



AD FALCON API Manual

FALCON Error Dictionary

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1 FALCON Error Dictionary

This reference documents the error and warning codes emitted by FALCON. Codes are printed in brackets like [IR-0001] and are intended to be searchable in logs.

Always read the full message printed after the code: many messages include the exact key/value, IDs, or sizes that caused the failure.

1.1 Prefix Quick Reference

Prefix	Component
IR-XXXX	Input parsing / input validation
CT-XXXX	Contact
EFC-XXXX	Stress/discharge boundary force assembly
ESP-XXXX	Effective stress utilities
CSV-XXXX	Custom state variable registry
SWRC-XXXX	Soil-water retention curve (SWRC)
UMAT-XXXX	UMAT compilation/loading
VTK-XXXX	VTK export
SCFG-XXXX	Solver configuration validation
GID-XXXX	GiD output writer
ENV-XXXX	Environment file parsing
FP-XXXX	FALCONPunch post-processing
OZC-XXXX	Zone optimization utilities
SR-XXXX	Stress recovery
RME-XXXX	Rigid motion equation
ALE-XXXX	ALE mesh smoothing
CG-XXXX	Gauss/quadrature utilities
CM-XXXX	Matrix assembly utilities
CP-XXXX	Checkpoint/restart
CS-XXXX	Constitutive model
FBM-XXXX	B-matrix assembly
FMO-XXXX	Matrix operations
GP-XXXX	Gauss point utilities
IFC-XXXX	Internal force calculation
LA-XXXX	Load application
MAIN-XXXX	CLI / entrypoint
MF-XXXX	Material factory
PPR-XXXX	Permeability properties

Prefix	Component
SF-XXXX	Shape functions
SSH-XXXX	Simulation step handling
ST-XXXX	Internal helper
UT-XXXX	General utilities

1.2 IR Quick Reference: Error Code Ranges

Code Range	Section	Notes
IR-0001–0012	General / File I/O	10 code(s)
IR-0101–0106	% Nodes	6 code(s)
IR-0201–0212	% Elements	10 code(s)
IR-0301–0301	Element / UMAT Init	1 code(s)
IR-0401–0401	Shape Functions	1 code(s)
IR-0501–0503	% Materials	2 code(s)
IR-0601–0603	Material Verification	3 code(s)
IR-0701–0711	% Boundary Conditions	6 code(s)
IR-0801–0801	Element DOF Init	1 code(s)
IR-0901–0901	Initial Assignments	1 code(s)
IR-1003–1004	% Release Boundary	2 code(s)
IR-1103–1104	% Restrain DOFs	2 code(s)
IR-1201–1215	% Stress Boundary	15 code(s)
IR-1301–1313	% Discharge Boundary	13 code(s)
IR-1401–1406	% Prescribed Values	6 code(s)
IR-1500–1599	% Step Definitions	65 code(s)
IR-1600–1610	% Step Definitions	11 code(s)
IR-1701–1732	% Initial Assignments	26 code(s)
IR-1801–1804	Custom Variable Assignment	4 code(s)
IR-1901–1905	Hydraulic State / Material Init	5 code(s)
IR-2101–2111	Coordinate Files	11 code(s)
IR-2201–2202	Variable Assignment	2 code(s)
IR-2301–2302	IDW Interpolation	2 code(s)
IR-2401–2401	State Variables	1 code(s)
IR-2501–2502	Height-based Assignment	2 code(s)
IR-2601–2603	Height-based Assignment	3 code(s)

Code Range	Section	Notes
IR-2701–2743	% Contact Pairs / Tie / Un-tie	36 code(s)
IR-2801–2899	Constraints / Prescribed Values (extended)	82 code(s)
IR-2900–2965	Output / Watch / Post-processing	61 code(s)
IR-3004–3099	Special Features (Infinite Elements / Sponge / PML / ALE)	41 code(s)
IR-3100–3112	% Debug	13 code(s)
IR-3200–3207	% Surrogate Training	8 code(s)
IR-3600–3621	% MPCConstraints	22 code(s)
IR-4001–4004	% Checkpoint Control	4 code(s)
IR-4101–4102	% Restart From	2 code(s)

1.3 IR Detailed Error Codes by Section

1.3.1 General / File I/O (IR-0001 to IR-0012)

Code	Type	Message (representative)	Resolution
IR-0001	FileOpen Exception	Empty input filename	Provide a valid input filename/path
IR-0002	Data Format Exception	Invalid analysis type	Use a valid analysis type (e.g., PLNonCoupled, PLCoupled, PLFully Coupled)
IR-0003	FileOpen Exception / Data Format Exception	Failed to open input file / Analysis type not specified	Check file path and ensure % Analysis Type section is present
IR-0004	Data Format Exception	Unknown element ID in EnforceElastic Flag list	Verify all element IDs in EnforceElasticFlag exist in % Elements

Code	Type	Message (representative)	Resolution
IR-0006	Data Format Exception	EnforceElasticFlag list parsed empty	Specify 'All' or valid element IDs for EnforceElasticFlag
IR-0007	Data Format Exception	Malformed Include directive	Use format: % Include "path/ to/file" or @ Include path/to/ file
IR-0008	Data Format Exception	Cyclic Include detected	Remove circular dependencies in include directives
IR-0009	Data Format Exception	Failed to open included file	Check path and ensure included file exists
IR-0010	Data Format Exception	Failed to open input file during core-section order validation	Check file path during preprocessing
IR-0012	Data Format Exception	Invalid order of core sections detected	Reorder core sections: % Analysis Type → % Nodes → % Materials → % Elements → % Step Definitions

1.3.2 % Nodes (IR-0101 to IR-0106)

Code	Type	Message (representative)	Resolution
IR-0101	Data Format Exception	Invalid file stream state	Check file stream before reading nodes
IR-0102	Data Format Exception	Invalid node ID format in input file	Ensure node lines start with integer ID: <ID> <X> <Y> [<Z>]
IR-0103	Data Format Exception	Node IDs must start from 1 and be sequential	Number nodes consecutively starting from 1 with no gaps

Code	Type	Message (representative)	Resolution
IR-0104	Data Format Exception	Insufficient coordinates: expected 3D coordinates	Provide X, Y, Z coordinates for 3D analyses
IR-0105	Data Format Exception	Insufficient coordinates: expected at least 2D coordinates	Provide at least X, Y coordinates for all nodes
IR-0106	Data Format Exception	Duplicate node ID detected	Ensure each node ID appears only once

1.3.3 % Elements (IR-0201 to IR-0212)

Code	Type	Message (representative)	Resolution
IR-0201	Data Format Exception	Invalid element ID or type format	Use format: <Elem ID> <Type> <Node 1> ... <NodeN> <MatID>
IR-0202	Data Format Exception	Invalid element type	Use valid element types: N3P3, N4P4, N6P6, N8P8 with optional C/F suffix
IR-0203	Data Format Exception	Element type format error	Element type must follow pattern N<X>P<Y>[C\|F]
IR-0204	Data Format Exception	Element must be fully coupled ('F') for fully coupled analysis	Add 'F' suffix (e.g., N6P6F) for PLFully Coupled analysis
IR-0205	Data Format Exception	Element must be coupled ('C') for coupled analysis	Add 'C' suffix (e.g., N6P6C) for PLCoupled analysis
IR-0206	Data Format Exception	Element cannot be coupled for non-coupled analysis	Remove C/F suffix for PLNonCoupled analysis
IR-0207	Data Format Exception	Error reading node ID for element	Provide correct number of node IDs matching element type

Code	Type	Message (representative)	Resolution
IR-0208	Data Format Exception	Node ID not found	Ensure all node IDs referenced in elements are defined in % Nodes
IR-0209	Data Format Exception	Error reading material type for element	Provide material ID at end of element definition line
IR-0212	Data Format Exception	Do not define infinite elements directly in % Elements. Use the % Infinite Elements generator section instead (element).	Use the message context to correct the input syntax/-value.

1.3.4 Element / UMAT Init (IR-0301)



Code	Type	Message (representative)	Resolution
IR-0301	Data Format Exception	Material type not found during UMAT initialization	Ensure material ID referenced by element is defined in % Materials

1.3.5 Shape Functions (IR-0401)

Code	Type	Message (representative)	Resolution
IR-0401	Data Format Exception	Unsupported element type for shape function assignment	Use supported element types: N3, N4, N6, N8 variants

1.3.6 % Materials (IR-0501 to IR-0503)

Code	Type	Message (representative)	Resolution
IR-0501	Data Format Exception	Invalid file stream state	Check file stream before reading materials

Code	Type	Message (representative)	Resolution
IR-0503	Data Format Exception	Material property encountered before any material ID	Use the message context to correct the input syntax/-value.

1.3.7 Material Verification (IR-0601 to IR-0603)

Code	Type	Message (representative)	Resolution
IR-0601	Data Format Exception	UMAT property cannot coexist with standard property of same category	Use either UMAT or built-in model for each property category, not both
IR-0602	Data Format Exception	Material missing required property (not covered by UMAT)	Provide all required properties for analysis type (Mech, SWRC, Effective Stress, Perm, etc.)
IR-0603	Data Format Exception	Undefined material IDs found in elements	Define all materials referenced in % Elements section

1.3.8 % Boundary Conditions (IR-0701 to IR-0711)

Code	Type	Message (representative)	Resolution
IR-0701	Data Format Exception	Invalid node ID in boundary conditions	Use format: <Node ID> <DOF1> <Value1> [<DOF 2> <Value2> ...]
IR-0702	Data Format Exception	Node ID not found for boundary conditions	Ensure node ID is defined in % Nodes section
IR-0703	Warning	Invalid DOF for node (skipping)	Check DOF is valid for analysis type and node status (principal/non-principal)

Code	Type	Message (representative)	Resolution
IR-0704	Warning	Unknown DOF for node (skipping)	Use valid DOFs: DisX, DisY, DisZ, PW, PA depending on analysis type
IR-0710	Data Format Exception	Missing required '% Boundary Conditions' section. Add an empty block if you have no restraints, e.g.: % Boundary Conditions %%%	Use the message context to correct the input syntax/-value.
IR-0711	Data Format Exception	Missing/invalid VoidRatio for coupled/fully-coupled analysis at element , GaussPoint (VoidRatio=). Assign @VoidRatio in % InitialAssignments (or via @CoordinateFile) for all coupled/fully-coupled elements.	Use the message context to correct the input syntax/-value.

1.3.9 Element DOF Init (IR-0801)

Code	Type	Message (representative)	Resolution
IR-0801	Data Format Exception	Adjusted Node ID out of range in initializeElementDofs:...	Use the message context to correct the input syntax/-value.

1.3.10 Initial Assignments (IR-0901)

Code	Type	Message (representative)	Resolution
IR-0901	Warning	See printed message (varies by context)	Use the message context to correct the input syntax/-value.

1.3.11 % Release Boundary (IR-1003 to IR-1004)

Code	Type	Message (representative)	Resolution
IR-1003	Warning	See printed message (varies by context)	Use the message context to correct the input syntax/-value.
IR-1004	Data Format Exception	Missing required 'Step:' in % Release Boundary section	Use the message context to correct the input syntax/-value.

1.3.12 % Restrain DOFs (IR-1103 to IR-1104)

Code	Type	Message (representative)	Resolution
IR-1103	Warning	See printed message (varies by context)	Use the message context to correct the input syntax/-value.
IR-1104	Data Format Exception	Missing required 'Step:' in % Restrain DOFs section	Use the message context to correct the input syntax/-value.

1.3.13 % Stress Boundary (IR-1201 to IR-1215)

Code	Type	Message (representative)	Resolution
IR-1201	Data Format Exception	Invalid stress boundary marker	Use format: @ StressBoundary <ID>
IR-1202	Data Format Exception	Missing 'ElemId' label	Include ElemId <ID> line in stress boundary definition
IR-1203	Data Format Exception	Missing 'Edgenodes' label	Include Edgenodes <node1> <node2> . . . line
IR-1204	Data Format Exception	Unknown element ID	Reference valid element ID from % Elements section

Code	Type	Message (representative)	Resolution
IR-1205	Data Format Exception	Node ID not in element	Ensure all edge nodes belong to the specified element
IR-1206	Data Format Exception	Incorrect number of nodes for element	Provide correct number of edge nodes for element type
IR-1207	Data Format Exception	Missing 'NormalPressures' label	Include Normal Pressures <p1> <p2> ... line
IR-1208	Data Format Exception	Missing 'TangentialPressures' label	Include Tangential Pressures <t1> <t2> ... line
IR-1209	Data Format Exception	Invalid or missing LoadType parameters	Specify valid LoadType: Immediate, Ramp, Sinusoidal, DampedSinusoidal, Tabular
IR-1210	Data Format Exception	Unexpected EOF reading TabularData	Complete TabularData section before end of file
IR-1211	Data Format Exception	TabularData is required for tabular load type	Provide TabularData section for Tabular LoadType
IR-1212	Data Format Exception	Invalid time in TabularData	Ensure time values are valid numbers
IR-1213	Data Format Exception	Invalid magnitude in TabularData	Ensure magnitude values are valid numbers
IR-1214	Data Format Exception	Propagation must be enabled for Tabular load type	Set Propagate Yes ... for Tabular loads
IR-1215	Data Format Exception	Invalid Propagate option	Use format: Propagate Yes FinalStep <N> or Propagate No

1.3.14 % Discharge Boundary (IR-1301 to IR-1313)

Code	Type	Message (representative)	Resolution
IR-1301	Data Format Exception	Expected 'Values' label missing in discharge definition	Include Values <v1> <v2> ... line
IR-1302	Data Format Exception	Load type parameters are missing or incorrect for the given load type	Provide required parameters for specified LoadType
IR-1303	Data Format Exception	Invalid discharge marker	Use @Qw: (water) or @Qa: (air) on marker line
IR-1304	Data Format Exception	Missing 'ElemId' label in discharge definition	Include ElemId <ID> on the marker line
IR-1305	Data Format Exception	Missing 'Edgenodes' label in discharge definition	Include Edgenodes <node1> <node2> ... on the marker line
IR-1306	Data Format Exception	Unknown element ID in discharge definition	Reference a valid element ID from % Elements
IR-1307	Data Format Exception	No edge nodes specified in discharge definition	Provide at least two edge node IDs after Edgenodes
IR-1308	Data Format Exception	Node ID not on specified element edge	Ensure all Edgenodes belong to the given element
IR-1309	Data Format Exception	Number of discharge values does not match number of edge nodes	Provide one numeric Values entry per edge node
IR-1310	Data Format Exception	Unexpected EOF reading TabularData for discharge boundary	Complete TabularData line for Tabular load type
IR-1311	Data Format Exception	TabularData is required for Tabular discharge load type	Add a TabularData ... line immediately after Load Type Tabular

Code	Type	Message (representative)	Resolution
IR-1312	Data Format Exception	Invalid time in TabularData for discharge boundary	Ensure all Tabular-Data times are valid numbers
IR-1313	Data Format Exception	Invalid magnitude in TabularData for discharge boundary	Ensure all Tabular-Data magnitudes are valid numbers

1.3.15 % Prescribed Values (IR-1401 to IR-1406)

