

orbit[®]

Gauge Software 4.0



Solartron
Metrology

AMETEK[®]

Measurement Templates in OGS4.0

The image displays three screenshots of the Orbit Gauge Software 4.0 Measurement Calculation interface, illustrating various measurement templates.

Top Screenshot: Center Line Location

- Template:** Center Line Location
- Script:** $clLocOppProbes(P1,P2) = (P1 - P2)/2.0$
- Description:** Calculates the center point from two opposing values.
- Parameters:**
 - Parameter 1: Value one.
 - Parameter 2: Value one.
- Diagram:** A blue circle with two points, P1 and P2, on opposite sides of the center line.

Middle Screenshot: FlatnessOverDist

- Template:** FlatnessOverDist
- Script:** $FlatnessOverDist(P1,P2)$
- Description:** Calculates maximum flatness over the specified distance relative to a best fit plane created from the Z values of the points defining the plane. All points defining the plane are compared to each other to determine the worst case point to...
- Parameters:**
 - 1 XY_Plane
 - 2 D3/2/P-4.v
- Diagram:** A blue curved surface with several vertical arrows indicating measurement points.

Bottom Screenshot: Concentricity between (2) points

- Template:** Concentricity between (2) points
- Script:** $xyConcentricity(P1,P2,P3,P4,P5,P6) = (P6/P5) * \sqrt{(\sqrt{(P1-P3)^2 + (P2-P4)^2})}$
- Description:** Calculates the distance between two center points, each defined by separate X and Y measurements, that are at the top and bottom of a bore or cylindrical part.
- Parameters:**
 - 1 LT2-2_Scl.v
 - 2 D3/2/P-2.v
 - 3 D63/2/P-4.v
 - 4 D63/2/P-3.v
- Diagram:** A blue cylindrical part with two horizontal center lines, P1/P2 at the top and P3/P4 at the bottom, and vertical dimensions P5 and P6.

```
Result := _seqStatusStayInDuring;
addLogItem(_logAlertOnly, ...);
Sleep(5000); // allow menu interaction
end;
```

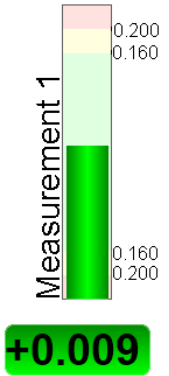
```
// Verify measurements gauged and no input
msg := EvtInpFaults (ErrNo);
if noStatusGauged (ErrNo) then
begin
```

Precision. Quality. Reliability

MEASUREMENT/SCALED FIELD/INPUT DEFINITION

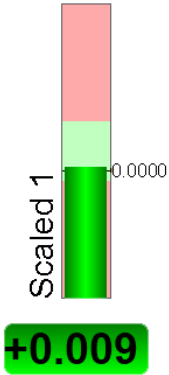
MEASUREMENT

Measurements define all items to be inspected on the part. Each measurement has several properties defining how its measured value should be interpreted including accept/reject limits. Orbit Gauge Software 4.0 DataCollect measurement will be created for each part print measurement that the gauge checks. Additional measurements may also be made that are used for calculation purpose only.



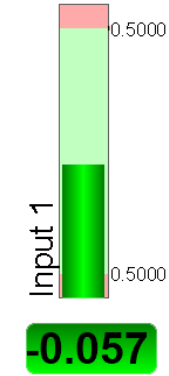
SCALED FIELD

Scaled fields are the result of mastering inputs. They provide scaled results from inputs that are then used to calculate measurement results. Orbit Gauge Software 4 DataCollect creates 32 inputs and 32 scaled fields in a new setup with a one-to-one correlation between them. That is scaled field #1 represents input #1, scaled field #2 represents input #2, and so on. Note that it is not required or guaranteed that a one-to-one correlation will exist between scaled fields and inputs

