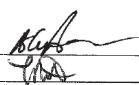
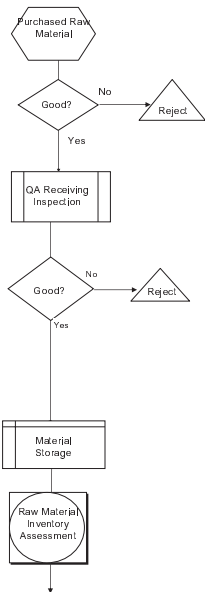
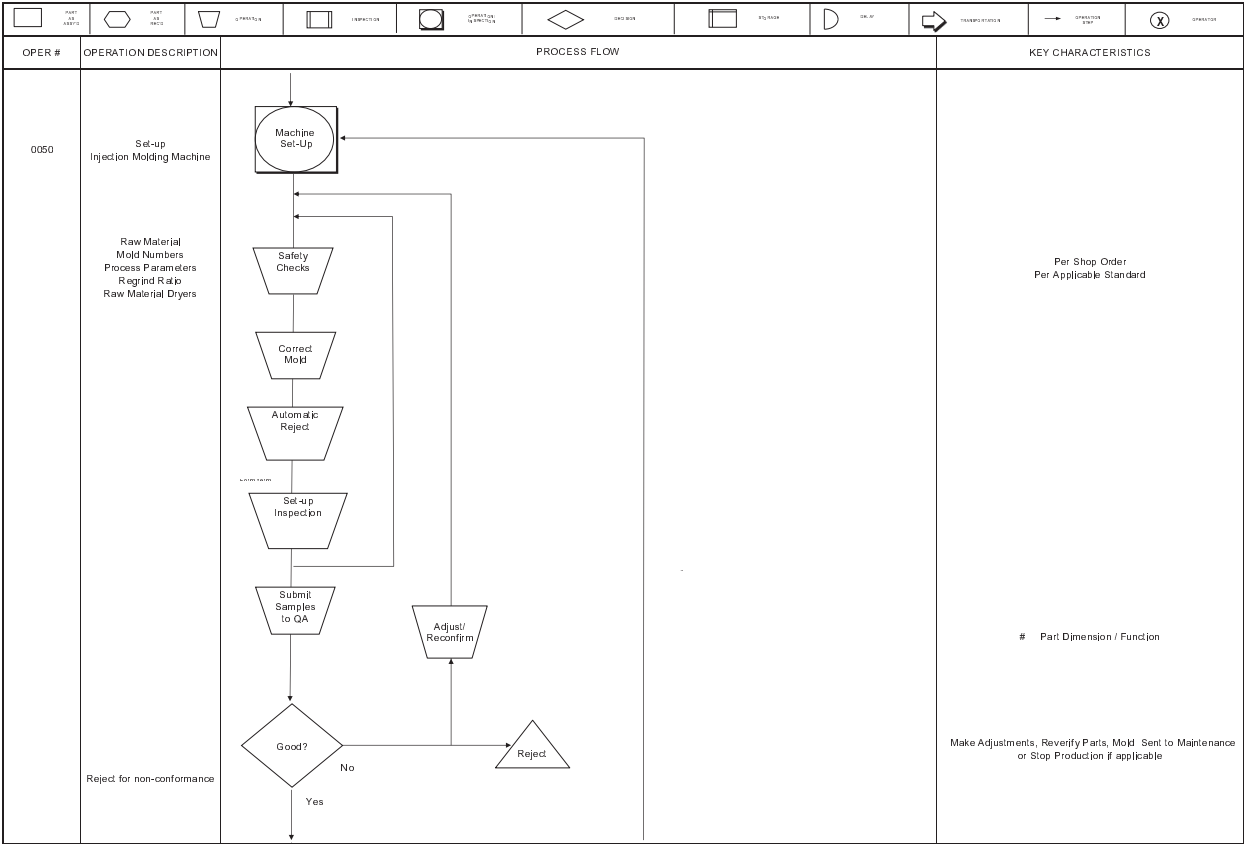