Code	Type	Message (representative)	Resolution
IR-1401	Data Format Exception	Unknown parameter	Use valid prescribed value parameters
IR-1402	Data Format Exception	Value for parameter is missing	Provide value after parameter name
IR-1403	Data Format Exception	Step ID does not exist	Reference valid step ID from % Step Definitions
IR-1404	Data Format Exception	Invalid value for parameter	Ensure parameter value is correct type (number/string)
IR-1405	Data Format Exception	Frequency is required for sinusoidal loads	Specify @@ Frequency for sinusoidal prescribed values
IR-1406	Data Format Exception	PhaseLag is required for sinusoidal loads	Specify @@Phase Lag for sinusoidal prescribed values

1.3.16 % Step Definitions (IR-1500 to IR-1599)

Code	Type	Message (representative)	Resolution
IR-1500	Data Format Exception	Unexpected line in % Step Definitions:...	Use the message context to correct the input syntax/-value.
IR-1502	Data Format Exception	Consolidation mode only allowed for coupled analyses	Remove consolidation mode for non-coupled analysis or use coupled analysis type
IR-1503	Data Format Exception	Invalid StartStep value	Provide valid numeric value for @@StartStep
IR-1504	Data Format Exception	Invalid NumberSteps value	Provide valid integer for @@NumberSteps
IR-1505	Data Format Exception	Invalid StepTime value	Provide valid numeric value for @@StepTime
IR-1506	Warning	Invalid SolverType (using default)	Use valid solver: Direct, BiCGSTAB, GMRES, Conjugate Gradient
IR-1507	Warning	Invalid PreconditionerType (using default)	Use valid preconditioner for chosen solver type
IR-1508	Warning	PreconditionerType must follow valid SolverType	Define SolverType before PreconditionerType
IR-1509	Data Format Exception	OutputInterval must be > 0	Provide positive value for Output Interval
IR-1510	Warning	Invalid OutputInterval (defaulting to ByStep=1)	Check Output Interval format and value
IR-1511	Data Format Exception / Warning	OutputControlValue must be > 0 / Invalid OutputControlType	Use valid OutputControlType (ByStep/ByTime) with positive OutputControlValue

Code	Type	Message (representative)	Resolution
IR-1512	Warning	Invalid OutputControlValue	Provide positive numeric value
IR-1513	Data Format Exception / Warning	MaxIterations out of range	Provide positive integer for Max Iterations
IR-1514	Data Format Exception / Warning	Max Substeps out of range	Provide positive integer for MaxSub-steps
IR-1515	Data Format Exception / Warning	Max Retry out of range	Provide non-negative integer for MaxRetry
IR-1516	Data Format Exception / Warning	MinTimeStep out of range	Provide positive value for MinTimeStep
IR-1517	Data Format Exception / Warning	MaxTimeStep out of range	Provide positive value > MinTimeStep for MaxTimeStep
IR-1518	Data Format Exception / Warning	ErrorTarget out of valid range	Provide value in range (1e-12, 1) for ErrorTarget
IR-1519	Data Format Exception / Warning	Deprecated step parameter	Remove deprecated damping parameter from step definition
IR-1520	Data Format Exception / Warning	ModifiedNewtonFrequency must be > 0	Provide positive integer for Modified NewtonFrequency
IR-1521	Warning	Invalid ModifiedNewtonFrequency	Check Modified NewtonFrequency value

Code	Type	Message (representative)	Resolution
IR-1524	Data Format Exception	Invalid AutoTolerance	Use the message context to correct the input syntax/-value.
IR-1525	Data Format Exception	Invalid SmallResidualFactor	Use the message context to correct the input syntax/-value.
IR-1526	Data Format Exception	Invalid LargeResidualFactor	Use the message context to correct the input syntax/-value.
IR-1527	Data Format Exception	Invalid InitialStepFallbackDivisor	Use the message context to correct the input syntax/-value.
IR-1528	Data Format Exception	Invalid RefilterFraction	Use the message context to correct the input syntax/-value.
IR-1529	Data Format Exception	Invalid RetryClampUpper	Use the message context to correct the input syntax/-value.
IR-1530	Data Format Exception	Invalid RetryClampLower	Use the message context to correct the input syntax/-value.
IR-1531	Data Format Exception	Invalid JustAfterRetryFactor	Use the message context to correct the input syntax/-value.
IR-1532	Data Format Exception	Invalid RetryBackoffBaseCoeff	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-1533	Data Format Exception	Invalid RetryBackoffDecayBase	Use the message context to correct the input syntax/-value.
IR-1534	Data Format Exception	Invalid ShrinkFailureBase	Use the message context to correct the input syntax/-value.
IR-1535	Data Format Exception	Invalid HardSafeFactor	Use the message context to correct the input syntax/-value.
IR-1536	Data Format Exception	Invalid GrowthCooldownInc	Use the message context to correct the input syntax/-value.
IR-1537	Data Format Exception	Invalid GrowthCooldownMax	Use the message context to correct the input syntax/-value.
IR-1538	Data Format Exception	Invalid PrevFnormGrowthThreshold	Use the message context to correct the input syntax/-value.
IR-1539	Data Format Exception	Invalid MinIncrementAbsolute	Use the message context to correct the input syntax/-value.
IR-1540	Data Format Exception	Invalid FnormSignificanceThreshold	Use the message context to correct the input syntax/-value.
IR-1541	Data Format Exception	Invalid AdjustClampMin	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-1542	Data Format Exception	Invalid AdjustClampMax	Use the message context to correct the input syntax/-value.
IR-1543	Data Format Exception	Invalid GrowthCapSlope	Use the message context to correct the input syntax/-value.
IR-1544	Data Format Exception	Invalid GrowthCapLimit	Use the message context to correct the input syntax/-value.
IR-1545	Data Format Exception	Invalid SuccessStreakGrowthThreshold	Use the message context to correct the input syntax/-value.
IR-1546	Data Format Exception	Invalid LowFnormRatioForRelax	Use the message context to correct the input syntax/-value.
IR-1547	Data Format Exception	Invalid SafetyMinNumerator	Use the message context to correct the input syntax/-value.
IR-1548	Data Format Exception	Invalid SafetyMinDenominator	Use the message context to correct the input syntax/-value.
IR-1549	Data Format Exception	Invalid RelaxFactorSlope	Use the message context to correct the input syntax/-value.
IR-1550	Data Format Exception	Invalid RelaxFactorSuccessOffset	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-1551	Data Format Exception	Invalid RelaxFactorSuccessCap	Use the message context to correct the input syntax/-value.
IR-1552	Data Format Exception	Invalid MaxGrowthFromLastSuccessful	Use the message context to correct the input syntax/-value.
IR-1553	Data Format Exception	Invalid SmoothingHistoricalWeight	Use the message context to correct the input syntax/-value.
IR-1554	Data Format Exception	Invalid SmoothingNewWeight	Use the message context to correct the input syntax/-value.
IR-1555	Data Format Exception	Invalid OvershootTolerance	Use the message context to correct the input syntax/-value.
IR-1556	Data Format Exception	Invalid MaxFinalCorrections	Use the message context to correct the input syntax/-value.
IR-1589	Warning	See printed message (varies by context)	Use the message context to correct the input syntax/-value.
IR-1590	Warning	See printed message (varies by context)	Use the message context to correct the input syntax/-value.
IR-1591	Data Format Exception / Warning	Gravity must be > 0	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-1592	Warning	See printed message (varies by context)	Use the message context to correct the input syntax/-value.
IR-1593	Warning	See printed message (varies by context)	Use the message context to correct the input syntax/-value.
IR-1594	Warning	See printed message (varies by context)	Use the message context to correct the input syntax/-value.
IR-1595	Warning	See printed message (varies by context)	Use the message context to correct the input syntax/-value.
IR-1596	Warning	See printed message (varies by context)	Use the message context to correct the input syntax/-value.
IR-1597	Warning	See printed message (varies by context)	Use the message context to correct the input syntax/-value.
IR-1598	Data Format Exception / Warning	ElementBirthRampTime must be ≥ 0	Use the message context to correct the input syntax/-value.
IR-1599	Warning	See printed message (varies by context)	Use the message context to correct the input syntax/-value.

1.3.17 % Step Definitions (IR-1600 to IR-1610)

Code	Type	Message (representative)	Resolution
IR-1600	Warning	See printed message (varies by context)	Use the message context to correct the input syntax/-value.
IR-1601	Data Format Exception	No @Step blocks found	Define at least one step in % Step Definitions section
IR-1602	Data Format Exception	Duplicate stepId	Ensure each step has unique ID
IR-1603	Data Format Exception	No step has StartStep = 0	Define one initial step with @@StartStep: 0
IR-1604	Data Format Exception	Multiple steps have StartStep = 0	Only one step should have @@StartStep: 0
IR-1605	Data Format Exception	Step refers to unknown StartStep	Ensure StartStep references valid existing step ID
IR-1606	Data Format Exception	Step cannot reference itself as StartStep	Step's StartStep must reference different step
IR-1607	Data Format Exception	Cyclic StartStep dependency	Remove circular dependencies in step sequencing
IR-1608	Data Format Exception	Small-deformation step follows UL step (invalid)	Cannot switch from Updated Lagrangian back to small deformation
IR-1609	Data Format Exception	Step : TimeIntegration=Explicit/IMEX is supported only for SimMode=Dynamic	Use the message context to correct the input syntax/-value.
IR-1610	Data Format Exception	Step : TimeIntegration=Explicit is not supported for coupled/fully-coupled analyses (PW/PA present). Use TimeIntegration=IMEX or Implicit.	Use the message context to correct the input syntax/-value.

1.3.18 % Initial Assignments (IR-1701 to IR-1732)

Code	Type	Message (representative)	Resolution
IR-1701	Data Format Exception	Error parsing initial assignments	Check syntax in % Initial Assignments section
IR-1702	Data Format Exception	Expected '@SeepageFace '	Use the message context to correct the input syntax/-value.
IR-1703	Data Format Exception	Invalid seepage face id in:...	Use the message context to correct the input syntax/-value.
IR-1704	Data Format Exception	Invalid @@DOF line:...	Use the message context to correct the input syntax/-value.
IR-1705	Data Format Exception	Invalid @@Value line:...	Use the message context to correct the input syntax/-value.
IR-1706	Data Format Exception	Invalid @@PressureTol line:...	Use the message context to correct the input syntax/-value.
IR-1707	Data Format Exception	Invalid @@MaxOuterIters line:...	Use the message context to correct the input syntax/-value.
IR-1708	Data Format Exception	Invalid @@AllowRemoval line:...	Use the message context to correct the input syntax/-value.
IR-1709	Data Format Exception	Invalid @@OutflowsPositive line:...	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-1710	Data Format Exception	Invalid @@FluxTol line:...	Use the message context to correct the input syntax/-value.
IR-1711	Data Format Exception	Unknown key in @SeepageFace block:...	Use the message context to correct the input syntax/-value.
IR-1712	Data Format Exception	SeepageFace id= has empty @@NodeIds:...	Use the message context to correct the input syntax/-value.
IR-1713	Data Format Exception	% StepInitialAssignments refers to unknown stepId	Use the message context to correct the input syntax/-value.
IR-1720	Data Format Exception	% Step Materials block is missing @@MaterialId.	Use the message context to correct the input syntax/-value.
IR-1721	Data Format Exception	% Step Materials block is missing @@Elements / @@ElementIds.	Use the message context to correct the input syntax/-value.
IR-1725	Data Format Exception	Expected '@Step : ' header in % Step Materials.	Use the message context to correct the input syntax/-value.
IR-1726	Data Format Exception	Unrecognized line in % Step Materials: "	Use the message context to correct the input syntax/-value.
IR-1727	Data Format Exception	Empty @@MaterialId in % Step Materials.	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-1728	Data Format Exception	Empty @@Elements list in % Step Materials.	Use the message context to correct the input syntax/-value.
IR-1730	Data Format Exception	Only @@MaterialId and @@Elements are supported in % Step Materials. Define materials in % Materials and reference them by ID.	Remove material property lines from % Step Materials; define materials (including @UMAT) in % Materials.
IR-1731	Data Format Exception	% Step Materials refers to unknown stepId	Ensure the step exists in % Step Definitions and the step ID matches.
IR-1732	Data Format Exception	Unknown materialId " referenced in % Step Materials for step	Define the material in % Materials and reference its ID exactly.

1.3.19 Custom Variable Assignment (IR-1801 to IR-1804)

Code	Type	Message (representative)	Resolution
IR-1801	Data Format Exception	Custom variable has no values	Provide at least one value for custom variable assignment
IR-1802	Data Format Exception	Custom variable has inconsistent assignments	Ensure custom variable values are consistent across assignments
IR-1803	Data Format Exception	Custom variable missing in Gauss point	Custom variable must be defined in UMAT Custom Variable list
IR-1804	Data Format Exception	Error setting custom variable	Check custom variable name and value type

1.3.20 Hydraulic State / Material Init (IR-1901 to IR-1905)

Code	Type	Message (representative)	Resolution
IR-1901	Data Format Exception	Material type not found	Ensure material is defined before initial assignments reference it
IR-1902	Data Format Exception	SWRC properties required before EffectiveStress	Define SWRC properties in material before computing effective stress
IR-1903	Data Format Exception	Saturation must be > 0 for effective stress	Provide positive saturation value
IR-1904	Data Format Exception	Effective stress properties not found	Define effective stress properties in material for fully coupled analysis
IR-1905	Data Format Exception	Alpha_p_c out of range [0,1]	Provide alpha_p_c value between 0 (main wetting) and 1 (main drying)

1.3.21 Coordinate Files (IR-2101 to IR-2111)

Code	Type	Message (representative)	Resolution
IR-2101	FileOpen Exception	Unable to open coordinate file	Check path to external coordinate file
IR-2102	Data Format Exception	Both Stress* and TotalStress* present in external coords	Use either Stress* or TotalStress* variables, not both
IR-2103	Data Format Exception	No '@Coords' section in coordinate file	Include @Coords section in coordinate file
IR-2104	Data Format Exception	Error reading external coordinate file	Check coordinate file format

Code	Type	Message (representative)	Resolution
IR-2105	Data Format Exception	Expected token 'X' at the start of the line	Coordinate lines must start with 'X'
IR-2106	Data Format Exception	Could not read X-value	Provide valid numeric X coordinate
IR-2107	Data Format Exception	Expected token 'Y' after X-value	Include 'Y' token after X value
IR-2108	Data Format Exception	Could not read Y-value	Provide valid numeric Y coordinate
IR-2109	Data Format Exception	Expected token 'Z' after Y-value (3D)	Include 'Z' token for 3D analyses
IR-2110	Data Format Exception	Could not read Z-value	Provide valid numeric Z coordinate
IR-2111	Data Format Exception	No numeric value found after variable name	Provide value after variable name in coordinate file

1.3.22 Variable Assignment (IR-2201 to IR-2202)

Code	Type	Message (representative)	Resolution
IR-2201	Data Format Exception	Error setting custom variable	Verify custom variable name and value
IR-2202	Data Format Exception	Unknown variable (neither state nor custom)	Use valid state variable or define custom variable in UMAT

1.3.23 IDW Interpolation (IR-2301 to IR-2302)

Code	Type	Message (representative)	Resolution
IR-2301	Warning	No data points found for variable (using o)	Provide data points for IDW interpolation
IR-2302	Warning	Degenerate IDW denominator (using o)	Check coordinate data for IDW interpolation

1.3.24 State Variables (IR-2401)

Code	Type	Message (representative)	Resolution
IR-2401	Data Format Exception	Unrecognized state variable	Use valid state variable name (see State Variables)

