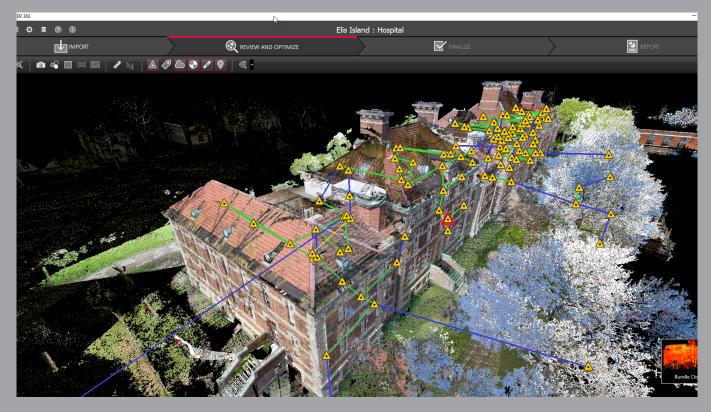
Leica Cyclone and Leica CloudWorx Tacketical Capacification

Technical Specifications



Valid as of August 2018







Key	
1	These types can be created using best-fit methods
2	As delivered in database, cannot modify
3	Enabled if licensed copy of CloudWorx is installed on the same machine
t	These types can use catalog tables.
4	No grip editing for size. Enabled with a Cyclone PUBLISHER Pro or Cyclone JetStream PUBLISHER license
5	Requires TruView Enterprise or Cloud license
6	Finished registrations are imported as a unified point cloud, unfinished registrations are imported as separate scan worlds into an unfinished registration.
7	Requires Cyclone JetStream PUBLISHER license
◊	Requires Cyclone PUBLISHER Pro or Cyclone JetStream PUBLISHER or Cyclone TruView PUBLISHER license
8	Not in Cyclone REGISTER 360
*	Requires Cyclone TruView PUBLISHER or Cyclone PUBLISHER Pro license
Х	Requires Cyclone JetStream PUBLISHER or Cyclone PUBLISHER Pro license
#	Requires Cyclone MODEL VR PUBLISHER license
+	Requires Cyclone PUBLISHER Pro license

	2100						
REGISTRATION, VISUALISATION,	BASIC	REGISTER 360	REGISTER	MODEL	SURVEY	IMPORTER	Free VIEWER
MODELLING & QUERY TOOLS							
3D navigation, Pan, Zoom, Rotate	•	•	•	•	•	•	♦/◊
3D mouse support			+	•	•		♦/◊
Panoramic view mode	•	•	•	•	•	•	♦/◊
Align to surface view mode		•					
Cloud Level of Detail for fast visualisation	•	•	•	•	•	•	♦/◊
Model Level of Detail for fast visualisation	•		•	•	•	•	♦/◊
Decimation of point clouds	•		•	•	•		
Selectable levels of point cloud density	•		•	•	•	•	♦/◊
Quickly show/hide point clouds	•	•	•	•	•	•	•
Point Cloud Color map viewing options		,					
Intensity mapping	•	•	•	•	•	♦ ²	♦/◊
Greyscale	•	+	•	•	•	♦ ²	♦/◊
Image Color mapping	•	•	•	•	•	→ ²	♦/◊
Infrared	•	•	•	•	•	↓ 2	♦/◊
	↓ 2	•	↓ 2	•	•	↓ 2	♦ 2
Elevation Based Color Mapping	V			*	V	V	▼-
Color clouds per setup		•					
Color clouds per bundle		•					.,
Gradient Background	•	•	+	•	•	•	♦/◊
Manually map external digital photo to point clouds	•		•	•	•		
(Texture cube map, not pano)							
Create Multi-image from cube-mapped images	•	•	•	•	•		
Multi-image blending	•	•	•	•	•	•	
Texture map colours onto point clouds	•	•	•	•	•	♦ ²	♦ ² /◊
Limit Box for efficient viewing and interaction	•		•	•	•		♦ ⁴ /◊
of selected regions	·			Ť	Ĭ ,		
Limit Box Manager to organise multiple limit boxes	•		•	•	•		♦ ² /◊
QuickSlice			•	•	•		
TruSlicer		•					
Slice along X,Y and Z axis		+					
Color clouds by setup		+					
Set Limit Box by fence	•		•	•	•		♦
Auto Bundle (grouping) of scans		•					
Visualise bundle's Link network		•					
View multiple setups and bundles in same view		•					
Global registration of multiple scans		•	•				
Geo-referencing		•	•				
Cloud-to-Cloud registration		•	•				
Auto Align Scans		-					
		•	•				
Smart Align for Auto Align		•	•				
Visual Alignment		•	•				
Automatic orientation for Visual Alignment			•				
Automated registration using HDS targets			•				
Optional prioritization of target-based registration over Cloud-		•					
to-Cloud registration							
Automated registration across sitemaps		•					
Automatic registration from RTC360 VIS data	•	•					
Editing Target labels/names	•	•	•				
View scanner locations	•	•	•	•	•	•	♦ ² /◊
Unify point clouds	•		•	•	•	•	
Basic conceptual design & 2D drawing tools				•	•		
Insertion of modelled objects/geometry				•			
Replication and editing of modelled objects				•	•		
Planar patch editing					,		
Make Square or Rectangular				•	•		
Create/Fill Hole				•	•		
User-defined quality-of-fit checks			•	•	•		
			•	-	▼		
Region growing						l	
Plane			•	•	•		
Cylinder			•	•	•		
Sphere			•	•			<u> </u>