Sumitomo Electric Wiring Systems,INC.-Components Division

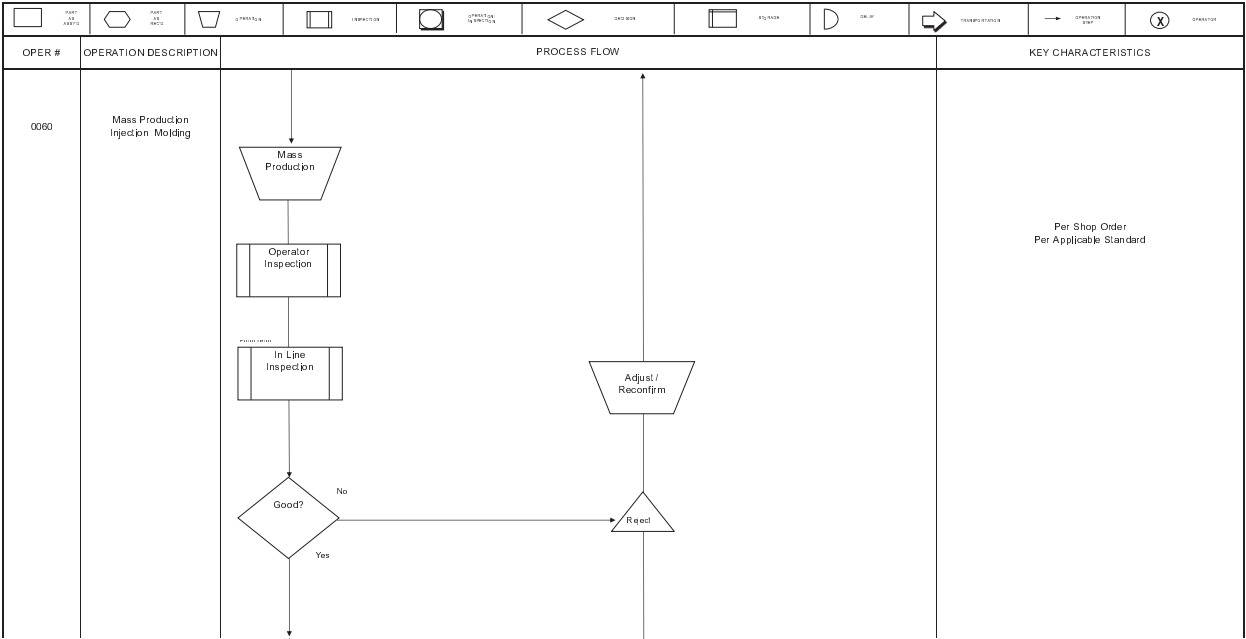
PROCESS FLOW DIAGRAM				
KEY CONTACT/DEPT. LOC. Debbie Gillenwater (-QA Dept.)				
PRODUCT : Molded Component Parts PROCESS: Injection Molding Group 1 Supplier/Loc. SEW S-Scottsville#5 Mfg. Sup: Alan Boman Prepared By: John Frazer	4/18/2018	Update Operation sequence #s. Remove Automatic bulk / Non bulk packaging and labeling operation (moved to FRK).	R. Gonzalez, L. Roth, P. Keith, A. Davidson	SUPPLIER APPROVALS: General Plant Manager  Quality Manager  Other Approvals _____ CUSTOMER APPROVALS: (IF REQUIRED) _____
	4/3/2014	Update process - Packing	L. Roth	
	3/30/2011	Update process - Packing	L. Roth	
	1/25/2008	Update process 101	J. Frazer	
	9/27/2005	Update Information	D. Karakent	
	8/25/2005	Update Information	J. Frazer, J. Sajons	
	1/25/2005	Update Information	J. Frazer, L. Roth, J. Renfrow, D. Gillenwater	
	4/7/2004	Update Information	D. Gillenwater, G. Smith, J. Renfrow	
	3/13/2001	Update Information	T. Gray, R. Ramsey, D. Lyons	
	2/06/2001	Update Information	T. Gray	
1/8/2000	ISSUED WITH FORMAT CHANGES	T. Gray		
004/1999	ISSUED WITH FORMAT CHANGES/UPDATED INFO	T. Gray, D. Lyons, T. Nal, K. Cantrell		
DATE CHANGE POINTS		CORE DEVELOPMENT TEAM		
ISSUE/REVISION HISTORY				
               				