1.3.25 Height-based Assignment (IR-2501 to IR-2502)

Code	Type	Message (representative)	Resolution
IR-2501	Data Format Exception	Empty values at height for state variable	Provide values for each height specification
IR-2502	Data Format Exception	State variable index out of range	Use valid state variable index

1.3.26 Height-based Assignment (IR-2601 to IR-2603)

Code	Type	Message (representative)	Resolution
IR-2601	Data Format Exception	Heights and values must have same length	Provide equal number of heights and values
IR-2602	Data Format Exception	Heights/values cannot be empty	Provide at least one height-value pair

Code	Type	Message (representative)	Resolution
IR-2603	Data Format Exception	Target height outside bounds	Ensure target height is within specified height range

1.3.27 % Contact Pairs (IR-2701 to IR-2740)

Code	Type	Message (representative)	Resolution
IR-2701	Data Format Exception	Invalid @ContactPair header (missing id)	Use format: @ContactPair <ID>
IR-2705	Warning	Unknown formulation (defaulting to Penalty)	Use valid formulation: Penalty or Lagrange
IR-2706	Warning	Unknown phase in @@DrainageOn Contact	Use valid phase: Water or Air
IR-2707	Warning	Unknown phase in @@DrainageOn Separation	Use valid phase: Water or Air
IR-2711	Data Format Exception	ContactPair missing master nodes	Define master nodes with @@MasterNodes
IR-2712	Data Format Exception	ContactPair missing slave nodes	Define slave nodes with @@SlaveNodes
IR-2713	Data Format Exception	ContactPair invalid order of contact	Use valid order: 1 or 2
IR-2714	Data Format Exception	ContactPair invalid Gauss points	Provide positive number of Gauss points
IR-2715	Data Format Exception	ContactPair invalid normal penalty	Provide positive normal penalty value
IR-2716	Data Format Exception	ContactPair invalid tangential penalty	Provide positive tangential penalty value

Code	Type	Message (representative)	Resolution
IR-2717	Data Format Exception	ContactPair initiationStepId out of range	Reference valid step ID
IR-2718	Data Format Exception	ContactPair terminationStepId < initiationStepId	Termination step must be after initiation step
IR-2719	Data Format Exception	ContactPair terminationStepId beyond last step	Reference existing step ID
IR-2721	Data Format Exception	Invalid @RigidBody header (missing id)	Use format: @RigidBody <ID>
IR-2722	Data Format Exception	RigidBody mass must be > 0	Provide positive mass value
IR-2723	Data Format Exception	RigidBody is missing node IDs	Define nodes with @Nodes
IR-2724	Data Format Exception	RigidBody has an invalid mass	Check mass value is positive and finite
IR-2725	Data Format Exception	RigidBody node not found	Ensure all node IDs are defined in % Nodes
IR-2726	Warning	RigidBody includes node already in another rigid body	Each node can belong to only one rigid body
IR-2727	Data Format Exception / Warning	ContactPair : in fully coupled analysis, master node must have PW restrained (Dirichlet), but it is active.	Use the message context to correct the input syntax/-value.
IR-2728	Data Format Exception / Warning	ContactPair : in fully coupled analysis, master node must have PA restrained (Dirichlet), but it is active.	Use the message context to correct the input syntax/-value.
IR-2730	Data Format Exception	Invalid @Tie header (missing id)	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-2731	Data Format Exception	Tie: node not found	Reference valid node ID from % Nodes
IR-2732	Data Format Exception	Tie: invalid Id	Provide positive integer for tie ID
IR-2733	Data Format Exception	Tie: bad ref-node	Provide valid refer- ence node ID
IR-2734	Data Format Exception	Tie: no ref DOFs	Define reference DOFs with @@ ReferenceDOFs
IR-2735	Data Format Exception	Tie: no tied nodes	Define tied nodes with @@TiedNodes
IR-2736	Data Format Exception	Tie: no @@Steps	Define active steps with @@Steps
IR-2737	Data Format Exception	Tie: unknown Step	Reference valid step IDs
IR-2738	Data Format Exception	Tie: bad DOF	Use valid DOF names
IR-2739	Data Format Exception	Tie: ref-DOF is restrained	Reference node DOF cannot be re- strained
IR-2740	Data Format Exception	Tie: slave node DOF validation error	Verify slave node DOF is valid and not restrained
IR-2741	Data Format Exception	Invalid @Tie header (id must be > 0)	Use a positive inte- ger ID in @Tie <ID>
IR-2742	Data Format Exception	Tie id collides with existing AddDOFs boundary id	Use a unique @Tie ID (do not reuse AddDOFs boundary IDs)

Code	Type	Message (representative)	Resolution
IR-2743	Data Format Exception	Duplicate @Tie id	Ensure each @Tie block has a unique ID

1.3.28 Constraints / Prescribed Values (extended) (IR-2801 to IR-2899)

Code	Type	Message (representative)	Resolution
IR-2801	Data Format Exception	Invalid @Untie header (missing id)	Use format: @Untie <ID>
IR-2802	Data Format Exception	Untie: no Tie with specified id	Reference existing tie ID
IR-2803	Data Format Exception	Untie: unknown step	Reference valid step ID
IR-2804	Data Format Exception	Untie step validation error	Verify untie step is valid
IR-2805	Data Format Exception	Invalid @@TieID value	Provide a valid (integer) @@TieID
IR-2806	Data Format Exception	Invalid @Untie header (id must be > 0)	Use a positive integer ID in @Untie <ID>
IR-2807	Data Format Exception	Duplicate @Untie id	Ensure each @Untie block has a unique ID
IR-2810	Data Format Exception	Duplicate PrescribedValue Id:...	Use the message context to correct the input syntax/-value.
IR-2811	Data Format Exception	Invalid @PrescribedValue header (type-/id)	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-2812	Data Format Exception	Unknown Prescribed Value Type:...	Use the message context to correct the input syntax/-value.
IR-2813	Data Format Exception	Invalid @@Amplitude value	Use the message context to correct the input syntax/-value.
IR-2814	Data Format Exception	Invalid LoadType:...	Use the message context to correct the input syntax/-value.
IR-2815	Data Format Exception	Invalid @@StartStep value	Use the message context to correct the input syntax/-value.
IR-2816	Data Format Exception	Invalid @@Frequency value	Use the message context to correct the input syntax/-value.
IR-2817	Data Format Exception	Missing @@DOF in @Prescribed Value...	Define @@DOF for each @Prescribed Value block
IR-2818	Data Format Exception	Missing @@Amplitude in @Prescribed Value...	Define @@Amplitude for each @PrescribedValue block
IR-2819	Data Format Exception	Missing @@LoadType in @Prescribed Value...	Define @@Load Type for each @PrescribedValue block
IR-2820	Data Format Exception	Missing/invalid @@StartStep in @PrescribedValue...	Define a valid, positive @@StartStep
IR-2821	Data Format Exception	Unknown keyword in % Body Force:...	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-2822	Data Format Exception	Expected element IDs after 'ElementIDs'.	Use the message context to correct the input syntax/-value.
IR-2823	Data Format Exception	Missing @@NodeIDs in @Prescribed Value...	Define @@Node IDs for each @PrescribedValue block
IR-2824	Data Format Exception	Missing @@Propagate in @Prescribed Value...	Define @@Propagate for each @PrescribedValue block
IR-2825	Data Format Exception	Invalid StartStep value. It must be a positive integer.	Use the message context to correct the input syntax/-value.
IR-2826	Data Format Exception	StartStep ... is not a defined stepId	Ensure @@Start Step references an existing simulation step ID
IR-2827	Data Format Exception	Expected format: 'DisplacementReset End of Step '.	Use the message context to correct the input syntax/-value.
IR-2828	Data Format Exception / Warning	Missing LoadType value.	Use the message context to correct the input syntax/-value.
IR-2829	Data Format Exception	@@Frequency must be > 0 for Sinusoidal/DampedSinusoidal (Prescribed Value)	Provide a positive @Frequency for sinusoidal load types
IR-2830	Data Format Exception	@@DampingFactor must be >= 0 for DampedSinusoidal (PrescribedValue)	Provide @@Damping Factor >= 0 for damped sinusoidal loads
IR-2832	Data Format Exception	Invalid FinalStep value for Propagate.	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-2833	Data Format Exception	Propagation with FinalStep is not supported for Tabular load type	Use the message context to correct the input syntax/-value.
IR-2834	Data Format Exception	Invalid FinalStep value in prescribed value definition	Use the message context to correct the input syntax/-value.
IR-2835	Data Format Exception	StartStep must be explicitly defined for each body force.	Use the message context to correct the input syntax/-value.
IR-2836	Data Format Exception	BodyForce: StartStep ... is not a defined stepId	Ensure StartStep references an existing simulation step ID
IR-2837	Data Format Exception	BodyForce: Frequency must be > 0 for Sinusoidal/DampedSinusoidal	Provide a positive Frequency for sinusoidal body forces
IR-2838	Data Format Exception	BodyForce: DampingFactor must be >= 0 for DampedSinusoidal	Provide Damping Factor >= 0 for damped sinusoidal body forces
IR-2839	Data Format Exception	BodyForce: TabularData is required for LoadType=Tabular	Provide Tabular Data points (or a tabular file) for tabular body forces
IR-2840	Data Format Exception	Invalid @RigidMotionConstraint header (missing id)	Use the message context to correct the input syntax/-value.
IR-2841	Data Format Exception	RigidMotionConstraint refers to non-existing RigidBody	Use the message context to correct the input syntax/-value.
IR-2842	Data Format Exception	RigidMotionConstraint uses unknown StepId	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-2843	Data Format Exception	RigidMotionConstraint uses unknown ForcePropagateStepsX StepId	Use the message context to correct the input syntax/-value.
IR-2844	Data Format Exception	RigidMotionConstraint uses unknown ForcePropagateStepsY StepId	Use the message context to correct the input syntax/-value.
IR-2845	Data Format Exception	RigidMotionConstraint uses unknown ForcePropagateStepsZ StepId	Use the message context to correct the input syntax/-value.
IR-2846	Data Format Exception	Unknown LoadType parameter:...	Use only supported LoadType inline parameters (e.g., Step, Frequency, PhaseLag, Damping Factor)
IR-2847	Data Format Exception	Invalid TabularData point:...	Provide points in TabularData as time magnitude; time magnitude; . . .
IR-2848	Data Format Exception	BodyForce: LoadType Step must match StartStep	Ensure LoadType Step matches the body force Start Step
IR-2850	Warning	autoRestrainedPrescribedDOFs: Node	Use the message context to correct the input syntax/-value.
IR-2851	Data Format Exception / Warning	Unknown RigidMotionType:...	Use the message context to correct the input syntax/-value.
IR-2852	Data Format Exception	Multiple equation types defined for X.	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-2853	Data Format Exception	Multiple equation types defined for Y.	Use the message context to correct the input syntax/-value.
IR-2854	Data Format Exception	Multiple equation types defined for Z.	Use the message context to correct the input syntax/-value.
IR-2855	Data Format Exception	Unknown key in RigidMotionConstraint line:...	Use the message context to correct the input syntax/-value.
IR-2856	Data Format Exception	Invalid @@ForceLoadX parameters	Fix the @@Force LoadX parameter list/format in the input
IR-2857	Data Format Exception	Invalid @@ForceLoadY parameters	Fix the @@Force LoadY parameter list/format in the input
IR-2858	Data Format Exception	Invalid @@ForceLoadZ parameters	Fix the @@Force LoadZ parameter list/format in the input
IR-2859	Data Format Exception	Invalid @@ForceLoad parameters	Use the message context to correct the input syntax/-value.
IR-2861	Data Format Exception	Expected 'file=' after 'TabularData'	Use the message context to correct the input syntax/-value.
IR-2862	Data Format Exception	Malformed TabularData directive:...	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-2863	Data Format Exception	Unknown param in RigidMotion Equation:...	Use the message context to correct the input syntax/-value.
IR-2864	Data Format Exception	Invalid numeric value in RigidMotion Equation:...	Use the message context to correct the input syntax/-value.
IR-2871	Data Format Exception	Failed to open tabular data file:...	Use the message context to correct the input syntax/-value.
IR-2872	Data Format Exception	Malformed line in tabular data file:...	Use the message context to correct the input syntax/-value.
IR-2873	Data Format Exception	Invalid tabular data point:...	Use the message context to correct the input syntax/-value.
IR-2874	Data Format Exception	PrescribedValue : @@TabularData is required for LoadType=Tabular	Use the message context to correct the input syntax/-value.
IR-2875	Data Format Exception	No simulation steps are defined; cannot evaluate Propagate...	Define simulation steps before using Propagate
IR-2876	Data Format Exception	FinalStep ... is less than StartStep ...	Ensure FinalStep >= StartStep
IR-2877	Data Format Exception	FinalStep ... is beyond the last defined stepId ...	Ensure FinalStep is within the defined simulation step range
IR-2881	Data Format Exception	Invalid Node ID:...	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-2882	Data Format Exception	Invalid Step ID:...	Use the message context to correct the input syntax/-value.
IR-2883	Data Format Exception	Invalid DOF specified:...	Use the message context to correct the input syntax/-value.
IR-2884	Data Format Exception	Output file path cannot be empty.	Use the message context to correct the input syntax/-value.
IR-2885	Data Format Exception	Unknown keyword in % ReactionForceSum section:...	Use the message context to correct the input syntax/-value.
IR-2886	Data Format Exception	Missing required inputs in % ReactionForceSum section (nodes, steps, DOFs, or output file).	Use the message context to correct the input syntax/-value.
IR-2887	Warning	processReactionForceSum: @OutputFile not provided; using default:...	Use the message context to correct the input syntax/-value.
IR-2891	Data Format Exception	Invalid Node ID:...	Use the message context to correct the input syntax/-value.
IR-2892	Data Format Exception	Invalid DOF specified:...	Use the message context to correct the input syntax/-value.
IR-2893	Data Format Exception	Output file path cannot be empty.	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-2894	Data Format Exception	Unknown keyword in % DOFOutput section:...	Use the message context to correct the input syntax/-value.
IR-2895	Data Format Exception	Missing required inputs in % DOFOutput section (nodes, DOFs, or output file).	Use the message context to correct the input syntax/-value.
IR-2896	Data Format Exception	Failed to create output CSV file:...	Use the message context to correct the input syntax/-value.
IR-2897	Data Format Exception / Warning	Invalid @Point specification (expected at least x y).	Use the message context to correct the input syntax/-value.
IR-2898	Data Format Exception	Invalid @Every/@Frequency value in % DOFOutput (expected integer >= 1).	Use the message context to correct the input syntax/-value.
IR-2899	Data Format Exception	Invalid Step ID:...	Use the message context to correct the input syntax/-value.