Senooth surface to segment extraneous data Automated Pipe Run with ebbose Virtual Surveyor™ to assign survey teature codes to points Mesh Creation (basic, complex, TIN) Intelligent decimation Decimation based on user-specified grid spacing Polyline and breakline support Delete and add faces Fill in holes Converte contours from meshes Scan Cleaning, Single scan ceaning Support for double scan cleaning Cross-SitoMap deaning Support for double scan cleaning Surface Deviation Cut/fill contours Cut/fill contours Cut/fill contours Alignment/Station Manager Create Linus, at Station Create COGO Points, Breaklines & Cross Section Lines Create profiles, plans and sections Import LandAWL Alignment Import LandAWL Alignment Import LandAWL Alignment Create, Save, ® Load Station Templates Secondary Phan View Window Orthor Image Estraction User-defined Out parameters mapped to link and bundle errors Color-coded Optimized with graphics for color-bind users Station Notation display relative to an alignment Fit edge template for curve extraction (e.g., curbs, flowlines) Mesh Surface area Ax, AY, AZ distance Ax, AY, AZ distance Angel to Vertical Fit cylinders, statucural steel from catalogues Insect piping components from	REGISTRATION, VISUALISATION, MODELLING & QUERY TOOLS	BASIC	REGISTER 360	REGISTER	MODEL	SURVEY	IMPORTER	Free VIEWER
Mesh Creation [basic, complex, TIN] Intelligent decimation Decimation based on user-specified grid spacing Polyline and breakline support Delete and add faces Fill in holes Cenerate contours from meshes Cenerate contours from meshes Scan Cleaning Single scan cleaning Single scan cleaning Single scan cleaning Support for double scan cleaning Cross-SiteMap cleaning Support for double scan cleaning Cross-SiteMap cleaning Surface Deviation Cut/fill contours Table output on user-specified grid Points on user-specif	Smooth surface to segment extraneous data			•	•	•		
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Back angle Cut/fill volume Piping takeoff query Automated visual interference checking Fit cylinders, structural steel from catalogues Insert piping components from catalogues (reducer, elbow,	Angel to Horizontal	•		•	•	•		
Cut/fill volume Piping takeoff query Automated visual interference checking Fit cylinders, structural steel from catalogues Insert piping components from catalogues (reducer, elbow,	Angel to Vertical	•		•	•	•		
Piping takeoff query Automated visual interference checking Fit cylinders, structural steel from catalogues Insert piping components from catalogues (reducer, elbow,	Back angle	•		•	•	•		
Automated visual interference checking Fit cylinders, structural steel from catalogues Insert piping components from catalogues (reducer, elbow,	Cut/fill volume	•			•	•		
Fit cylinders, structural steel from catalogues Insert piping components from catalogues (reducer, elbow,	Piping takeoff query				•			
Insert piping components from catalogues (reducer, elbow,	Automated visual interference checking				•			
Insert piping components from catalogues (reducer, elbow,	it cylinders, structural steel from catalogues				•			
					•			
Piping Mode to add insulation thickness, Line ID, specification, Symbol Key (SKEY)					•			
Set object creation parameters		•		•	•	•		
Create and manage object annotation		•		•	•	•		
Output feature codes and annotated vertices, spheres, to ASCII	Output feature codes and annotated vertices, spheres, to ASCII	•			•	•		
Generate 2D drawings from 3D models ♦ ♦					•	•		
3D redlining ◆ ◆ ◆	-	•			•	•		
Scanner simulation	-	+		•	•	•		
Multiple coordinate system support ♦ ♦ ♦ ♦	Aultiple coordinate system support	+		•	•	•		
Assign colours & materials to objects		•		•	•	•		\Q
Create and manage layers		•		•	•	•		◊