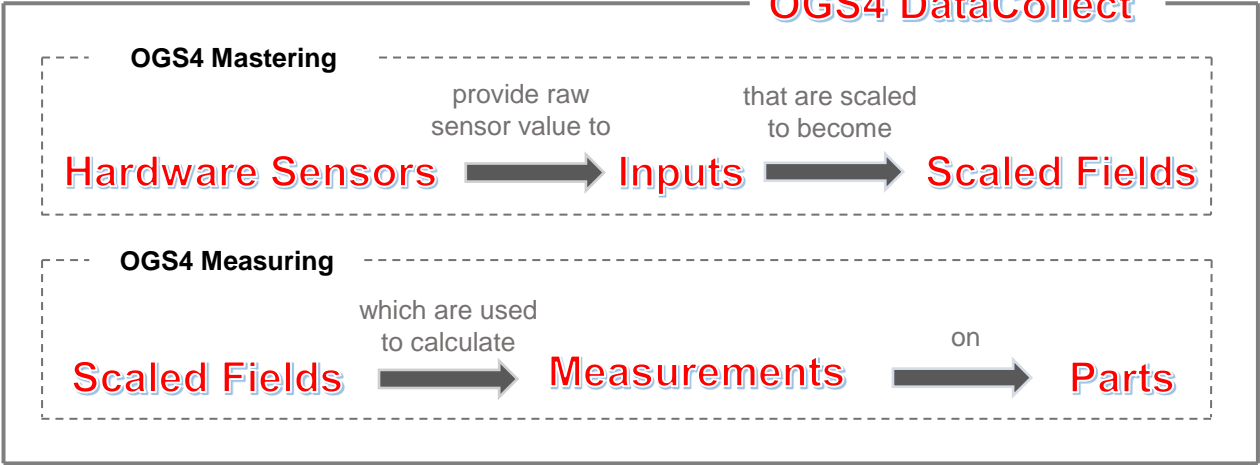


INPUT

Orbit Gauge Software 4 DataCollect inputs provide the interface between scaled fields and support hardware. Scaled fields use input raw values to generate known scaled values for measurement calculations. Inputs are generic and all have the same properties. They are sourced to incoming hardware input values. Hardware inputs originate outside of Orbit Gauge Software 4 DataCollect in specialized programs that handle the specifics of each hardware manufacturer and then pass the hardware values to Orbit Gauge 4 DataCollect for assignment to inputs.



OGS4 DataCollect



MEASUREMENT TEMPLATES

OGS4 functionality includes Measurement Calculation Templates which provide an easy way to define inspected part parameters without having to know all the math required for the measurement. All OGS4 packages use general math, form, profile, orientation, location measurement templates. Also, the software is designed to remember the most common frequently used templates to optimize user time spent to develop inspection sequence.

GENERAL TEMPLATES

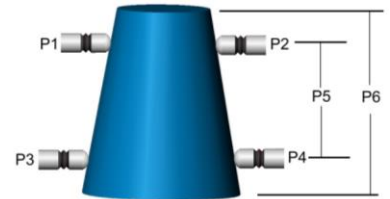
OGS4 General Measurement Templates created for basic math operations like addition, subtraction, multiplication, division, exponents, average, extreme and absolute values.

Rigorous attention focused on trigonometric and inverse trigonometric functions sine, cosine, tangent, cotangent, arcsine, arccosine, arctangent etc. Return values of operand can be in radians or in degrees.

$$\text{Avg}([a_1, \dots, a_n]) = \frac{1}{n} \sum_{i=1}^n a_i = \frac{a_1 + a_2 + \dots + a_n}{n}$$

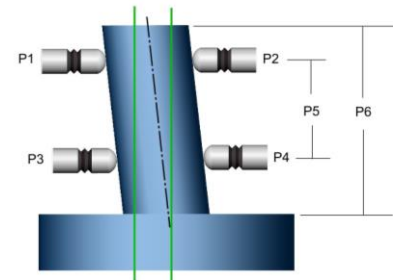
FORM AND PROFILE TEMPLATES

OGS4 Forms and Profile Templates are widely used in the most common applications. These templates are designed using the best practices in metrology. Each template has a full description of the selected template, it helps process engineers to fully define inspection part form or profile. The most common templates are best fit line or plane, roundness, taper etc. These templates are designed to simplify an applications required geometric form tolerance evaluation, straightness, flatness, circularity and cylindricity.



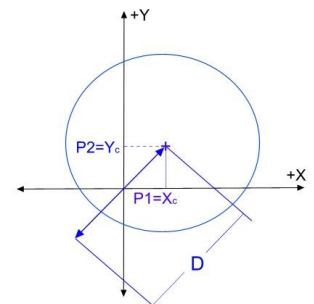
ORIENTATION TEMPLATES

OGS4 Orientation Templates are used to define axis perpendicularity, squareness, parallelism and angularity. For example, perpendicularity of a face to an axis established using inputs that are positioned along a bore or cylinder. These templates allow to calculate acute angle between two lines, line and a plane, between two planes of the inspected part. There is a Geometric Objects functionality built in the OGS4 which allows common geometric inspection objects to be created. This includes planes, lines and circles. Each object is created from a set of points which must be defined before the object can be defined. All points are cartesian (x,y,z) points in space.