1.3.29 Output / Watch / Post-processing (IR-2900 to IR-2965)

Code	Type	Message (representative)	Resolution
IR-2900	Data Format Exception	Output file path cannot be empty.	Use the message context to correct the input syntax/-value.
IR-2901	Error	Conflict: Cannot use both RemeshEveryDeltaT and RemeshAtTimes	Use either RemeshEveryDeltaT or RemeshAtTimes, not both

Code	Type	Message (representative)	Resolution
IR-2902	Data Format Exception	Invalid ALE configuration for Laplacian remesher	Provide required ALE settings for Laplacian method
IR-2903	Data Format Exception	Watch validation error	Check watch configuration parameters
IR-2904	Data Format Exception / Warning	Invalid @Line specification (expected: @Line x0 y0 x1 y1 spacing OR @Line x0 y0 z0 x1 y1 z1 spacing).	Use the message context to correct the input syntax/-value.
IR-2905	Data Format Exception	Line spacing must be positive in @Line specification.	Use the message context to correct the input syntax/-value.
IR-2906	Data Format Exception	Unknown state variable in @State- EV Vars:...	Use the message context to correct the input syntax/-value.
IR-2907	Data Format Exception	Invalid Step ID:...	Use the message context to correct the input syntax/-value.
IR-2908	Data Format Exception	Output file path cannot be empty.	Use the message context to correct the input syntax/-value.
IR-2909	Data Format Exception	Invalid @Frequency value in % Line StateOutput section (must be > 0).	Use the message context to correct the input syntax/-value.
IR-2910	Data Format Exception	Unknown keyword in % LineStateOutput section:...	Use the message context to correct the input syntax/-value.
IR-2911	Data Format Exception	Missing required inputs in % LineState Output section (lines, state variables, steps/times, or output file).	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-2912	Data Format Exception	Invalid Time value in @Times:...	Use the message context to correct the input syntax/-value.
IR-2913	Warning	processLineStateOutput: @OutputFile not provided; using default:...	Use the message context to correct the input syntax/-value.
IR-2914	Warning / Error	Invalid remesher method/solver	Use valid remesher solver
IR-2915	Warning	Invalid remesher solver	Use: Nelder-Mead, Powell, COBYLA, or SLSQP
IR-2916	Warning	No valid remesher criteria set / empty list	Define at least one remesher criterion
IR-2917	Warning	Invalid RemesherMaxIterations	Provide positive integer
IR-2918	Warning	Unknown remesher criterion	Use valid criterion names
IR-2919	Warning	Unknown ALE technique	Use valid ALE technique
IR-2920	Warning	Unknown ALE property	Use valid ALE property name
IR-2921	Warning	Invalid RemeshingIntervalSeconds	Provide positive value
IR-2922	—	readWatchControls: No movable boundary nodes defined for Watch	Use the message context to correct the input syntax/-value.
IR-2923	Warning	Invalid MaximumDisplacement	Provide positive value
IR-2925	Warning	Missing value for ALE property	Provide value for all ALE properties
IR-2926	Warning	readWatchControls: Invalid WatchDisY flag '	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-2927	Warning	readWatchControls: Invalid WatchDisZ flag '	Use the message context to correct the input syntax/-value.
IR-2928	Warning	readWatchControls: Invalid WatchPW flag '	Use the message context to correct the input syntax/-value.
IR-2929	Warning	readWatchControls: Invalid WatchPA flag '	Use the message context to correct the input syntax/-value.
IR-2930	Data Format Exception / Warning	Invalid @Id header token:...	Use the message context to correct the input syntax/-value.
IR-2931	Data Format Exception / Warning	ContactID (block) not found in mesh.contactPairs.	Use the message context to correct the input syntax/-value.
IR-2932	Data Format Exception / Warning	Step (block) not defined in simulation Steps.	Use the message context to correct the input syntax/-value.
IR-2933	Data Format Exception / Warning	[MasterForceContact] cannot create file:...	Use the message context to correct the input syntax/-value.
IR-2934	Data Format Exception / Warning	Unknown keyword in % MasterForce Contact section:...	Use the message context to correct the input syntax/-value.
IR-2935	Warning	readWatchControls: Invalid Monitor GeometricZones flag '	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-2936	Warning	readWatchControls: Invalid Monitor Anomaly flag '	Use the message context to correct the input syntax/-value.
IR-2937	Warning	readWatchControls: Invalid Watch Everything flag '	Use the message context to correct the input syntax/-value.
IR-2938	Warning	readWatchControls: Invalid Remesh EveryDeltaT flag '	Use the message context to correct the input syntax/-value.
IR-2941	Data Format Exception	[ElementActivity] malformed line:...	Use the message context to correct the input syntax/-value.
IR-2942	Data Format Exception	[ElementActivity] unknown action:...	Use the message context to correct the input syntax/-value.
IR-2943	Data Format Exception	[ElementActivity] invalid element id:...	Use the message context to correct the input syntax/-value.
IR-2944	Data Format Exception	Missing or invalid @Id in % MasterForce Contact section.	Provide a valid @Id for each Master ForceContact block
IR-2945	Data Format Exception	Duplicate @Id (...) in % MasterForce Contact section.	Ensure each Master ForceContact block uses a unique @Id
IR-2946	Data Format Exception	Missing or invalid @ContactID in block ...	Provide a valid @ContactID that references an existing contact pair
IR-2947	Data Format Exception	Missing or invalid @Step/@Steps in block ...	Provide @Step or @Steps using valid simulation step IDs

Code	Type	Message (representative)	Resolution
IR-2948	Data Format Exception	Missing or invalid @OutputFreq in block ...	Provide a valid, non-negative @OutputFreq
IR-2949	Warning	processMasterForceContact: @Output-File not provided; using default:...	Optional: set @OutputFile to control the CSV output path/name
IR-2951	Data Format Exception	% PostStepActions → missing @Post StepAction Id	Use the message context to correct the input syntax/-value.
IR-2952	Data Format Exception	% PostStepActions → duplicate Id	Use the message context to correct the input syntax/-value.
IR-2953	Data Format Exception	PostStepAction Id has no Step specified.	Use the message context to correct the input syntax/-value.
IR-2954	Data Format Exception	PostStepAction Id refers to undefined Step	Use the message context to correct the input syntax/-value.
IR-2955	Data Format Exception	PostStepAction Id references unknown element	Use the message context to correct the input syntax/-value.
IR-2956	Data Format Exception	Malformed @PostStepAction header:...	Use the message context to correct the input syntax/-value.
IR-2957	Data Format Exception	% PostStepActions → stray line outside a block:...	Use the message context to correct the input syntax/-value.
IR-2958	Data Format Exception	Unknown PostStepAction Type:...	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-2959	Data Format Exception	Unknown keyword in % PostStep Actions:...	Use the message context to correct the input syntax/- value.
IR-2960	Data Format Exception	Invalid PostStepAction Id:...	Use a positive in- teger for PostStep Action IDs
IR-2961	Data Format Exception	Invalid @Append value in % PicardLoop Output section:...	Use the message context to correct the input syntax/- value.
IR-2962	Data Format Exception	Unknown keyword in % PicardLoop Output section:...	Use the message context to correct the input syntax/- value.
IR-2963	Data Format Exception	Output file path cannot be empty in % PicardLoopOutput section.	Use the message context to correct the input syntax/- value.
IR-2965	Warning	processPicardLoopOutput: @OutputFile not provided; using default:...	Use the message context to correct the input syntax/- value.

1.3.30 Special Features (Infinite Elements / Sponge / PML / ALE) (IR-3004 to IR-3099)

Code	Type	Message (representative)	Resolution
IR-3004	Data Format Exception	Unknown side in @@Sides	Use valid sides: Left, Right, Top, Bot- tom
IR-3005	Data Format Exception	Sponge Layer requires @@Thickness and @@MaxDamping	Define both re- quired parameters
IR-3006	Data Format Exception	% Infinite Elements must appear before % Boundary Conditions	Use the message context to correct the input syntax/- value.

Code	Type	Message (representative)	Resolution
IR-3007	Data Format Exception	Node ID not found	Use the message context to correct the input syntax/-value.
IR-3008	Data Format Exception	Unknown @@Type: (use TRI3, TRI6, QUAD4, QUAD8, or TET10)	Use the message context to correct the input syntax/-value.
IR-3009	Data Format Exception	% PML Layer must appear after % Elements (no elements are defined yet).	Use the message context to correct the input syntax/-value.
IR-3010	Data Format Exception	Unknown side in @@Sides:...	Use the message context to correct the input syntax/-value.
IR-3011	Data Format Exception	PML Layer requires @@Thickness, @@SigmaMax, and @@KappaMax	Use the message context to correct the input syntax/-value.
IR-3012	Data Format Exception	@@Exponent must be >= 1	Use the message context to correct the input syntax/-value.
IR-3013	Data Format Exception	@@KappaMax must be >= 1	Use the message context to correct the input syntax/-value.
IR-3014	Data Format Exception	% PML Layer is currently supported only for AnalysisType=PLNonCoupled/PLCoupled/PLFullyCoupled, AXNonCoupled/AXCoupled/AXFullyCoupled, or ThreeDNonCoupled/ThreeDCoupled/ThreeDFullyCoupled.	Use the message context to correct the input syntax/-value.
IR-3015	Data Format Exception	@@Sides must include at least one face	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-3016	Data Format Exception	@@AlphaMax must be >= 0	Use the message context to correct the input syntax/-value.
IR-3018	Data Format Exception / Warning	Failed to create/truncate PML debug file:...	Use the message context to correct the input syntax/-value.
IR-3019	Data Format Exception / Warning	Adjacent element for edge - is not a triangle (element)	Use the message context to correct the input syntax/-value.
IR-3020	Data Format Exception / Warning	Adjacent element for edge - is not TRI6 (element)	Use the message context to correct the input syntax/-value.
IR-3021	Data Format Exception / Warning	Failed to locate TRI6 mid-node on boundary edge - (adjacent element)	Use the message context to correct the input syntax/-value.
IR-3022	Data Format Exception	Adjacent element for edge - is not a quadrilateral (element)	Use the message context to correct the input syntax/-value.
IR-3023	Data Format Exception	Adjacent element for edge - is not QUAD8 (element)	Use the message context to correct the input syntax/-value.
IR-3024	Data Format Exception	Failed to locate QUAD8 mid-node on boundary edge - (adjacent element)	Use the message context to correct the input syntax/-value.
IR-3025	Data Format Exception	% Infinite Elements block " requires @@Material	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-3026	Data Format Exception	Invalid @@Material: expected a material ID	Use the message context to correct the input syntax/-value.
IR-3027	Data Format Exception	Material " not found while initializing generated infinite element (add it in % Materials, or fix @@Material)	Use the message context to correct the input syntax/-value.
IR-3028	Data Format Exception	Invalid @@InteriorPoint: expected two numbers	Use the message context to correct the input syntax/-value.
IR-3029	Data Format Exception	InteriorPoint is ambiguous for segment -	Use the message context to correct the input syntax/-value.
IR-3030	Data Format Exception	Cannot infer outward direction for segment - (provide @@ExteriorPoint or @@InteriorPoint)	Use the message context to correct the input syntax/-value.
IR-3031	Data Format Exception	TRI3 infinite elements are not supported in coupled/fully-coupled analyses. Use TRI6/QUAD4/QUAD8 for boundary "	Use the message context to correct the input syntax/-value.
IR-3032	Data Format Exception	Unsupported infinite element node count in generator boundary "	Use the message context to correct the input syntax/-value.
IR-3036	Data Format Exception	Internal error: TRI6 ray mid-node requested before direction node was created	Use the message context to correct the input syntax/-value.
IR-3037	Data Format Exception	Edge - is not a boundary edge (shared by elements).	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-3038	Data Format Exception	Unknown @@Topology: (use Auto, Wedge, or Strip)	Use the message context to correct the input syntax/-value.
IR-3041	Data Format Exception	Unknown side in @@Sides:...	Use the message context to correct the input syntax/-value.
IR-3042	Data Format Exception	% Infinite Elements boundary " with @@Type=TET10 requires a 3D analysis type	Use the message context to correct the input syntax/-value.
IR-3043	Data Format Exception	% Infinite Elements boundary " with @@Type=TET10 currently supports exactly one side in @@Sides (use multiple @Boundary blocks for multiple faces)	Use the message context to correct the input syntax/-value.
IR-3044	Data Format Exception	% Infinite Elements boundary " (@@Type=TET10) found no boundary faces on the requested side	Use the message context to correct the input syntax/-value.
IR-3048	Data Format Exception	Invalid @@FarFieldShape: expected a value	Use the message context to correct the input syntax/-value.
IR-3049	Warning	readInfiniteElements: @@FarField Shape=	Use the message context to correct the input syntax/-value.
IR-3050	Data Format Exception	@@Edges requires an even number of node IDs (pairs), e.g. '@@Edges: n1 n2 n3 n4'	Use the message context to correct the input syntax/-value.
IR-3051	Data Format Exception	Boundary face adjacent element is not an active finite T10 tetrahedron (element index)	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-3052	Data Format Exception	Failed to locate base quadratic mid-node for boundary edge (,)	Use the message context to correct the input syntax/-value.
IR-3099	Data Format Exception	ALE mesh smoothing is currently limited to 2D elements. Disable % ALE Configuration (@@Enabled: No) for 3D analyses.	Use the message context to correct the input syntax/-value.

1.3.31 % Debug (IR-3100 to IR-3112)

Code	Type	Message (representative)	Resolution
IR-3100	Warning	readDebugConfig: Unknown key '	Use the message context to correct the input syntax/-value.
IR-3101	Warning	readDebugConfig: Invalid value '	Use the message context to correct the input syntax/-value.
IR-3102	Warning	readDebugConfig: @Echo requires a file path (e.g., @Echo: debug/echo.txt). Ignoring.	Use the message context to correct the input syntax/-value.
IR-3103	Warning	readDebugConfig: Invalid value '	Use the message context to correct the input syntax/-value.
IR-3104	Warning	readDebugConfig: Invalid value '	Use the message context to correct the input syntax/-value.
IR-3105	Warning	readDebugConfig: Invalid value '	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-3106	Warning	readDebugConfig: Invalid value '	Use the message context to correct the input syntax/-value.
IR-3107	Warning	readDebugConfig: Invalid value '	Use the message context to correct the input syntax/-value.
IR-3108	Warning	readDebugConfig: Invalid value '	Use the message context to correct the input syntax/-value.
IR-3109	Warning	readDebugConfig: Invalid value '	Use the message context to correct the input syntax/-value.
IR-3110	Warning	readDebugConfig: Invalid value '	Use the message context to correct the input syntax/-value.
IR-3111	Warning	readDebugConfig: Invalid value '	Use the message context to correct the input syntax/-value.
IR-3112	Warning	readDebugConfig: Invalid value '	Use the message context to correct the input syntax/-value.

1.3.32 % Surrogate Training (IR-3200 to IR-3207)

Code	Type	Message (representative)	Resolution
IR-3200	Warning	readSurrogateTraining: Unknown key '	Use the message context to correct the input syntax/-value.

Code	Type	Message (representative)	Resolution
IR-3201	Warning	readSurrogateTraining: Invalid or incomplete	Use the message context to correct the input syntax/-value.
IR-3202	Data Format Exception	Seed must be >= 0	Use the message context to correct the input syntax/-value.
IR-3203	Data Format Exception / Warning	Step: is missing a value in @Qol:...	Use the message context to correct the input syntax/-value.
IR-3204	Data Format Exception	Freq: is missing a value in @Qol:...	Use the message context to correct the input syntax/-value.
IR-3205	Data Format Exception	Mat: is missing a material id in @Parameter:...	Use the message context to correct the input syntax/-value.
IR-3206	Data Format Exception	Invalid Elem: list in @Parameter:...	Use the message context to correct the input syntax/-value.
IR-3207	Data Format Exception	Missing node ID list in @Qol:...	Use the message context to correct the input syntax/-value.

1.3.33 % MPCConstraints (IR-3600 to IR-3621)

Code	Type	Message (representative)	Resolution
IR-3600	Data Format Exception	% MPCConstraints must appear after % Elements	Move % MPC Constraints to after % Elements (nodes/materials/elements must be known).