REGISTRATION, VISUALISATION,	BASIC	REGISTER 360	REGISTER	MODEL	SURVEY	IMPORTER	Free VIEWER
MODELLING & QUERY TOOLS							
Save/restore viewpoints	•		•	•	•		♦
Save screen image as image file	•	•	•	•	•		♦
Object Grouping				•	•		
Geometry types that can be created:				,	,	,	
HDS flat targets	•		•				
HDS spherical targets!	•	•	•				
Black/White targets	•	•	•				
Patch (plane)!			•	•			
Extruded patch				•			
Box ^{!†}				•			
Corner!			•	•	•		
Steel shape!†(e.g. I-beam)			•	•			
Cylinder!†			•	•	•		
Sphere ^{!†}			•	•			
Vertex			*	•	•		
Line			•	•	•		
Elbow ^{!†} , Reducing Elbow [†]				•			
Cone ^{!†}				•			
Torus†				•			
Reducer (Eccentric, Concentric)†				•			
Flange (Blind, Weld-Neck)†				•			
Pipe Tee [†]				•			
Valve [†]				•			
Polyline, Polygon				•	•		
Rectangle, Square				•	•		
Arc, Circle				•	•		
Ellipse				•	•		
Cubic spline				•	•		
Point-of-view camera	•			•	•		♦
Point-of-view camera (Height)	•			•	•		♦
Pointed (Ballistic) cone				•	•		
Environmental lighting	•			•	•		♦
Create fly-throughs and output sequence of image files or .AVI (Audio Video Interleave) file				•	•		
Elevation check	•		•	•	•		
Pipe Modelling user interface				•			
Auto Black & White Target Extraction		•	•				
Ortho Image output	•		•	•	•		♦
Estimate normals		•	•	•	•	•	
Scripting				•			
Model Library				•			
Automatic Pipe Finder				•			
Create GeoTags		•		•	•		♦
Floor Flatness/Floor Levelness				•	•		
Customisable Registration Report		•					
				l	l	<u> </u>	1

TruSpace\Keyplan\Sitemap\Map	BASIC	REGISTER 360	REGISTER	MODEL	SURVEY	IMPORTER	Free VIEWER
Open\View KeyPlan	•		•	•	•		♦
Create SiteMap		•					
Create Map from OpenStreetMap's Slippy map (satellite or streetmap view)		•					
GPS locate Setups on satellite map		•					
Create Hyper links in SiteMaps		•					
Edit Hyperlinks in SiteMaps		•					
Create KeyPlan			•	•	•		♦
Edit KeyPlan			•	•	•		♦
Open TruSpace	•		*	•	•		
Extract targets in TruSpace			*	•	•		
Measurements in TruSpace	•		*	•	•		
View Multi-Image in TruSpace	•		•	•	•		

Change Colour Mapping (RGB, Intensity, Greyscale, Infrared)	•	•	•	•	•	•	◊
Temperature readout within infrared view	•	•	•	•	•		
Open ModelSpace view from TruSpace	•		•	•	•		
Publish TruView from KeyPlan	* *						
Sync view- TruSpace to ModelSpace	•		•	•	•		
Quick Limit box from TruSpace to ModelSpace	•		•	•	•		
Load Points within Fence	•		•	•	•		