OPER #	OPERATION DESCRIPTION	PROCESS FLOW	KEY CHARACTERISTICS	
010	Receive Raw Material		Visual Comparison Against Packing List Shipping-Receiving Notify Quality Assurance Red Tag Procedure & Return to Vendor	
0020	Quality Assurance Receiving Inspection Packaging, Identification, Visual Inspection, # Characteristics Reject for non-conformance		Per QA Inspection Instruction Sheet-Receiving Red Tag Procedure/Return to Vendor	
0030	Raw Material Storage Raw Material Inventory Assessment			

[illegible]

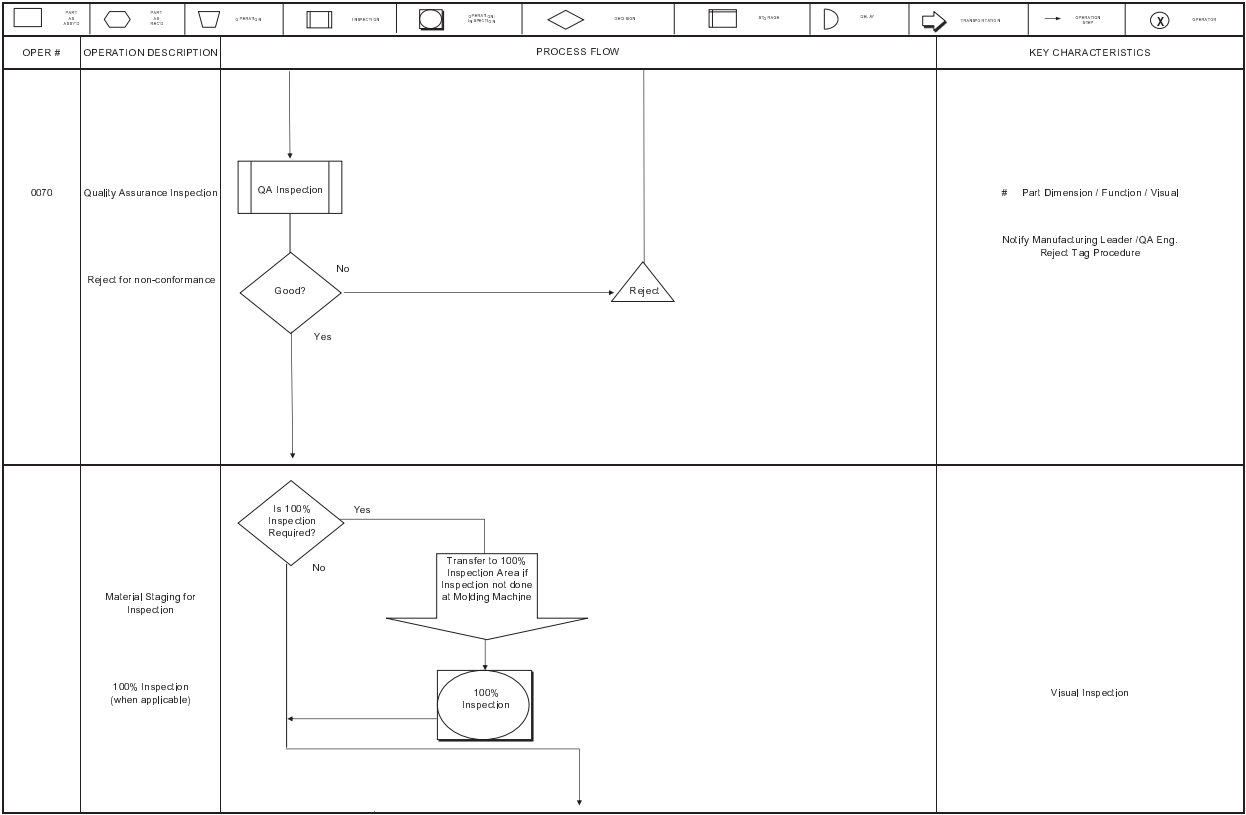
Sumitomo Electric Wiring Systems,INC.-Components Division