Code	Type	Message (representative)	Resolution
IR-3601	Data Format Exception	Expected '@MPCConstraint ' but got:...	Use @MPC Constraint <id> to start each con- straint block.
IR-3602	Data Format Exception	Invalid MPCConstraint id in:...	Use a non-negative integer ID in @MPC Constraint <id>.
IR-3603	Data Format Exception	Unknown @@Kind '...' for MPC- Constraint ...	Use @@Kind Slide AlongDirection.
IR-3604	Data Format Exception	Unknown @@Method '...' for MPC- Constraint ...	Use @@Method Augmented Lagrangian / AL.
IR-3605	Data Format Exception	Invalid @@Direction line for MPC- Constraint ...	Provide at least two numbers: @@ Direction <dx> <dy> [dz].
IR-3606	Data Format Exception	Direction vector has zero XY magnitude for 2D analysis...	Use a non-zero in- plane direction (dx, dy) in 2D.
IR-3607	Data Format Exception	Direction vector has zero magnitude...	Use a non-zero di- rection vector.
IR-3608	Data Format Exception	Cannot build orthonormal basis from Direction...	Use a valid direc- tion; avoid degener- ate vectors.
IR-3609	Data Format Exception	Cannot build second normal for Direc- tion...	Use a valid direc- tion; avoid degener- ate vectors.
IR-3610	Data Format Exception	Invalid @@ActiveSteps line for MPC- Constraint ...	Use @@Active Steps All or a list of step IDs.
IR-3611	Data Format Exception	Invalid step id '...' in @@ActiveSteps...	Provide integer step IDs (ranges like 1-5 are al- lowed).

Code	Type	Message (representative)	Resolution
IR-3612	Warning	Unknown key '...' in MPCConstraint ... (skipping)	Remove/rename unknown @@Key lines; see the MPC-Constraints documentation for supported keys.
IR-3613	Data Format Exception	MPCConstraint ...: missing @@NodeIDs	Add @@NodeIDs with at least one node ID.
IR-3614	Data Format Exception	MPCConstraint ...: @@Penalty must be > 0	Use a positive penalty value.
IR-3615	Data Format Exception	MPCConstraint ...: @@ALMaxIterations must be >= 0	Use 0 or a positive integer.
IR-3616	Data Format Exception	MPCConstraint ...: @@ALUpdate Tolerance must be >= 0	Use 0 or a positive tolerance.
IR-3617	Data Format Exception	MPCConstraint ...: Node ID ... not found	Ensure all node IDs exist in % Nodes.
IR-3618	Warning	@@RHS2 provided for a 2D analysis... (ignoring)	Remove @@RHS2 in 2D; use @@RHS or @@RHS1.
IR-3619	Data Format Exception	Duplicate MPCConstraint id ...	Ensure each @MPC Constraint uses a unique ID.
IR-3620	Data Format Exception	Invalid @@Enabled line for MPC-Constraint ...	Use @@Enabled Yes|No.
IR-3621	Data Format Exception	Invalid boolean '...' for MPCConstraint ...	Use a valid boolean (Yes/No, On/Off, True/False, 1/0).

1.3.34 % Checkpoint Control (IR-4001 to IR-4004)

Code	Type	Message (representative)	Resolution
IR-4001	Warning	readCheckpointControl: Invalid SAVE_FREQUENCY value:...	Use the message context to correct the input syntax/-value.
IR-4002	Warning	readCheckpointControl: Invalid MAX_CHECKPOINTS value:...	Use the message context to correct the input syntax/-value.
IR-4003	Warning	readCheckpointControl: Unknown key '	Use the message context to correct the input syntax/-value.
IR-4004	Warning	readCheckpointControl: OUTPUT_PATH not usable:...	Use the message context to correct the input syntax/-value.

1.3.35 % Restart From (IR-4101 to IR-4102)

Code	Type	Message (representative)	Resolution
IR-4101	Warning	readRestartFrom: Invalid TARGET_STEP value:...	Use the message context to correct the input syntax/-value.
IR-4102	Warning	readRestartFrom: Unknown key '	Use the message context to correct the input syntax/-value.

1.4 IR General Troubleshooting Tips

1.4.1 Error Code Hierarchy

Error codes follow a hierarchical pattern where the first two digits indicate the general section: - **00xx**: General file I/O and core structure - **01xx**: Nodes - **02xx**: Elements - **05-06xx**: Materials - **07xx**: Boundary Conditions - **10-11xx**: DOF modifications (Release/Restrain) - **12xx**: Stress Boundary - **13xx**: Discharge Boundary - **14xx**: Prescribed Values - **15-16xx**:

Step definitions and validation - **17xx**: Initial Assignments - **18–19xx**: Custom variables and hydraulic/material initialization - **21–26xx**: Coordinate files, state variables, and interpolation - **27–28xx**: Contact/constraint-style input sections - **29xx**: Output and watch controls - **30xx**: Special features (e.g., Infinite Elements / Sponge / PML / ALE configuration) - **31xx**: % Debug parsing - **32xx**: % Surrogate Training parsing - **36xx**: % MPCConstraints parsing - **40xx**: % Checkpoint Control parsing - **41xx**: % Restart From parsing

1.4.2 Common Issues

Sequential ID Requirements: - Node IDs typically start from 1 and increment sequentially (some workflows are stricter than others) - Element IDs should also be sequential (though less strictly enforced)

Material-Analysis Consistency: - Coupled analyses require compatible mechanical + liquid + permeability properties - Fully coupled analyses require additional SWRC/effective-stress + gas properties (or an equivalent UMAT)

DOF Validity: - DisX, DisY are valid for all nodes in all analysis types - DisZ is only valid for 3D analyses - PW is only valid for principal nodes in coupled/fully coupled analyses - PA is only valid for principal nodes in fully coupled analyses

Core Section Ordering: - The core sections must appear in order (enforced by IR-0012) - Optional sections can appear later as allowed by the reader - Use @Include directives for modular organization, but avoid cycles (see IR-0008)

1.4.3 Validation Workflow

When encountering errors: 1. Identify the related section using the Quick Reference table 2. Read the full message printed after the code (it often includes the exact key/value that failed) 3. Verify referenced IDs (nodes, elements, materials, steps) exist and are in range 4. Check that values are the right type/range and that required keys are present

1.4.4 Related Documentation

- [Input File Structure](#)
- [State Variables](#)
- [Steps](#)
- [Materials](#)
- [Initial Assignments](#)
- [Load Types](#)

!!! tip "Quick Debugging" When you see an error code like [IR-XXXX], [CT-XXXX], [EFC-XXXX], [ESP-XXXX], [CSV-XXXX], [UMAT-XXXX], or [SWRC-XXXX]:

1. Find the code range in the Quick Reference table
2. Locate the code under the corresponding detailed section

3. Follow the resolution guidance (and the full printed message)

1.5 CT Contact Error Codes (CT-XXXX)

Codes emitted by the contact modules. Some are warnings printed to stderr; others are thrown as exceptions.

Code	Type	Message (representative)	Resolution
CT-0001	Exception	Effective stress parameter Xi is NaN at contact GP	Ensure Xi is initialized/available at the contact nodes (and not NaN); check coupled/fully-coupled initialization and any custom state updates.
CT-0002	Exception	Invalid numGaussPoints (must be ≥ 1)	Set contact-pair Gauss point count to at least 1.
CT-0003	Warning	Master surface has too few nodes / invalid master configuration	Define a valid master surface (minimum node count; correct node ordering and expected segmentation).
CT-0004	Warning	Contact search failed (projection onto master surface failed)	Check master/slave geometry, search tolerance settings, and that the slave segment can project onto the master surface.
CT-0005	Warning	Penalty parameter mismatch (normal != tangential)	Use consistent normal/tangential penalty coefficients unless you intentionally model different stiffnesses.

Code	Type	Message (representative)	Resolution
CT-0006	Warning	Newton iteration did not converge in calcsiqu	Refine contact parameters (penalty, tolerances), reduce step size, or improve mesh quality in the contact region.
CT-0007	Exception	3D contact analysis is not supported	Use 2D (plane strain/stress) or axisymmetric contact.
CT-0008	Error (re-thrown)	Gauss point calculation failed	Check numGauss Points and contact Gauss-point settings; fix the upstream exception shown in the message.
CT-0009	Internal guard	Degenerate segment detected (zero length tangent)	Fix mesh/geometry so master segments are not degenerate (distinct node coordinates).
CT-1001	Exception	Node ... has <3 coordinates (3D contact)	Ensure the mesh nodes have 3 coordinates for 3D contact operations.

1.6 EFC EdgeForceCalculator Error Codes (EFC-XXXX)

Codes thrown while assembling nodal forces for stress and discharge boundaries.

Code	Type	Message (representative)	Resolution
EFC-0001	Data Format Exception	T10 face nodes do not match any valid face on element	Ensure the provided face node IDs belong to a single T10 face on the referenced element.
EFC-0002	Data Format Exception	Unsupported edge node count (2D stress boundary)	Use 2-node (linear) or 3-node (quadratic) edges for 2D stress boundaries.
EFC-0003	Data Format Exception	3D surface stress boundary requires 6 face nodes	Provide exactly 6 nodes for a quadratic triangular face on a T10 element.
EFC-0004	Data Format Exception	Face node not found in element / boundary node list	Ensure all listed face nodes are part of the element and are consistently listed in the boundary definition.
EFC-0005	Data Format Exception	Degenerate face detected (zero surface Jacobian)	Improve mesh quality; fix collapsed/degenerate faces.
EFC-0006	Data Format Exception	Discharge boundary edge/node count mismatch	Use 2-node or 3-node edges and provide discharge arrays with matching lengths.
EFC-0007	Data Format Exception	Discharge boundary node not found in element	Ensure discharge boundary nodes belong to the referenced element edge.
EFC-0008	Data Format Exception	3D normal pressure vector size mismatch	Provide exactly 6 normal pressure values for a 3D quadratic face.

Code	Type	Message (representative)	Resolution
EFC-0009	Data Format Exception	3D surface discharge boundary requires 6 face nodes	Provide exactly 6 face nodes for 3D discharge on a quadratic triangular face.
EFC-0010	Data Format Exception	3D water discharge vector size mismatch	Provide exactly 6 water discharge values (one per face node).
EFC-0011	Data Format Exception	3D air discharge vector size mismatch	Provide exactly 6 air discharge values (one per face node).
EFC-0012	Data Format Exception	3D face node not found / mapping failed	Ensure the face node set is consistent and belongs to the element.
EFC-0013	Data Format Exception	3D discharge face degenerate (zero Jacobian)	Improve mesh quality; fix collapsed/degenerate faces.

1.7 ESP EffectiveStressProperties Error Codes (ESP-XXXX)

Codes thrown by effective stress model utilities.

Code	Type	Message (representative)	Resolution
ESP-0001	Exception	Invalid saturation value (negative)	Ensure saturation is in a valid physical range (non-negative; typically $0 \leq S_w \leq 1$).

1.8 CSV CustomStateVariable Error Codes (CSV-XXXX)

Codes thrown by the custom state variable registry.

Code	Type	Message (representative)	Resolution
CSV-0001	Exception	Variable already exists (duplicate registration)	Register each custom variable once; use <code>setVariable()/updateVariables()</code> to modify values.
CSV-0002	Exception	Variable does not exist (not found)	Ensure the variable is registered before reading/updating it (or check for typos).

1.9 SWRC SWRCProperties Error Codes (SWRC-XXXX)

Codes thrown by soil-water retention curve model parsing/validation.

Code	Type	Message (representative)	Resolution
SWRC-0001	Exception	Saturation bounds invalid ($S_r > S_s$)	Ensure residual saturation is \leq saturated saturation.
SWRC-0002	Exception	Void ratio invalid (≤ 0)	Provide a positive void ratio.
SWRC-0003	Exception	st must be > 0	Provide a positive st parameter.
SWRC-0004	Exception	st denominator invalid (≤ 0)	Adjust parameters so the denominator is positive (see message context).

1.10 UMAT UMATHandler Error Codes (UMAT-XXXX)

Codes thrown by UMAT compilation/loading and dynamic symbol resolution.

Code	Type	Message (representative)	Resolution
UMAT-0001	Data Format Exception	UMAT source/library file not found	Verify the UMAT source/library path exists.
UMAT-0002	Data Format Exception	Eigen not found	Install Eigen (or set the include path expected by your build configuration).
UMAT-0003	Data Format Exception	No compiler configured (empty CXX?)	Set CXX (or the corresponding compiler configuration) before compiling UMATs.
UMAT-0004	Data Format Exception	No compiler found (CXX empty?)	Ensure your compiler is installed and CXX points to it.
UMAT-0005	Data Format Exception	Compilation failed (exit code ...)	Check compiler output/logs and fix UMAT/build flags.
UMAT-0006	Data Format Exception	Compilation appeared to succeed but library not found	Ensure the expected output library path/-name matches the toolchain output.
UMAT-0007	Data Format Exception	UMAT library file not found	Verify the built library exists at the expected location.
UMAT-0008	Data Format Exception	Cannot open library (dlopen/LoadLibrary)	Ensure the library is compatible with your platform and dependencies are resolvable.
UMAT-0009	Exception	UMAT library not loaded	Load/compile the UMAT before requesting symbols.

Code	Type	Message (representative)	Resolution
UMAT-0010	Exception	Cannot load symbol ...	Ensure the exported function name matches and the symbol is present in the library.

1.11 VTK VTKWriter Error Codes (VTK-XXXX)

Codes thrown during VTK legacy unstructured grid export.

Code	Type	Message (representative)	Resolution
VTK-0001	Exception	VTK export: mesh has no nodes	Ensure nodes are loaded/created before exporting.
VTK-0002	Exception	VTK export: mesh has no elements	Ensure elements are loaded/created before exporting.
VTK-0003	Exception	VTK export: empty output file path	Provide a valid output file path.
VTK-0004	Exception	VTK export: failed to open output file	Check directory permissions and path validity.

1.12 SCFG SolverConfig Error Codes (SCFG-XXXX)

Codes thrown when validating solver configuration settings.

Code	Type	Message (representative)	Resolution
SCFG-0001	Exception	Invalid solver type	Use a supported solver type.
SCFG-0002	Exception	Invalid preconditioner type for solver type	Choose a preconditioner supported by the selected solver.

Code	Type	Message (representative)	Resolution
SCFG-0003	Exception	maxIterations must be between ... and ...	Keep maxIterations within the allowed bounds.
SCFG-0004	Exception	tolerance must be between ... and ...	Keep tolerance within the allowed bounds.
SCFG-0005	Exception	theta must be in [0.5, 1.0]	Choose a valid theta value.

1.13 GiD GiDMesh Error Codes (GiD-XXXX)

Codes thrown by the GiD output writer.

Code	Type	Message (representative)	Resolution
GiD-0001	Exception	Failed to open grid output file	Verify the output path is writable.
GiD-0002	Exception	Failed to open Gauss output file	Verify the output path is writable.

1.14 ENV Dotenv Error Codes (ENV-XXXX)

Codes thrown while reading .env files.

Code	Type	Message (representative)	Resolution
ENV-0001	Exception	Could not open .env file	Check the file path and permissions.

1.15 FP FALCONPunch Error Codes (FP-XXXX)

Codes thrown by FALCONPunch utilities.