DATA IMPORT	BASIC	REGISTER 360	REGISTER	MODEL	SURVEY	IMPORT	Free VIEWER
ASCII (XYZ, SVY, PTS, PTX, TXT, Customized format)	+	PTX only	•	•	•	•	•3
PTZ, PTG, PTB	*	PTG only	*	•	•	•	♦3
Cyclone Object Exchange (COE) format (from AutoCAD, MicroStation, via COE Data Transfer)	•		•	•	•	•	♦ 3
SCAN, SC2	•					•	♦ 3
ZFS, ZFC	+	•	•	•	•	•	♦ 3
BMP, TIFF, JPEG, PNG	+	•	•	•	•	•	♦ 3
Batch Import and Auto-Align Images (supports iSTAR, Nodal Ninja, Spheron)	•	•	•	•	•	•	♦
LandXML	•		•	•	•	•	♦ 3
SIMA	+		•	•	•	•	
Optech: ixf			*			•	
FARO: fls, fws, frp		•	•			•	
RIEGL: rsp, 3dd			•			•	
LAS	+		•	•	•	•	♦ 3
Cyclone REGISTER 360 archive file (RAF)		•					
Import Cyclone REGISTER 360 Project	♦ ⁶		•	♦ ⁶	♦ ⁶		
Import project data collected on ScanStation C10	•	•	•	•	•	•	♦ 3
Import project data collected on ScanStation P15/P16/P20/P30/ P40/P50	•	•	•	•	•	•	♦ 3
Import project data collected on Pegasus scanners	•		•	•	•	•	
Direct WiFi import of project data collected on BLK360	•	•	•	•	•	•	♦ 3
Import project data collected on RTC360 imaging scanner including Cyclone FIELD 360 links, assets and GeoTags	•	•	•	•	•	•	
E57	•	•	•	•	•	•	♦ 3
DotProduct: dp	•		•	•	•	•	♦ 3
HeXML	•		*	•	•	•	
Import *.blk data from BLK360 Data Manager	•	•	•	•	•	•	•
LGS (Leica Geosystems Universal project file)	+	•	•	•	•	•	

DATA EXPORT/PUBLISH	BASIC	REGISTER 360	REGISTER	MODEL	SURVEY	IMPORTER	Free VIEWER
AutoCAD DXF R12	•		+	•	•		
Cyclone Object Exchange (COE) format (to AutoCAD, MicroStation via COE Data Transfer)	•		•	•	•		
ASCII (XYZ, SVY, PTS, PTX, TXT, Customized format)	•	PTX/PTS	•	•	•		
PTX as separate Setups		•					
Binary Point Cloud (PTZ, PTB)	•		•				
PTG	•	•	•				
BMP, TIFF, JPEG, PNG	•		•	•	•		♦
Ortho Image, GeoTIFF, TWF (World File)	•		•	•	•		♦
SDNF 3.0 (Intergraph Steel Detailing Neutral File)				•			
PCF (Alias Piping Component File)				•			
Leica System 1200	•			•	•		
LandXML	•			•	•		
Cyclone II TOPO CWF & PCI	•		•	•	•		•
CloudWorx-VR ALP ³	•		•	•	•		
E57 unified	•	•	•	•	•		
E57 separate Setups	•	•	•	•	•	•	•
Cyclone REGISTER 360 archive file (RAF)		•					
LGS (Leica Geosystems Universal project file)	◆ ⁺						
TruView Local dataset	* *	* *	* *	* *	*	* *	* *
TVG	* *	*	* *				

JSV	φX	φX	ψX	φX	φX	φX	φX
CVR				+ #			
Publish to TruView Cloud	* *						
Publish to JetStream Enterprise	♦ X	×	×	•×	•×	φX	φX