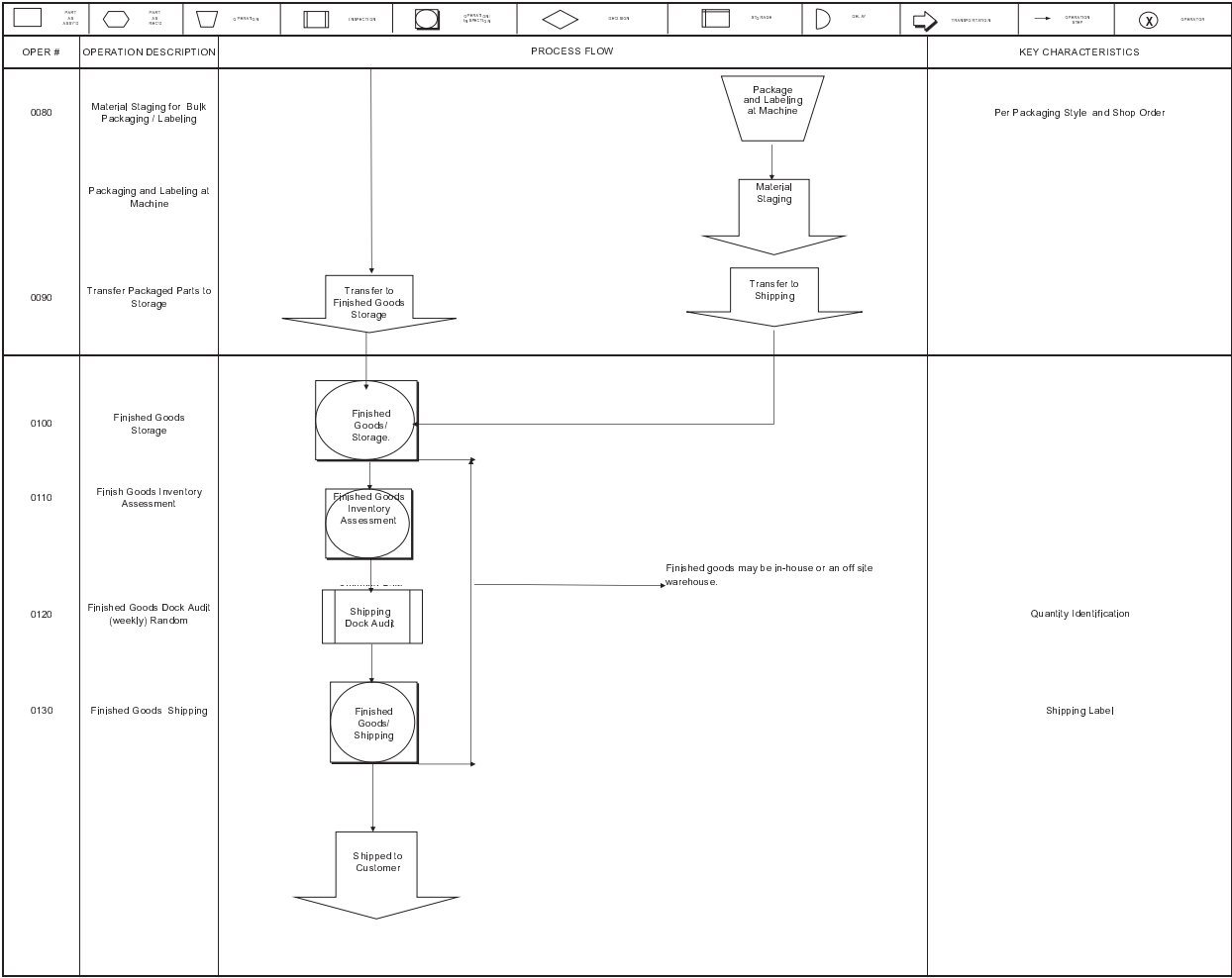
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Sumitomo Electric Wiring Systems,INC.-Components Division