Code	Type	Message (representative)	Resolution
FP-0001	Exception	Node ... missing	Ensure referenced node IDs exist in the mesh.
FP-0002	Exception	Principal node ... missing	Ensure principal node IDs exist and are consistent with element connectivity.

1.16 OZC Zone Optimization Error Codes (OZC-XXXX)

Codes thrown by zone optimization utilities.

Code	Type	Message (representative)	Resolution
OZC-0001	Exception	Node ... missing	Ensure referenced node IDs exist in the mesh.
OZC-0002	Exception	Principal node ... missing	Ensure principal node IDs exist and are consistent with element connectivity.

1.17 SR StressRecovery Error Codes (SR-XXXX)

Codes thrown by stress recovery post-processing.

Code	Type	Message (representative)	Resolution
SR-0001	Exception	Some joints were not processed in REC-STR6	Investigate the listed missed nodes; ensure mesh/connectivity is consistent for stress recovery.

1.18 RME Rigid Motion Equation Error Codes (RME-XXXX)

Codes thrown by rigid motion equation evaluation.

Code	Type	Message (representative)	Resolution
RME-0001	Exception	Tabular data is empty but isTabular==true	Provide tabular data points when isTabular=true.
RME-0002	Exception	Tabular interpolation logic error	Check that the tabular data is sorted and covers the queried time range.

1.19 Additional error code sets

The following sections document additional error code prefixes used across the solver. Each table provides a representative message fragment and a general resolution approach. Always rely on the full message printed at runtime for details.

1.20 ALE ALE mesh smoothing error codes (ALE-XXXX)

Code	Severity	Message (representative)	Resolution
ALE-0001	Warning	Cannot initialize: mesh has no nodes or elements	Review the full message; adjust settings/inputs if needed.
ALE-0002	—	); proceeding with proactive smoothing safeguards	Use the full message text for troubleshooting.
ALE-0003	—	Failed: mesh already has invalid Gauss point Jacobians (trigger autotinc retry)	Use the full message text for troubleshooting.
ALE-0005	Exception	3D elements detected. ALE mesh smoothing currently supports only 2D elements	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
ALE-0006	Exception	3D elements detected. ALE mesh smoothing currently supports only 2D elements	Correct the invalid input/state indicated by the message and rerun.
ALE-0007	Exception	LinearQuadrilateral (Q4, 4-node), QuadraticQuadrilateral (Q8, 8-node).	Correct the invalid input/state indicated by the message and rerun.
ALE-0008	Warning	Failed to open debug output file:	Review the full message; adjust settings/inputs if needed.
ALE-0009	Exception	Unsupported shape function encountered during pre-smoothing Jacobian check for element	Correct the invalid input/state indicated by the message and rerun.
ALE-0010	Exception	Unsupported shape function encountered during pre-smoothing Jacobian check for element	Correct the invalid input/state indicated by the message and rerun.
ALE-0011	Exception	Unsupported shape function encountered during mesh validation for element	Correct the invalid input/state indicated by the message and rerun.
ALE-0012	Exception	Unsupported shape function encountered during mesh validation for element	Correct the invalid input/state indicated by the message and rerun.
ALE-0014	—	Failed: smoothing would create invalid mesh after midpoint recomputation (rolled back; trigger autoinc retry)	Use the full message text for troubleshooting.
ALE-0015	Exception	Unsupported shape function encountered for element	Correct the invalid input/state indicated by the message and rerun.

1.21 CG Gauss/quadrature utilities error codes (CG-XXXX)

Code	Severity	Message (representative)	Resolution
CG-0001	Warning	≤ 0 , cannot compute log). Returning 0.	Review the full message; adjust settings/inputs if needed.
CG-0003	Exception	Invalid number of Gauss points:	Correct the invalid input/state indicated by the message and rerun.
CG-0004	Exception	Invalid number of Gauss points:	Correct the invalid input/state indicated by the message and rerun.

1.22 CM Matrix assembly utilities error codes (CM-XXXX)

Code	Severity	Message (representative)	Resolution
CM-0001	Error	NaN encountered in scalar value for Element	Fix the underlying issue indicated by the message and rerun.
CM-0002	Error	NaN encountered in scalar value for Element	Fix the underlying issue indicated by the message and rerun.
CM-0003	Error	Missing material property key: PHASE_SOLID_DENSITY for material type:	Fix the underlying issue indicated by the message and rerun.
CM-0004	Error	Missing material property key: PHASE_LIQUID_DENSITY for material type:	Fix the underlying issue indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
CM-0005	Error	Missing material property key: PHASE_LIQUID_DENSITY for material type:	Fix the underlying issue indicated by the message and rerun.
CM-0006	Warning	Missing state variable: InitialVoidRatio in GaussPoint. Using InitialVoidRatio = 0.0	Review the full message; adjust settings/inputs if needed.
CM-0007	Warning	Missing state variable: InitialVoidRatio in GaussPoint. Using InitialVoidRatio = 0.0	Review the full message; adjust settings/inputs if needed.
CM-0008	Warning	Missing state variable: InitialVoidRatio in GaussPoint. Using InitialVoidRatio = 0.0	Review the full message; adjust settings/inputs if needed.
CM-0009	Error	Missing state variable: InitialVoidRatio in GaussPoint. Using InitialVoidRatio = 0.0	Fix the underlying issue indicated by the message and rerun.
CM-0010	Error	Missing state variable: DegreeOfSaturation in GaussPoint. Using SW = 0.0	Fix the underlying issue indicated by the message and rerun.
CM-0011	Error	Density associated keys not found:	Fix the underlying issue indicated by the message and rerun.
CM-0012	Error	SWRC properties not found for material type:	Fix the underlying issue indicated by the message and rerun.
CM-0013	Error	SWRC properties not found for material type:	Fix the underlying issue indicated by the message and rerun.

1.23 CP Checkpoint/restart error codes (CP-XXXX)

Code	Severity	Message (representative)	Resolution
CP-0001	—	Mesh dimension mismatch (node/element counts differ)	Use the full message text for troubleshooting.
CP-0002	—	Time integration mismatch (IMEX/-Explicit/Implicit settings changed)	Use the full message text for troubleshooting.
CP-0003	—	Failed to open checkpoint file for writing:	Use the full message text for troubleshooting.
CP-0004	—	Failed to get file position after writing checkpoint	Use the full message text for troubleshooting.
CP-0005	—	Failed to get file position after writing checkpoint	Use the full message text for troubleshooting.
CP-0006	—	Exception during checkpoint save:	Use the full message text for troubleshooting.
CP-0101	—	Invalid checkpoint file (magic number mismatch) - not a FALCON checkpoint	Use the full message text for troubleshooting.
CP-0102	—	Invalid checkpoint file (magic number mismatch) - not a FALCON checkpoint	Use the full message text for troubleshooting.
CP-0103	—	Invalid checkpoint file (magic number mismatch) - not a FALCON checkpoint	Use the full message text for troubleshooting.
CP-0104	—	The input file mesh has different node positions than when checkpoint was saved.	Use the full message text for troubleshooting.
CP-0105	—	The input file has different element-node relationships than when checkpoint was saved.	Use the full message text for troubleshooting.
CP-0106	—	The input file has different element-node relationships than when checkpoint was saved.	Use the full message text for troubleshooting.

Code	Severity	Message (representative)	Resolution
CP-0107	—	Failed to re-open checkpoint file for checksum verification	Use the full message text for troubleshooting.
CP-0108	—	Failed to re-open checkpoint file after checksum verification	Use the full message text for troubleshooting.
CP-0109	—	Failed to re-open checkpoint file after checksum verification	Use the full message text for troubleshooting.
CP-0110	—	Failed to re-open checkpoint file after checksum verification	Use the full message text for troubleshooting.
CP-0111	—	Failed to re-open checkpoint file after checksum verification	Use the full message text for troubleshooting.
CP-0112	—	Exception during checkpoint load:	Use the full message text for troubleshooting.
CP-0113	—	(Implicit/Explicit/IMEX and/or explicit mass-solve options) differ from when the checkpoint was saved.	Use the full message text for troubleshooting.
CP-0114	—	(Implicit/Explicit/IMEX and/or explicit mass-solve options) differ from when the checkpoint was saved.	Use the full message text for troubleshooting.
CP-0115	—	(Implicit/Explicit/IMEX and/or explicit mass-solve options) differ from when the checkpoint was saved.	Use the full message text for troubleshooting.
CP-0116	—	(Implicit/Explicit/IMEX and/or explicit mass-solve options) differ from when the checkpoint was saved.	Use the full message text for troubleshooting.
CP-0117	—	Infinite-element mismatch: element infinite flags differ from when the checkpoint was saved.	Use the full message text for troubleshooting.

Code	Severity	Message (representative)	Resolution
CP-0118	—	(Implicit/Explicit/IMEX and/or explicit mass-solve options) differ from when the checkpoint was saved.	Use the full message text for troubleshooting.
CP-0119	—	(Implicit/Explicit/IMEX and/or explicit mass-solve options) differ from when the checkpoint was saved.	Use the full message text for troubleshooting.
CP-0120	—	(Implicit/Explicit/IMEX and/or explicit mass-solve options) differ from when the checkpoint was saved.	Use the full message text for troubleshooting.
CP-0121	—	birth/kill schedule vector size exceeds maximum (	Use the full message text for troubleshooting.
CP-0122	—	birth/kill schedule vector size exceeds maximum (	Use the full message text for troubleshooting.
CP-0123	—	birth/kill schedule vector size exceeds maximum (	Use the full message text for troubleshooting.
CP-0124	—	: principal node index out of range while rebuilding PLocalCoord	Use the full message text for troubleshooting.
CP-0125	—	: principal node index out of range while rebuilding PLocalCoord	Use the full message text for troubleshooting.
CP-0130	—	Checkpoint version ... does not serialize MPCConstraints. Using input-file defaults.	Create a new checkpoint with a newer format version (v10+) if you need MPC-Constraints state preserved on restart.
CP-0201	—	Session state elementJustActivated size exceeds maximum (	Use the full message text for troubleshooting.

Code	Severity	Message (representative)	Resolution
CP-0202	—	Number of elements exceeds maximum (	Use the full message text for troubleshooting.
CP-0203	—	Auto-increment states map size exceeds maximum (	Use the full message text for troubleshooting.
CP-0204	—	Auto-increment states map size exceeds maximum (	Use the full message text for troubleshooting.

1.24 CS Constitutive model error codes (CS-XXXX)

Code	Severity	Message (representative)	Resolution
CS-0001	Exception	Required elastic properties (Young's modulus, Poisson's ratio) not found for material '	Correct the invalid input/state indicated by the message and rerun.
CS-0002	Exception	Required elastic properties (Young's modulus, Poisson's ratio) not found for material '	Correct the invalid input/state indicated by the message and rerun.
CS-0005	Exception	Failed to retrieve UMAT compute StressStrainMatrix function for element	Correct the invalid input/state indicated by the message and rerun.
CS-0006	Exception	Failed to retrieve UMAT compute StressStrainMatrix function for element	Correct the invalid input/state indicated by the message and rerun.
CS-0007	Exception	Failed to retrieve UMAT compute StressStrainMatrix function for element	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
CS-0008	Exception	Unable to resolve UMAT compute StressStrainMatrix for element	Correct the invalid input/state indicated by the message and rerun.
CS-0010	Exception	Unable to resolve UMAT compute StressStrainMatrix for element	Correct the invalid input/state indicated by the message and rerun.
CS-0011	Exception	Unable to resolve UMAT compute StressStrainMatrix for element	Correct the invalid input/state indicated by the message and rerun.
CS-0012	Exception	Unable to resolve UMAT compute StressStrainMatrix for element	Correct the invalid input/state indicated by the message and rerun.
CS-0014	Exception	Unable to resolve UMAT compute StressStrainMatrix for element	Correct the invalid input/state indicated by the message and rerun.
CS-0015	Exception	Unable to resolve UMAT compute StressStrainMatrix for element	Correct the invalid input/state indicated by the message and rerun.
CS-0016	Exception	Unsupported or missing elastic properties for element	Correct the invalid input/state indicated by the message and rerun.
CS-0017	Exception	Null principalShapeFunction for element	Correct the invalid input/state indicated by the message and rerun.
CS-0018	Exception	Null principalShapeFunction for element	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
CS-0019	Exception	Principal shape function count mismatch: expected	Correct the invalid input/state indicated by the message and rerun.
CS-0020	Exception	Principal shape function count mismatch: expected	Correct the invalid input/state indicated by the message and rerun.
CS-0021	Exception	SWRC properties not found for material '	Correct the invalid input/state indicated by the message and rerun.
CS-0022	Exception	SWRC properties not found for material '	Correct the invalid input/state indicated by the message and rerun.
CS-0023	Exception	). Cannot calculate effective stress.	Correct the invalid input/state indicated by the message and rerun.
CS-0024	Exception	' not found for element	Correct the invalid input/state indicated by the message and rerun.
CS-0025	Exception	Failed to retrieve UMAT calculate StressIncrement function for element	Correct the invalid input/state indicated by the message and rerun.
CS-0026	Exception	Failed to retrieve UMAT calculate StressIncrement function for element	Correct the invalid input/state indicated by the message and rerun.
CS-0027	Exception	Unsupported material property combination for element	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
CS-0028	Exception	Failed to retrieve UMAT calculate StressIncrement function for element	Correct the invalid input/state indicated by the message and rerun.
CS-0029	Warning	' not found in customStateVariables 2	Review the full message; adjust settings/inputs if needed.
CS-0030	Exception	Unable to locate mutable Element(id=	Correct the invalid input/state indicated by the message and rerun.



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1.25 FBM B-matrix assembly error codes (FBM-XXXX)

Code	Severity	Message (representative)	Resolution
FBM-0001	Exception	Shape function vector has fewer entries (	Correct the invalid input/state indicated by the message and rerun.
FBM-0002	Exception	Shape function vector has fewer entries (	Correct the invalid input/state indicated by the message and rerun.
FBM-0003	Exception	Shape function vector has fewer entries (	Correct the invalid input/state indicated by the message and rerun.

1.26 FMO Matrix operations error codes (FMO-XXXX)

Code	Severity	Message (representative)	Resolution
FMO-0001	Exception	Degenerate element detected (near-zero Jacobian determinant).	Correct the invalid input/state indicated by the message and rerun.
FMO-0002	Exception	Degenerate element detected (near-zero Jacobian determinant).	Correct the invalid input/state indicated by the message and rerun.
FMO-0003	Exception	Degenerate element detected (near-zero Jacobian determinant).	Correct the invalid input/state indicated by the message and rerun.
FMO-0004	Exception	Matrix decomposition failed (singular or ill-conditioned matrix).	Correct the invalid input/state indicated by the message and rerun.
FMO-0005	Exception	Matrix decomposition failed (singular or ill-conditioned matrix).	Correct the invalid input/state indicated by the message and rerun.
FMO-0011	Exception	. Ensure element type provides a principal shape function (e.g., LinearTetrahedron for T10).	Correct the invalid input/state indicated by the message and rerun.
FMO-0012	Exception	Element is marked infinite but shapeFunction type is unsupported (element	Correct the invalid input/state indicated by the message and rerun.

