

ISO 10303-109:2004-12 (E)

Industrial automation systems and integration - Product data representation and exchange - Part 109: Integrated application resource: Kinematic and geometric constraints for assembly models

| Contents | | Page |
|-----------------|---|-------------|
| 1 | Scope | 1 |
| 2 | Normative references | 2 |
| 3 | Terms, definitions, and abbreviations | 3 |
| 3.8 | Abbreviations | 4 |
| 4 | Assembly feature relationship | 5 |
| 4.1 | Introduction | 5 |
| 4.2 | Fundamental concepts and assumptions | 6 |
| 4.3 | Assembly feature relationship type definitions | 7 |
| 4.3.1 | Representing relationship | 7 |
| 4.4 | Assembly feature relationship entity definitions | 7 |
| 4.4.1 | Shape aspect relationship representation association | 7 |
| 4.4.2 | Representative shape representation | 9 |
| 4.4.3 | Free kinematic motion representation | 10 |
| 4.4.4 | Constrained kinematic motion representation | 12 |
| 4.5 | Assembly feature relationship function definitions | 13 |
| 4.5.1 | Assembly root | 13 |
| 4.5.2 | Find assembly root | 14 |
| 4.5.3 | Find shape representation of product definition | 16 |
| 4.5.4 | Find shape representation of shape aspect | 17 |
| 4.5.5 | Find representative shape representation of product definition | 18 |
| 4.5.6 | Find representative shape representation of shape aspect | 18 |
| 4.5.7 | Unique in product definition | 19 |
| 4.5.8 | Unique in shape aspect | 20 |
| 4.5.9 | Using product definition of shape aspect | 21 |
| 4.5.10 | Using product definition of shape representation | 22 |
| 4.5.11 | Using shape aspect of shape representation | 23 |
| 4.5.12 | Using representations with mapping | 24 |
| 5 | Assembly constraint | 26 |
| 5.1 | Introduction | 26 |
| 5.2 | Fundamental concepts and assumptions | 27 |
| 5.3 | Assembly constraint entity definitions | 29 |
| 5.3.1 | Assembly geometric constraint | 29 |
| 5.3.2 | Binary assembly constraint | 29 |
| 5.3.3 | Fixed constituent assembly constraint | 31 |
| 5.3.4 | Parallel assembly constraint | 32 |
| 5.3.5 | Parallel assembly constraint with dimension | 33 |
| 5.3.6 | Surface distance assembly constraint with dimension | 33 |
| 5.3.7 | Angle assembly constraint with dimension | 34 |
| 5.3.8 | Perpendicular assembly constraint | 34 |
| 5.3.9 | Incidence assembly constraint | 35 |
| 5.3.10 | Coaxial assembly constraint | 35 |
| 5.3.11 | Tangent assembly constraint | 36 |
| 5.4 | Assembly constraint function definitions | 36 |
| 5.4.1 | Assembly leaf | 36 |

| | |
|--|-------------|
| Annex A (normative) Short names of entities | 38 |
| Annex B (normative) Information object registration | 39 |
| B.1 Document identification | 39 |
| B.2 Schema identification | 39 |
| B.2.1 Identification of the schema assembly_feature_relationship | 39 |
| B.2.2 Identification of the schema assembly_constraint | 39 |
| Annex C (informative) Computer-interpretable listings | 40 |
| Annex D (informative) EXPRESS-G diagrams | 41 |
| Annex E (informative) Informative figures | 44 |
| Index | 46 |
| Figures box) and other resource schemas | viii |
| Figure D.1 EXPRESS-G diagram of the assembly_feature_relationship_schema (1 of 1) | 42 |
| Figure D.2 EXPRESS-G diagram of the assembly_constraint_schema (1 of 1) | 43 |
| resource entities (overall structure) | 45 |
| Tables Table A.1 Short names of entities | 38 |