

Gauge R&R Evaluation

Part Number: 20097833		Supplier: Hansin Precision Engine		OPERATOR		NAME		DATE				Number of Operators		3	
Part Name: ASSY RIGHT 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	50.010	50.020	50.010	50.020	0.010	50.020	50.020	50.020	50.020	50.020	0.000									
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	50.010	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									
4	50.030	50.020	50.030	50.020	50.030	0.010	50.020	50.030	50.030	50.020	50.030	0.010	50.030	50.030	50.030	50.030	50.030	0.000									
5	50.010	50.020	50.020	50.010	50.020	0.010	50.010	50.010	50.010	50.010	50.010	0.000	50.020	50.010	50.010	50.010	50.020	0.010									
6	50.010	50.030	50.010	50.010	50.030	0.020	50.010	50.010	50.020	50.010	50.020	0.010	50.010	50.020	50.010	50.010	50.020	0.010									
7	50.020	50.010	50.020	50.010	50.020	0.010	50.020	50.020	50.020	50.020	50.020	0.000	50.010	50.020	50.030	50.010	50.030	0.020									
8	50.010	50.010	50.010	50.010	50.010	0.000	50.010	50.010	50.010	50.010	50.010	0.000	50.020	50.010	50.010	50.010	50.020	0.010									
9	50.030	50.020	50.030	50.020	50.030	0.010	50.020	50.030	50.030	50.020	50.030	0.010	50.030	50.030	50.030	50.030	50.030	0.000									
10	50.010	50.010	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									
TOTALS	500.170	500.180	500.210			0.090	500.170	500.180	500.200			0.040	500.200	500.200	500.200			0.050									
X _{MIN} : 50.0183	Operator						R _A	0.009						R _B	0.004						R _C	0.005					
X _{MAX} : 50.0200	2						SUM	1500.560						SUM	1500.550						SUM	1500.600					
X _{diff} : 0.0017	(K2*Xdiff) ²						X _A	50.019						X _B	50.018						X _C	50.020					
	(EV) ² /nxt																										
	Diff																										

TEST FOR CONTROL

Upper Control Limit, UCLr = D4R D4: 2.570 x R: 0.006 = 0.015

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						QUALITY GOAL		
# Trials	2.00	3.00	# Oprs	2	3	ACCEPTABLE: LESS THAN 10%		
K1	4.56	3.05	K2	3.65	2.70	CONDITIONALLY ACCEPTABLE: BETWEEN 10% to 30%		
D4	3.27	2.57	n = # of parts	m = # of trials		NOT ACCEPTABLE: GREATER THAN 30%		

Repeatability - Equipment Variation (E.V)
E.V. = K₁R 3.050 x 0.006 = 0.018 % E.V. = 18.3

Reproducibility - Appraiser Variation (A.V)
A.V. = [(X_{diff}) x (K₂)]² - [(E.V.)²/(n x m)] 2.025E-05 - 1.12E-05 = 0.003014 % A.V. = 3.0

Repeatability and Reproducibility (R & R)
R&R = [(E.V.)² + (A.V.)²] 0.0003349 + 9.09E-06 = 0.018547 % R&R = 18.5

COMMENTS

RESULT: Conditionally Acceptable