1.27 GP Gauss point utilities error codes (GP-XXXX)

Code	Severity	Message (representative)	Resolution
GP-0001	Exception	Unsupported integration point count for triangles: pNum=	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
GP-0002	Exception	Unsupported integration point count for quadrilaterals: pNum=	Correct the invalid input/state indicated by the message and rerun.
GP-0003	Exception	Unsupported integration point count for tetrahedron: pNum=	Correct the invalid input/state indicated by the message and rerun.
GP-0004	Exception	Unsupported integration point count for tetrahedron: pNum=	Correct the invalid input/state indicated by the message and rerun.



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1.28 IFC Internal force calculation error codes (IFC-XXXX)

Code	Severity	Message (representative)	Resolution
IFC-0001	Exception	Shape function not assigned for element	Correct the invalid input/state indicated by the message and rerun.
IFC-0002	Exception	Empty derivative matrix for element	Correct the invalid input/state indicated by the message and rerun.
IFC-0003	Exception	Principal shape function not assigned for coupled element	Correct the invalid input/state indicated by the message and rerun.
IFC-0004	Exception	Shape function output size (	Correct the invalid input/state indicated by the message and rerun.
IFC-0005	Exception	Element is marked infinite but shapeFunction type is unsupported (element	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
IFC-0006	Exception	. This is required for coupled/fully-coupled analyses.	Correct the invalid input/state indicated by the message and rerun.

1.29 LA Load application error codes (LA-XXXX)

Code	Severity	Message (representative)	Resolution
LA-0001	Exception	Unknown LoadType:	Correct the invalid input/state indicated by the message and rerun.
LA-0002	Exception	Unsupported load type	Correct the invalid input/state indicated by the message and rerun.
LA-0003	Exception	Tabular data is empty	Correct the invalid input/state indicated by the message and rerun.

1.30 MAIN CLI / entrypoint error codes (MAIN-XXXX)

Code	Severity	Message (representative)	Resolution
MAIN-0001	Exception	[Args] Warning: ignoring extra positional argument:	Correct the invalid input/state indicated by the message and rerun.
MAIN-0002	Exception	4. Surrogate tag before value (e.g., YoungsModulus \$YM 210000, with @Parameter: \$YM ...)	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
MAIN-0003	Exception	Failed to create modified input file for run	Correct the invalid input/state indicated by the message and rerun.

1.31 MF Material factory error codes (MF-XXXX)

Code	Severity	Message (representative)	Resolution
MF-0101	Exception	Failed to parse YoungsModulus for model type '	Correct the invalid input/state indicated by the message and rerun.
MF-0102	Exception	Failed to parse YoungsModulus for model type '	Correct the invalid input/state indicated by the message and rerun.
MF-0110	Exception	Failed to parse YoungsModulus for model type '	Correct the invalid input/state indicated by the message and rerun.
MF-0111	Exception	Failed to parse YoungsModulus for model type '	Correct the invalid input/state indicated by the message and rerun.
MF-0201	Exception	Failed to parse all required properties for NonHysteretic SWRC model.	Correct the invalid input/state indicated by the message and rerun.
MF-0202	Exception	Failed to parse all required properties for Brooks and Corey SWRC model.	Correct the invalid input/state indicated by the message and rerun.
MF-0203	Exception	Failed to parse all required properties for Brooks and Corey SWRC model.	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
MF-0204	Exception	Failed to parse all required properties for FredlundXing SWRC model.	Correct the invalid input/state indicated by the message and rerun.
MF-0205	Exception	Failed to parse all required properties for FredlundXing SWRC model.	Correct the invalid input/state indicated by the message and rerun.
MF-0301	Exception	Missing parameters for Ghorbani & Kodikara model. Beta1 set:	Correct the invalid input/state indicated by the message and rerun.
MF-0302	Exception	Missing parameters for Ghorbani & Kodikara model. Beta1 set:	Correct the invalid input/state indicated by the message and rerun.
MF-0303	Exception	Missing parameters for Ghorbani & Kodikara model. Beta1 set:	Correct the invalid input/state indicated by the message and rerun.
MF-0304	Exception	Failed to parse K_sat for VoidRatio AffectedConstant Permeability	Correct the invalid input/state indicated by the message and rerun.
MF-0401	Exception	Failed to parse K_sat for VoidRatio AffectedConstant Permeability	Correct the invalid input/state indicated by the message and rerun.
MF-0402	Exception	Failed to parse K_sat for VoidRatio AffectedConstant Permeability	Correct the invalid input/state indicated by the message and rerun.
MF-0403	Exception	Failed to parse K_sat for Van Genuchten Permeability	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
MF-0404	Exception	Failed to parse K_sat for Van Genuchten Permeability	Correct the invalid input/state indicated by the message and rerun.
MF-0405	Exception	Failed to parse K_sat for Van GenuchtenKe Permeability	Correct the invalid input/state indicated by the message and rerun.
MF-0406	Exception	Failed to parse K_sat for Van GenuchtenKe Permeability	Correct the invalid input/state indicated by the message and rerun.
MF-0407	Exception	Solid density not specified correctly	Correct the invalid input/state indicated by the message and rerun.
MF-0408	Exception	Failed to parse K_sat for Van GenuchtenKe Permeability	Correct the invalid input/state indicated by the message and rerun.
MF-0409	Exception	Failed to parse K_sat for Van GenuchtenKe Permeability	Correct the invalid input/state indicated by the message and rerun.
MF-0410	Exception	Failed to parse lambda for Brooks CoreyKe Permeability	Correct the invalid input/state indicated by the message and rerun.
MF-0411	Exception	Failed to parse lambda for Brooks CoreyKe Permeability	Correct the invalid input/state indicated by the message and rerun.
MF-0501	Exception	Liquid properties not specified correctly	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
MF-0502	Exception	Liquid properties not specified correctly	Correct the invalid input/state indicated by the message and rerun.
MF-0503	Exception	Failed to parse anisotropic permeability coefficient:	Correct the invalid input/state indicated by the message and rerun.
MF-0504	Exception	Failed to parse anisotropic permeability coefficient:	Correct the invalid input/state indicated by the message and rerun.
MF-0601	Exception	Failed to parse anisotropic permeability coefficient:	Correct the invalid input/state indicated by the message and rerun.
MF-0700	Exception	UMAT requires: ... (or	Correct the invalid input/state indicated by the message and rerun.
MF-0701	Exception	UMAT header file does not exist at path:	Correct the invalid input/state indicated by the message and rerun.
MF-0702	Exception	UMAT header file does not exist at path:	Correct the invalid input/state indicated by the message and rerun.
MF-0703	Exception	Failed to parse UMAT parameter '	Correct the invalid input/state indicated by the message and rerun.
MF-0704	Exception	Failed to parse UMAT parameter '	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
MF-0705	Exception	Failed to parse UMAT parameter '	Correct the invalid input/state indicated by the message and rerun.

1.32 PPR Permeability properties error codes (PPR-XXXX)

Code	Severity	Message (representative)	Resolution
PPR-0001	Exception	Permeability must be positive (got	Correct the invalid input/state indicated by the message and rerun.
PPR-0002	Exception	Permeability: Void-Ratio-Affected Constant $K_{sat_ref} =$	Correct the invalid input/state indicated by the message and rerun.
PPR-0003	Exception	Permeability: Void-Ratio-Affected Constant $K_{sat_ref} =$	Correct the invalid input/state indicated by the message and rerun.
PPR-0004	Exception	Saturated permeability K_{sat} must be positive (got	Correct the invalid input/state indicated by the message and rerun.
PPR-0005	Exception	Saturated permeability K_{sat} must be positive (got	Correct the invalid input/state indicated by the message and rerun.
PPR-0006	Exception	$\lambda \leq 0$ causes division by zero in exponent calculations.	Correct the invalid input/state indicated by the message and rerun.
PPR-0007	Exception	$\lambda \leq 0$ causes division by zero in exponent calculations.	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
PPR-0008	Exception	Saturated permeability K_sat must be positive (got	Correct the invalid input/state indicated by the message and rerun.
PPR-0009	Exception	Saturated permeability K_sat must be positive (got	Correct the invalid input/state indicated by the message and rerun.
PPR-0010	Exception	Saturated permeability K_sat must be positive (got	Correct the invalid input/state indicated by the message and rerun.
PPR-0011	Exception	Saturated permeability K_sat must be positive (got	Correct the invalid input/state indicated by the message and rerun.
PPR-0012	Exception	Saturated permeability K_sat must be positive (got	Correct the invalid input/state indicated by the message and rerun.
PPR-0013	Exception	Saturated permeability K_sat must be positive (got	Correct the invalid input/state indicated by the message and rerun.
PPR-0014	Exception	Saturated permeability K_sat must be positive (got	Correct the invalid input/state indicated by the message and rerun.
PPR-0015	Exception	Saturated permeability K_sat must be positive (got	Correct the invalid input/state indicated by the message and rerun.

1.33 SF Shape functions error codes (SF-XXXX)

Code	Severity	Message (representative)	Resolution
SF-0001	Exception	Insufficient coordinates for Linear Triangle Element	Correct the invalid input/state indicated by the message and rerun.
SF-0002	Exception	Negative Jacobian for Element	Correct the invalid input/state indicated by the message and rerun.
SF-0003	Exception	Insufficient coordinates for QuadraticTriangle Element	Correct the invalid input/state indicated by the message and rerun.
SF-0004	Exception	Insufficient coordinates for Linear Quadrilateral Element	Correct the invalid input/state indicated by the message and rerun.
SF-0005	Exception	Insufficient coordinates for QuadraticQuadrilateral Element	Correct the invalid input/state indicated by the message and rerun.
SF-0006	Exception	is out of bounds [-1,1]	Correct the invalid input/state indicated by the message and rerun.
SF-0007	Exception	Insufficient coordinates for Linear Tetrahedron Element	Correct the invalid input/state indicated by the message and rerun.
SF-0008	Exception	Insufficient coordinates for Linear Tetrahedron Element	Correct the invalid input/state indicated by the message and rerun.
SF-0009	Exception	Negative or zero Jacobian for 3D Element	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
SF-0101	Exception	Insufficient coordinates for Infinite LinearQuadrilateral Element	Correct the invalid input/state indicated by the message and rerun.
SF-0102	Exception	Insufficient coordinates for Infinite LinearQuadrilateral Element	Correct the invalid input/state indicated by the message and rerun.
SF-0103	Exception	Invalid eta near +1 for InfiniteLinear Quadrilateral Element	Correct the invalid input/state indicated by the message and rerun.
SF-0104	Exception	Shape function derivatives not initialized for InfiniteLinear Quadrilateral Element	Correct the invalid input/state indicated by the message and rerun.
SF-0105	Exception	Shape function derivatives not initialized for InfiniteLinear Quadrilateral Element	Correct the invalid input/state indicated by the message and rerun.
SF-0106	Exception	Shape function derivatives not initialized for InfiniteLinear Quadrilateral Element	Correct the invalid input/state indicated by the message and rerun.
SF-0107	Exception	Invalid eta near +1 for InfiniteLinear Quadrilateral Element	Correct the invalid input/state indicated by the message and rerun.
SF-0110	Exception	Insufficient coordinates for Infinite LinearTriangle Element	Correct the invalid input/state indicated by the message and rerun.
SF-0111	Exception	Insufficient coordinates for Infinite LinearTriangle Element	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
SF-0112	Exception	Insufficient coordinates for Infinite LinearTriangle Element	Correct the invalid input/state indicated by the message and rerun.
SF-0113	Exception	Shape function data not initialized for InfiniteLinearTriangle Element	Correct the invalid input/state indicated by the message and rerun.
SF-0114	Exception	Shape function data not initialized for InfiniteLinearTriangle Element	Correct the invalid input/state indicated by the message and rerun.
SF-0115	Exception	Shape function data not initialized for InfiniteLinearTriangle Element	Correct the invalid input/state indicated by the message and rerun.
SF-0116	Exception	(did you call compute() before transformDerivatives(?)	Correct the invalid input/state indicated by the message and rerun.
SF-0120	Exception	Insufficient coordinates for Infinite QuadraticTriangle Element	Correct the invalid input/state indicated by the message and rerun.
SF-0121	Exception	Insufficient coordinates for Infinite QuadraticTriangle Element	Correct the invalid input/state indicated by the message and rerun.
SF-0122	Exception	Invalid xi near 1 for Infinite QuadraticTriangle Element	Correct the invalid input/state indicated by the message and rerun.
SF-0123	Exception	Shape function data not initialized for InfiniteQuadraticTriangle Element	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
SF-0124	Exception	Shape function data not initialized for InfiniteQuadraticTriangle Element	Correct the invalid input/state indicated by the message and rerun.
SF-0125	Exception	Shape function data not initialized for InfiniteQuadraticTriangle Element	Correct the invalid input/state indicated by the message and rerun.
SF-0126	Exception	Shape function data not initialized for InfiniteQuadraticTriangle Element	Correct the invalid input/state indicated by the message and rerun.
SF-0130	Exception	Insufficient coordinates for Infinite QuadraticTetrahedron Element	Correct the invalid input/state indicated by the message and rerun.
SF-0131	Exception	Insufficient coordinates for Infinite QuadraticTetrahedron Element	Correct the invalid input/state indicated by the message and rerun.
SF-0132	Exception	Invalid xi near 1 for Infinite QuadraticTetrahedron Element	Correct the invalid input/state indicated by the message and rerun.
SF-0133	Exception	Shape function data not initialized for InfiniteQuadraticTetrahedron Element	Correct the invalid input/state indicated by the message and rerun.
SF-0134	Exception	Shape function data not initialized for InfiniteQuadraticTetrahedron Element	Correct the invalid input/state indicated by the message and rerun.
SF-0135	Exception	Shape function data not initialized for InfiniteQuadraticTetrahedron Element	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
SF-0136	Exception	Invalid xi near 1 for Infinite QuadraticTetrahedron Element	Correct the invalid input/state indicated by the message and rerun.