OTHER GENERAL CYCLONE FEATURES

Metric or imperial units of measure

Decimal Degrees or Degrees, Minutes, Seconds angular units of measure 8

Bearing unit of measure for Azimuth of Resection ⁸

Simultaneous view of video image and scanned data image $^{\rm 8}$

Customisable, exchangeable user interface: hotkeys, toolbars 8

64-bit large number support

64-bit graphics support

Continuous auto-save

Undo/Redo 8

Client/server object database foundation 8

Multi-threading to take advantage of multiple processors

Hierarchical project layout

Flexible license support

Terminal Services support 8

Multi-user profile configuration management 8

Incremental, intelligent loading of 3D models 8

Parametric objects 8

Online help

Adjust Capture Settings of BLK360

Scan Density (High, Medium, Low)

Image Quality (HDR or LDR)

Image Exposure (EV-5 to +5)

Set capture button delay (up to 60 seconds) ⁸

Delete scans from BLK360

Check Battery level of BLK360

Check internal storage availability of BLK360

Check Serial Number of BLK360

Check Firmware Version of BLK360

Set time on BLK360 internal clock

Leica CloudWorx Technical Specifications

VISUALISATION, MODELLING & QUERY TOOLS	CW AutoCAD Basic	CW AutoCAD Pro	CW MicroStation	CW PDMS	CW Revit	CW Navisworks	CW 3DReshaper	CW BricsCAD	CW Ultimate
Large Point Cloud Support	•	•	•	•	•	•	•	•	•
Level of Detail (LOD) graphics	•	•	•	٠	•	•	•	•	•
Intensity mapping and True colour	•	•	•	•	•	•	•	•	•
Cutplane Manager (sections, slices)	•	•	•	•	•	•	•	•	•
Hide Regions Manager (fences)	+	•	•	•	+	•		•	•
Layers in Cyclone database	•	•	•	•	•		•	•	•
Tracing	•	•	•	•	•			•	•
Measure: 3D point coordinate	•	•	•	•	•	•		•	•
Measure Point-to-point	•	•	•	•	•	•		•	•
Measure Point-to-design entity	•	•	•	•	•	•		•	•
Limit box	•	•	•	•	•	•	•	•	•
Design Point Placement:									
Pipe Centre D-Point, D-Point at pick				•					,
Flange Tie-Point Location Tool:									
Place flange D-Point from point cloud				•	•				•
Interference Checking		٠	•	•	•	•		+	•
Flange Tie-Point Location Tool		•	•		•			•	•
Modelling (Least-Squares fitting)					•	,			
Pipes		•	•	•	•			•	•
Planer Patch		•	•		•			•	•
2D lines, Polylines arcs		•	•		•			•	•
Steel Fitter		•	•	•	•			•	•
Align cloud to model					•			•	•
Advanced clash management database system		•	•		•	•		•	•
QuickSlice		•						•	•
Auto-Fit Polyline from 1 Pick & 2 Pick		•						•	•
Open KeyPlan		•	•	•		•		•	•
Open TruSpace		•	•	•		•		•	•
Sync TruSpace viewer to Viewport or		•	•	•		,		·	·
Viewer in CAD system		•	•	•		•		•	•
Sync CAD Drawing tools to TruSpace		•	•					•	•
Quick Limit Box from TruSpace		•	•	•		•		•	•
TruSpace Layers (RGB, HDR, greyscale intensity, hue									·
intensity, IR w/ temperature data)	•	•	•		•	•	•	•	•
Points On A Grid		•	•					•	•
UCS Orientation Tools		•						•	•
SmartPicks (Highest, Lowest, and Ground)	•	•	•					•	•
Direct import of LGS file	•	•	•		•	•	•	•	•
Direct import of HeXML	•	•			•	+		•	•
Supports JetStream	•	•	•	•	•	•		•	•
Connect to Autodesk Recap Point Cloud (RCP)	•	•		-	•				•
JetStream Experience	•	•			•		•	•	•
Quickslice	•	•	•				_	•	•
Auto-Fit Polyline and Arcs		•	•					•	•
Floor Flatness/Floor Levelness		•	•					•	•
Orthoimage (GeoTIFF, PNG, JPEG)		•			•			•	•
		_			_			_	
Localized in the following languages: English, French, German, Italian, Spanish, Japanese, Chinese		•						•	On a per- product
(simplified and traditional), Russian, Korean		•							basis
Offers access to CloudWorx for AutoCAD, Revit,									•
MicroStation, PDMS, Navisworks									

Leica Geosystems - when it has to be right

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