

Gauge R&R Evaluation

Part Number: 20097832		Supplier: Hansin Precision Engines		OPERATOR		NAME		DATE				Number of Operators		3	
Part Name: ASSY LEFT_DOOR		Date: 21-May-2024		1		Yao Lixia		21-May-2024				Number of Trials		3	
Part Revision: B		Prepared By: Chu Libo		2		Qu Ruirong		21-May-2024							
				3		Bai Aocheng		21-May-2024							

SPECIFICATION:		50		+ TOL:		0.05		- TOL:		0.05		TOTAL TOLERANCE:		0.1		UNITS:		mm		INSPECTION METHOD:		SS	
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MEASUREMENT	OPERATOR 1						OPERATOR 2						OPERATOR 3															
	Trial 1	Trial 2	Trial 3	Min	Max	Range	Trial 1	Trial 2	Trial 3	Min	Max	Range	Trial 1	Trial 2	Trial 3	Min	Max	Range										
1	50.020	50.020	50.020	50.020	50.020	0.000	50.020	50.020	50.020	50.020	50.020	0.000	50.030	50.020	50.020	50.020	50.030	0.010										
2	50.020	50.020	50.030	50.020	50.030	0.010	50.020	50.020	50.020	50.020	50.020	0.000	50.020	50.020	50.020	50.020	50.020	0.000										
3	50.020	50.020	50.020	50.020	50.020	0.000	50.020	50.020	50.020	50.020	50.020	0.000	50.020	50.020	50.020	50.020	50.020	0.000										
4	50.050	50.050	50.050	50.050	50.050	0.000	50.050	50.040	50.050	50.040	50.050	0.010	50.050	50.050	50.050	50.050	50.050	0.000										
5	50.010	50.020	50.020	50.010	50.020	0.010	50.020	50.020	50.020	50.020	50.020	0.000	50.020	50.020	50.020	50.020	50.020	0.000										
6	50.020	50.020	50.010	50.010	50.020	0.010	50.020	50.020	50.020	50.020	50.020	0.000	50.020	50.020	50.020	50.020	50.020	0.000										
7	50.030	50.030	50.020	50.020	50.030	0.010	50.020	50.020	50.020	50.020	50.020	0.000	50.020	50.020	50.020	50.020	50.020	0.000										
8	50.020	50.030	50.030	50.020	50.030	0.010	50.030	50.030	50.030	50.030	50.030	0.000	50.030	50.030	50.030	50.030	50.030	0.000										
9	50.030	50.030	50.030	50.030	50.030	0.000	50.030	50.030	50.030	50.030	50.030	0.000	50.030	50.020	50.030	50.020	50.030	0.010										
10	50.020	50.020	50.010	50.010	50.020	0.010	50.020	50.020	50.020	50.020	50.020	0.000	50.020	50.020	50.020	50.020	50.020	0.000										
TOTALS	500.240	500.260	500.240			0.060	500.250	500.240	500.250			0.010	500.260	500.240	500.250			0.020										
X _{MIN} : 50.0247	Operator						R _A	0.006						R _B	0.001						R _C	0.002						
X _{MAX} : 50.0250	2						3	SUM	1500.740						SUM	1500.740						SUM	1500.750					
X _{diff} : 0.0003	(K2*Xdiff) ²						X _A	50.025						X _B	50.025						X _C	50.025						
	(EV) ² /nxt																											
	Diff																											
	-0.000001																											
	-0.000002																											

TEST FOR CONTROL

Upper Control Limit, UCLr = D4R D4: 2.570 x R: 0.003 = 0.008

If any individual range exceeds this limit, the measurement or reading should be reviewed, repeated, corrected, or discarded and new averages and ranges should be computed

MEASUREMENT SYSTEM ANALYSIS

STATISTICAL CONSTANT VALUE					
# Trials	2.00	3.00	# Oprs	2	3
K1	4.56	3.05	K2	3.65	2.70
D4	3.27	2.57	n = # of parts	m = # of trials	

QUALITY GOAL	
ACCEPTABLE: LESS THAN 10%	
CONDITIONALLY ACCEPTABLE: BETWEEN 10% to 30%	
NOT ACCEPTABLE: GREATER THAN 30%	

Repeatability - Equipment Variation (E.V)
E.V. = K₁R 3.050 x 0.003 = 0.009 % E.V. = 9.2

Reproducibility - Appraiser Variation (A.V)
A.V. = $\sqrt{\frac{[(X_{diff}) \times (K_2)]^2}{(n \times m)}} - \frac{[(E.V.)^2 / (n \times m)]}{2}$ 8.1E-07 - 2.79E-06 = 0 % A.V. = 0.0

Repeatability and Reproducibility (R & R)
R&R = $\sqrt{(E.V.)^2 + (A.V.)^2}$ 8.372E-05 + 0 = 0.00915 % R&R = 9.2

COMMENTS

RESULT: Acceptable
