ISO 10303-112:2006-12 (E)

Industrial automation systems and integration - Product data representation and exchange - Part 112: Integrated application resource: Modelling commands for the exchange of procedurally represented 2D CAD models

Contents

Page

1 Scope 1

2 Normative references 1

3 Terms, definitions, and abbreviations 2
3.5 Other terms and definitions 3
3.6 Abbreviations 3

4 Procedural sketch 3
4.1 Introduction 3
4.2 Fundamental concepts and assumptions 4
4.2.1 Identification of selected entities 4
4.2.2 Representation of construction history 4
4.2.3 Representation of explicit constraints in a 2D sketch 5
4.3 Procedural sketch type definitions 5
4.3.1 polygon_circle_type 5
4.3.2 circle_or_circular_arc 5
4.3.3 line_or_trimmed_line 6
4.3.4 rotation_direction 6
4.3.5 ps_sketch_element_select 6
4.4 procedural_sketch entity definitions 7
4.4.1 sketch_command 7
4.4.2 sketch_create_curve_element 7
4.4.3 create_line_segment 7
4.4.4 create_line_segment_2_points 8
4.4.5 create_line_segment_point_tangent 8
4.4.6 create_line_segment_2_tangents 9
4.4.7 create_centreline 10
4.4.8 create_polyline 11
4.4.9 create_rectangle 11
4.4.10 create_polygon 12
4.4.11 create_circular_arc 13
4.4.12 create_circular_arc_concentric 13
4.4.13 create_circular_arc_3_tangents 14
4.4.14 create_circular_arc_centre_ends 16
4.4.15 create_circular_arc_start_centre_angle 17
4.4.16 create_circular_arc_start_centre_length 18
4.4.17 create_circular_arc_start_end_angle 19
4.4.18 create_circular_arc_start_end_direction 19
4.4.19 create_circular_arc_start_end_radius 20
4.4.20 create_circular_arc_3_points 20
4.4.21 create_circular_arc_angles 21
4.4.22 create_circle 22
4.4.23 create_circle_centre_point 23
4.4.24 create_circle_concentric 23
4.4.25 create_circle_3_tangents 24
4.4.26 create_circle_2_points 25
4.4.27 create_circle_3_points 26
4.4.28 create_ellipse 27

4.4.29 create_ellipse_3_points ... 27
4.4.30 create_ellipse_centre_point ... 28
4.4.31 create_spline ... 29
4.4.32 create_parabolic_arc ... 30
4.4.33 create_fillet ... 31
4.4.34 create_chamfer ... 32
4.4.35 create_divided_curve ... 34
4.4.36 sketch_operate_transform ... 35
4.4.37 sketch_transform_translate ... 36
4.4.38 sketch_transform_rotate ... 36
4.4.39 sketch_transform_mirror ... 37
4.4.40 sketch_transform_scale ... 38
4.4.41 sketch_create_pattern_element ... 39
4.4.42 create_pattern_rectangular ... 39
4.4.43 create_pattern_circular ... 40
4.5 procedural_sketch function definitions ... 42
4.5.1 distance_between_cartesian_points ... 42
4.5.2 non_collinear_2d_points ... 42
4.5.3 midpoint ... 43
4.5.4 distinct_points ... 43
4.5.5 circular_type ... 44
4.5.6 linear_type ... 44
4.5.7 centre_of_circle_or_circular_arc ... 45
4.5.8 have_pattern_elements_in_geometric_curve_set ... 45
4.5.9 three_distinct_points ... 45

Annex A (normative) Short names of entities ... 47

Annex B (normative) Information object registration ... 49

B.1 Document identification ... 49
B.2 Schema identification ... 49

Annex C (informative) Computer interpretable listings ... 50

Annex D (informative) EXPRESS-G diagrams ... 51

E.1 Example ... 68

Index ... 70

Figures resource schemas ... vii

Figure 2 -- create_line_segment_2_points ... 8

Figure 3 -- create_centreline ... 10

Figure 4 -- create_polyline ... 11

Figure 5 -- create_rectangle ... 12

Figure 6 -- create_circular_arc_concentric ... 14

Figure 7 -- create_circular_arc_3_tangents ... 16

Figure 8 -- create_circular_arc_centre_ends ... 17

Figure 9 -- create_circular_arc_start_centre_angle ... 18

Figure 10 -- create_circular_arc_3_points ... 21

Figure 11 -- create_circular_arc_angles ... 22

Figure 12 -- create_circle_centre_point 23
Figure 13 -- create_circle_concentric 24
Figure 14 -- create_circle_3_tangents 25
Figure 15 -- create_circle_3_points 27
Figure 16 -- create_ellipse_3_points 28
Figure 17 -- create_ellipse_centre_point 29
Figure 18 -- create_spline 30
Figure 19 -- create_parabolic_arc 31
Figure 20 -- create_fillet 32
Figure 21 -- create_chamfer 34
Figure 22 -- sketch_divided_curve 35
Figure 23 -- sketch_transform_translate 36
Figure 24 -- sketch_transform_rotate 37
Figure 25 -- sketch_transform_mirror 38
Figure 26 -- sketch_transform_scale 39
Figure 27 -- create_pattern_rectangular 40
Figure 28 -- create_pattern_circular 42
Figure D. 1 -- procedural_sketch_schema EXPRESS-G diagram 1 of 16 52
Figure D. 2 -- procedural_sketch_schema EXPRESS-G diagram 2 of 16 53
Figure D. 3 -- procedural_sketch_schema EXPRESS-G diagram 3 of 16 54
Figure D. 4 -- procedural_sketch_schema EXPRESS-G diagram 4 of 16 55
Figure D. 5 -- procedural_sketch_schema EXPRESS-G diagram 5 of 16 56
Figure D. 6 -- procedural_sketch_schema EXPRESS-G diagram 6 of 16 57
Figure D. 7 -- procedural_sketch_schema EXPRESS-G diagram 7 of 16 58
Figure D. 8 -- procedural_sketch_schema EXPRESS-G diagram 8 of 16 59
Figure D. 9 -- procedural_sketch_schema EXPRESS-G diagram 9 of 16 60
Figure D. 10 -- procedural_sketch_schema EXPRESS-G diagram 10 of 16 61
Figure D. 11 -- procedural_sketch_schema EXPRESS-G diagram 11 of 16 62
Figure D. 12 -- procedural_sketch_schema EXPRESS-G diagram 12 of 16 63
Figure D. 13 -- procedural_sketch_schema EXPRESS-G diagram 13 of 16 64
Figure D. 14 -- procedural_sketch_schema EXPRESS-G diagram 14 of 16 65

Figure D. 15 -- procedural_sketch_schema EXPRESS-G diagram 15 of 16 66

Figure D. 16 -- procedural_sketch_schema EXPRESS-G diagram 16 of 16 67

Figure E. 1 -- Example 68

Tables Table A. 1 -- Short names of entities 47