a switch condition is met if both conditions
$ of switch-11 and switch-33 are met, I.e.,
$ axial force of beam-1>5.0 and time>50
44,11,33
*SENSOR_SWITCH_CALC-LOGIC
$ a switch condition is met if both conditions
$ of switch-22 and switch-33 are met, I.e.,
$ axial force of beam-2>10.0 and time>50
55,33,22
*SENSOR_SWITCH_CALC-LOGIC
$ a switch condition is met if the conditions
```

```
$ of switch-44 or switch-55 is met, I.e.,
$ axial force of beam-1>5.0 and time>50 or
$ axial force of beam-2>10.0 and time>50
66,44,-55
*TERMINATION_SENSOR
$ job will be terminated when the switch condition of switch-66 is met, I.e.,
$ axial force of beam-1>5.0 and time>50 or
$ axial force of beam-2>10.0 and time>50
66
```