1.34 SSH Simulation step handling error codes (SSH-XXXX)

Code	Severity	Message (representative)	Resolution
SSH-0010	Exception	DOF index out of range in tie constraint (slave idx=	Correct the invalid input/state indicated by the message and rerun.
SSH-0011	Exception	DOF index out of range in tie constraint (slave idx=	Correct the invalid input/state indicated by the message and rerun.
SSH-0012	Exception	) has no assigned index - possible circular tie reference	Correct the invalid input/state indicated by the message and rerun.
SSH-0013	Exception	) has no assigned index - possible circular tie reference	Correct the invalid input/state indicated by the message and rerun.
SSH-0014	Exception	) has no assigned index - possible circular tie reference	Correct the invalid input/state indicated by the message and rerun.
SSH-0015	Exception	) has no assigned index - possible circular tie reference	Correct the invalid input/state indicated by the message and rerun.
SSH-0016	Exception	) - tie constraint configuration error	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
SSH-3001	Exception	Cannot reset displacements: mesh.totalDOFs is not initialized	Correct the invalid input/state indicated by the message and rerun.
SSH-3002	Exception	Cannot reset displacements: mesh.totalDOFs is not initialized	Correct the invalid input/state indicated by the message and rerun.
SSH-3003	Exception	Displacement vector size mismatch after reset	Correct the invalid input/state indicated by the message and rerun.
SSH-3004	Exception	Mesh dimension mismatch: current totalDOFs=	Correct the invalid input/state indicated by the message and rerun.
SSH-3005	Exception	Mesh dimension mismatch: current totalDOFs=	Correct the invalid input/state indicated by the message and rerun.
SSH-3101	Exception	CHECKPOINT: Removed existing GID mesh file for fresh restart output.	Correct the invalid input/state indicated by the message and rerun.
SSH-3102	Exception	CHECKPOINT: Removed existing GID results file for fresh restart output.	Correct the invalid input/state indicated by the message and rerun.
SSH-3103	Exception	CHECKPOINT: Removed existing GID results file for fresh restart output.	Correct the invalid input/state indicated by the message and rerun.
SSH-3104	Exception	Step execution failed at step	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
SSH-3105	Exception	Invalid number of steps for step	Correct the invalid input/state indicated by the message and rerun.
SSH-3106	Exception	Invalid number of steps for step	Correct the invalid input/state indicated by the message and rerun.
SSH-3107	Exception	Invalid numberSteps in step	Correct the invalid input/state indicated by the message and rerun.
SSH-3108	Exception	Invalid numberSteps in step	Correct the invalid input/state indicated by the message and rerun.
SSH-3109	Exception	Stress integration failure in fixed sub-step	Correct the invalid input/state indicated by the message and rerun.
SSH-3110	Exception	Stress integration failure in fixed sub-step	Correct the invalid input/state indicated by the message and rerun.
SSH-3111	Exception	Exceeded maximum number of sub-steps:	Correct the invalid input/state indicated by the message and rerun.
SSH-3112	Exception	Exceeded maximum number of retries:	Correct the invalid input/state indicated by the message and rerun.
SSH-3113	Exception	Final time correction step failed after multiple attempts	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
SSH-3114	Exception	Final time correction step failed after multiple attempts	Correct the invalid input/state indicated by the message and rerun.
SSH-3115	Exception	Conservative dt at/below minimum. deltaTMin=	Correct the invalid input/state indicated by the message and rerun.
SSH-3116	Exception	Sub-step increment at/below minimum threshold. dt=	Correct the invalid input/state indicated by the message and rerun.
SSH-3117	Exception	Cannot reset vectors: mesh.totalDOFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3118	Exception	Cannot compute contributions: mesh.totalDOFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3119	Exception	Cannot compute contributions: mesh.totalDOFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3120	Exception	Cannot compute contributions: mesh.totalDOFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3121	Exception	Acceleration vector size mismatch in Dynamic mode: totalDOFs=	Correct the invalid input/state indicated by the message and rerun.
SSH-3122	Exception	Velocity vector size mismatch: totalDOFs=	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
SSH-3123	Exception	Cannot compute norms: mesh.totalDOFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3124	Exception	Cannot compute norms: mesh.totalDOFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3125	Exception	Invalid maxIterations in solver config:	Correct the invalid input/state indicated by the message and rerun.
SSH-3126	Exception	Vector size mismatch: totalDOFs=	Correct the invalid input/state indicated by the message and rerun.
SSH-3127	Exception	Cannot calculate DUP: total RestrainedDOFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3128	Exception	Cannot calculate DUP: total RestrainedDOFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3129	Exception	Cannot calculate DUP: total RestrainedDOFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3130	Exception	Invalid time step: dt =	Correct the invalid input/state indicated by the message and rerun.
SSH-3135	Exception	Matrix and vector size mismatch: globalK.rows()=	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
SSH-3136	Exception	Non-finite entries detected in K. Columns involved:	Correct the invalid input/state indicated by the message and rerun.
SSH-3137	Exception	Non-finite entries detected in K. Columns involved:	Correct the invalid input/state indicated by the message and rerun.
SSH-3138	Exception	ILUT preconditioner factorization failed (retry)	Correct the invalid input/state indicated by the message and rerun.
SSH-3139	Exception	ILUT preconditioner factorization failed (retry)	Correct the invalid input/state indicated by the message and rerun.
SSH-3140	Exception	Iterative solver failed after multiple attempts	Correct the invalid input/state indicated by the message and rerun.
SSH-3141	Exception	Iterative solver failed after multiple attempts	Correct the invalid input/state indicated by the message and rerun.
SSH-3142	Exception	Cannot calculate increments: totalDOFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3143	Exception	Cannot calculate increments: totalDOFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3144	Exception	Cannot calculate increments: totalDOFs not initialized:	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
SSH-3145	Exception	Cannot calculate increments: totalDOFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3146	Exception	Invalid globalIndex for node DOF: index=	Correct the invalid input/state indicated by the message and rerun.
SSH-3147	Exception	Invalid globalIndex for node DOF: index=	Correct the invalid input/state indicated by the message and rerun.
SSH-3148	Exception	: Binary GiD output requested, but binary writer is not yet integrated.	Correct the invalid input/state indicated by the message and rerun.
SSH-3149	Exception	: Binary GiD output requested, but binary writer is not yet integrated.	Correct the invalid input/state indicated by the message and rerun.
SSH-3150	Exception	: Binary GiD output requested, but binary writer is not yet integrated.	Correct the invalid input/state indicated by the message and rerun.
SSH-3151	Exception	Cannot write GiD output: mesh has no elements	Correct the invalid input/state indicated by the message and rerun.
SSH-3152	Exception	: Binary GiD output requested, but binary writer is not yet integrated.	Correct the invalid input/state indicated by the message and rerun.
SSH-3153	Exception	: Binary GiD output requested, but binary writer is not yet integrated.	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
SSH-3154	Exception	: Binary GiD output requested, but binary writer is not yet integrated.	Correct the invalid input/state indicated by the message and rerun.
SSH-3155	Exception	: PostprocessTool is ParaView (VTK) but vtkOutputDirPath is empty; skipping VTK output.	Correct the invalid input/state indicated by the message and rerun.
SSH-3156	Exception	Cannot assemble matrices: totalDOFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3157	Exception	Cannot assemble matrices: totalDOFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3158	Exception	Cannot assemble matrices: totalDOFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3159	Exception	Cannot assemble matrices: totalDOFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3160	Exception	NaN detected in globalK at (	Correct the invalid input/state indicated by the message and rerun.
SSH-3161	Exception	NaN detected in globalC21 at (	Correct the invalid input/state indicated by the message and rerun.
SSH-3162	Exception	NaN detected in globalC21 at (	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
SSH-3163	Exception	Cannot process body forces: totalD-OFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3164	Exception	Cannot process body forces: totalD-OFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3165	Exception	Cannot process body forces: totalD-OFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3166	Exception	Non-finite load factor in body force: coef_current=	Correct the invalid input/state indicated by the message and rerun.
SSH-3167	Exception	Non-finite load factor in body force: coef_current=	Correct the invalid input/state indicated by the message and rerun.
SSH-3168	Exception	Non-finite load factor in body force: coef_current=	Correct the invalid input/state indicated by the message and rerun.
SSH-3169	Exception	Non-finite values detected in body force vector	Correct the invalid input/state indicated by the message and rerun.
SSH-3170	Exception	Non-finite values detected in final external force vector FEXT	Correct the invalid input/state indicated by the message and rerun.
SSH-3171	Exception	Non-finite values detected in final external force vector FEXT	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
SSH-3172	Exception	Non-finite load factor in stress boundary	Correct the invalid input/state indicated by the message and rerun.
SSH-3173	Exception	Non-finite load factor in stress boundary	Correct the invalid input/state indicated by the message and rerun.
SSH-3174	Exception	Non-finite load factor in stress boundary	Correct the invalid input/state indicated by the message and rerun.
SSH-3175	Exception	Cannot apply Updated Lagrangian: mesh has no elements	Correct the invalid input/state indicated by the message and rerun.
SSH-3176	Exception	Cannot apply Updated Lagrangian: mesh has no elements	Correct the invalid input/state indicated by the message and rerun.
SSH-3177	Exception	Cannot apply Updated Lagrangian: mesh has no elements	Correct the invalid input/state indicated by the message and rerun.
SSH-3178	Exception	Cannot apply Updated Lagrangian: mesh has no elements	Correct the invalid input/state indicated by the message and rerun.
SSH-3179	Exception	Invalid globalIndex for DeltaU:	Correct the invalid input/state indicated by the message and rerun.
SSH-3180	Exception	: PostprocessTool is ParaView (VTK) but vtkOutputDirPath is empty; skipping VTK output.	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
SSH-3181	Exception	: PostprocessTool is ParaView (VTK) but vtkOutputDirPath is empty; skipping VTK output.	Correct the invalid input/state indicated by the message and rerun.
SSH-3182	Exception	Cannot assemble matrices: totalDOFs not initialized:	Correct the invalid input/state indicated by the message and rerun.
SSH-3183	Exception	Cannot revert Updated Lagrangian: mesh has no nodes	Correct the invalid input/state indicated by the message and rerun.
SSH-3184	Exception	not found in mesh	Correct the invalid input/state indicated by the message and rerun.
SSH-3185	Exception	globalK not initialized	Correct the invalid input/state indicated by the message and rerun.
SSH-3186	Exception	Failed to assemble global matrix:	Correct the invalid input/state indicated by the message and rerun.
SSH-3187	Exception	Failed to assemble global matrix:	Correct the invalid input/state indicated by the message and rerun.
SSH-3190	Exception	TimeIntegration=Explicit is not supported for coupled/fully-coupled analyses (PW/PA present).	Correct the invalid input/state indicated by the message and rerun.
SSH-3193	Exception	Non-finite explicit pore-pressure rate; idx=	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
SSH-3194	Exception	TimeIntegration=IMEX is currently supported only for SimMode: Dynamic	Correct the invalid input/state indicated by the message and rerun.
SSH-3195	Exception	IMEX requires invertible displacement mass in explicit solve; mode=	Correct the invalid input/state indicated by the message and rerun.
SSH-3196	Exception	IMEX requires invertible displacement mass in explicit solve; mode=	Correct the invalid input/state indicated by the message and rerun.
SSH-3197	Exception	TimeIntegration=Explicit/IMEX does not support Contact Formulation=AugmentedLagrangian;	Correct the invalid input/state indicated by the message and rerun.
SSH-3198	Exception	TimeIntegration=Explicit is not supported for coupled/fully-coupled analyses (PW/PA present).	Correct the invalid input/state indicated by the message and rerun.
SSH-3200	Exception	CHECKPOINT: Successfully restored simulation state	Correct the invalid input/state indicated by the message and rerun.
SSH-3210	Exception	Exceeded maximum number of sub-steps:	Correct the invalid input/state indicated by the message and rerun.
SSH-3211	Exception	Exceeded maximum number of retries:	Correct the invalid input/state indicated by the message and rerun.
SSH-7010	Exception	Signed-distance assignment profile requires 3D elements and (x,y,z) coordinates.	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
SSH-7012	Exception	Abscissa/values cannot be empty	Correct the invalid input/state indicated by the message and rerun.
SSH-7014	Exception	Abscissa/values cannot be empty	Correct the invalid input/state indicated by the message and rerun.
SSH-7015	Exception	State variable index out of range	Correct the invalid input/state indicated by the message and rerun.
SSH-7016	Exception	Error setting custom variable '	Correct the invalid input/state indicated by the message and rerun.
SSH-7017	Exception	Error setting custom variable '	Correct the invalid input/state indicated by the message and rerun.
SSH-7018	Exception	Error setting custom variable '	Correct the invalid input/state indicated by the message and rerun.
SSH-7019	Exception	Error setting custom variable '	Correct the invalid input/state indicated by the message and rerun.
SSH-7020	Exception	Material type '	Correct the invalid input/state indicated by the message and rerun.
SSH-7021	Exception	SWRC properties required before EffectiveStress	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
SSH-7022	Exception	SWRC properties required before EffectiveStress	Correct the invalid input/state indicated by the message and rerun.
SSH-7023	Exception	SWRC properties required before EffectiveStress	Correct the invalid input/state indicated by the message and rerun.
SSH-7024	Exception	Effective stress properties not found for material '	Correct the invalid input/state indicated by the message and rerun.
SSH-7040	Exception	Empty materialId in % Step Materials for step	Provide @@MaterialId: for the step-material update.
SSH-7042	Exception	Unknown materialId " in % Step Materials for step	Define the material in % Materials and reference its ID exactly.
SSH-7044	Exception	Unknown element ID in % Step Materials for step	Fix the element IDs/ranges (or use @@Elements: All) and rerun.

1.35 ST Internal helper error codes (ST-XXXX)

Code	Severity	Message (representative)	Resolution
ST-0100	Exception	not found in mesh	Correct the invalid input/state indicated by the message and rerun.

1.36 UT General utilities error codes (UT-XXXX)

Code	Severity	Message (representative)	Resolution
UT-2001	Exception	Input matrix must be square for inversion	Correct the invalid input/state indicated by the message and rerun.
UT-2002	Exception	Input matrix must be square for inversion	Correct the invalid input/state indicated by the message and rerun.
UT-2003	Exception	Input matrix must be square for inversion	Correct the invalid input/state indicated by the message and rerun.
UT-2004	Exception	Incompatible matrix dimensions for multiplication	Correct the invalid input/state indicated by the message and rerun.
UT-2101	Exception	Incompatible matrix dimensions for multiplication	Correct the invalid input/state indicated by the message and rerun.
UT-2102	Exception	Incompatible matrix dimensions for multiplication	Correct the invalid input/state indicated by the message and rerun.
UT-2103	Exception	Incompatible matrix dimensions for multiplication	Correct the invalid input/state indicated by the message and rerun.
UT-2104	Exception	Incompatible matrix dimensions for multiplication	Correct the invalid input/state indicated by the message and rerun.
UT-2201	Exception	Data format error:	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
UT-2202	Exception	Data format error:	Correct the invalid input/state indicated by the message and rerun.
UT-2299	Exception	Data format error:	Correct the invalid input/state indicated by the message and rerun.
UT-2301	Exception	UMAT requires no variables. Initialization might not be necessary.	Correct the invalid input/state indicated by the message and rerun.
UT-2302	Exception	UMAT requires no variables. Initialization might not be necessary.	Correct the invalid input/state indicated by the message and rerun.
UT-2303	Exception	Cannot initialize UMAT due to missing required variable names for element ID	Correct the invalid input/state indicated by the message and rerun.
UT-2304	Exception	Cannot initialize UMAT due to missing required variable names for element ID	Correct the invalid input/state indicated by the message and rerun.
UT-2305	Exception	Cannot initialize UMAT due to missing required variable names for element ID	Correct the invalid input/state indicated by the message and rerun.
UT-2306	Exception	Cannot initialize UMAT due to missing properties for element ID	Correct the invalid input/state indicated by the message and rerun.
UT-2307	Exception	Cannot initialize UMAT due to missing properties for element ID	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
UT-2310	Exception	– missing	Correct the invalid input/state indicated by the message and rerun.
UT-2311	Exception	' does not exist in Gauss Point of element	Correct the invalid input/state indicated by the message and rerun.
UT-2312	Exception	Missing initializeCustomVariable for element	Correct the invalid input/state indicated by the message and rerun.
UT-2399	Exception	UMAT loading error for element ID	Correct the invalid input/state indicated by the message and rerun.
UT-2501	Exception	Error updating contact node coordinates:	Correct the invalid input/state indicated by the message and rerun.
UT-2601	Exception	did not converge within	Correct the invalid input/state indicated by the message and rerun.
UT-2602	Error	Failed to prepare Picard output directory:	Fix the underlying issue indicated by the message and rerun.
UT-2603	Error	Failed to prepare Picard output directory:	Fix the underlying issue indicated by the message and rerun.
UT-2701	Exception	' does not exist in Gauss Point of element	Correct the invalid input/state indicated by the message and rerun.

Code	Severity	Message (representative)	Resolution
UT-2999	Exception	—	Correct the invalid input/state indicated by the message and rerun.