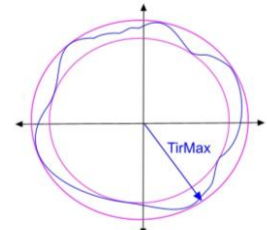
LOCATION TEMPLATES

OGS4 Location Templates designed to simplify the most common metrology challenges defining concentricity, true position and symmetry of the inspection part features. Templates in this section allow the user to define centre line location, circle true position, radius and diameter of the Best Fit Circle (BFC). Also, allows the user to evaluate part concentricity between two centre points, calculate point to point distance, point to line distance, point to plane distance etc.

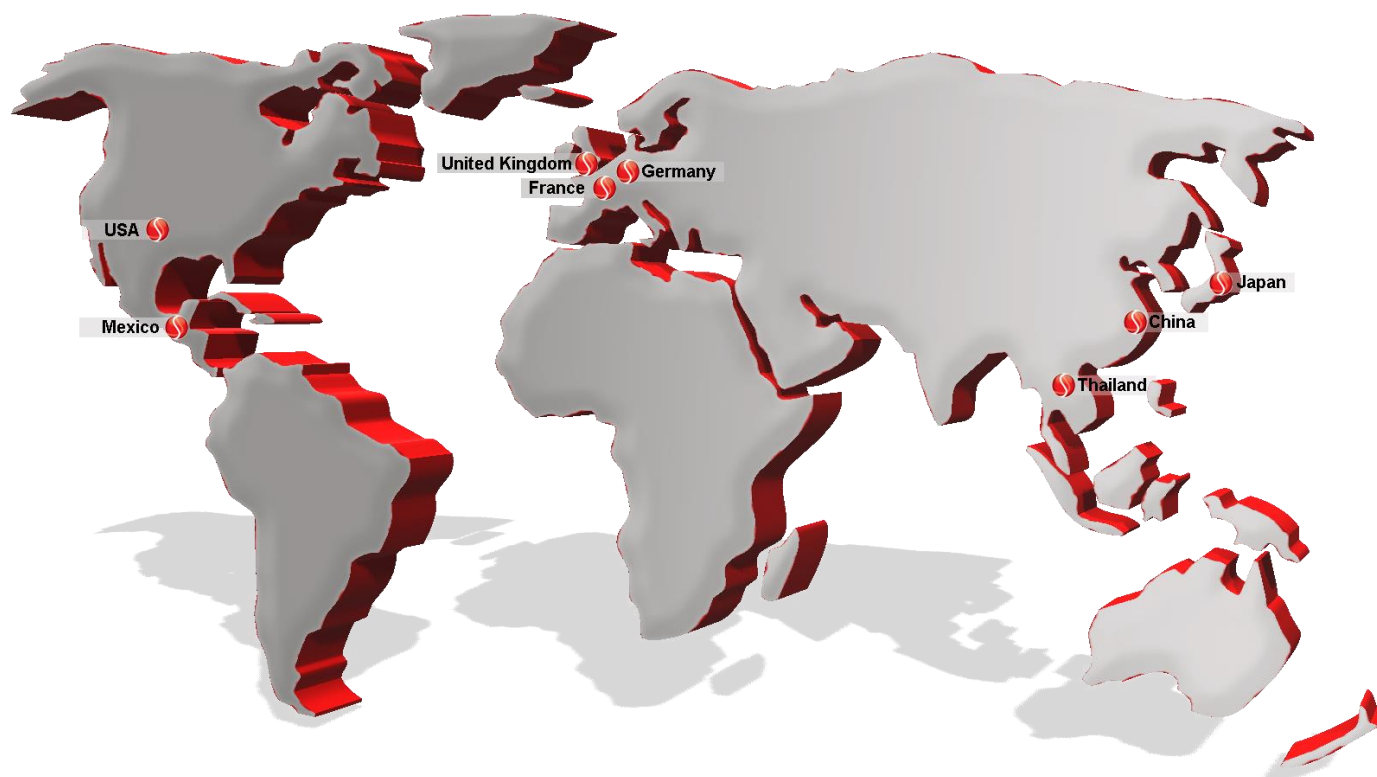


RUNOUT TEMPLATES

OGS4 Runout Templates designed to calculate Total Indication Reading (TIR) which returns extreme values seen during TIR measurement. Centre Line Runout calculates TIR of selected measurement to a dynamically established reference line.



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