☐ Prototype ☐ Pre-Launch ☒ Production

CONTROL PLAN

Control Plan Number <u>Connector Manufacturing Group (CMG)</u>			Key Contact/Phone <u>L. Roth /D. Gillenwater (270) 237-5419 x 8555 or 8563</u>			Date (Orig.) <u>8/9/2010</u>		Date (Rev.) <u>4/18/2018</u>				
Part Number/Latest Change Level <u>Various</u>			Core Team <u>L. Roth, P. Keith, A. Davidson, R. Gonzalez</u>			Customer Engineering Approval/Date (If Req'd.)						
Part Name/Description <u>Various, Connector Molding</u>			Supplier/Plant Approval/Date <u>L. Roth</u>			Customer Quality Approval/Date (If Req'd.)						
Supplier/Plant <u>Sumitomo Electric Wiring Systems</u>		Supplier Code <u>A. Bomar</u>	Other Approval/Date (If Req'd.) 			Other Approval/Date (If Req'd.)						
Revision History:			8/9/10 Reviewed process, minor changes in bold 9/21/10 Added Set-up Checklist at Setup 3/30/11 Modified Section 0090 8/11/11 Modified Section 0060, other minor changes in bold. 9/15/11 Added Annual Layouts, other updates in bold 3/6/12 Updated for Resin Concentrate Mix Process, Resin loading process 11/27/12 Updated special characteristics designations, Added Packing Scale Setup 4/3/14 Remove references to annealing process, color concentrate and 10T machine. 5/6/14 Review material loading section 0050, updated references to bag/gaylord/silo 5/29/14 Clarify 0020, Sample Size / Frequency 7/18/14 Match special characteristics with FMEA, update 0130. 12/3/14 Add QA Hold Procedure to section 0060 & 0080 1/11/16 Add Connector ID sheet in Control Method for item 090, Manual Packing / Labeling 4/18/18 Update Part/Process numbers sequence. Remove packaging process (moved to FRK)									
PART / PROCESS NUMBER	PROCESS NAME / OPERATION DESCRIPTION	MACHINE, DEVICE, JIG, TOOLS FOR MFG.	CHARACTERISTICS			SPECIAL CHAR. CLASS	METHODS				REACTION PLAN	
			NO.	PRODUCT	PROCESS		PRODUCT / PROCESS SPECIFICATION / TOLERANCE	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLE			CONTROL METHOD
								SIZE	FREQ.			
0010	Raw Material Receiving	N/A	10	Plastic Resin	Material Receiving		Correct color & type No Damage Dry Material Correct Part Number & all appropriate documentation	Visual Inspection & comparison to packing list	Per container	Each Receipt	* SRW- RECFLOW * Electronic Data Scan	Notify S&R Coordinator, Q. A.
0020	Quality Assurance Receiving Inspection		20	Plastic Resin	Receiving Inspection	IC IC	* Correct color & type * Correct Part Number * No Damage * No contamination * Material Certification * Melt Flow (As applicable per IISRP)	* Visual comparison to box/skid label * Visual check of packaging * Review of Material Cert. * MFR Test	Per QRW- RAINBOW SQA Sample Plan Each Lot	Each Incoming Shipment Each Lot	Q.A. Inspection Instruction Sheet, Material Certifications	* Notify SQA Coordinator, QA Leader or QA Manager. * Return to Supplier * Issue PIR to Supplier * Reject / Hold Procedure
0030	Material Storage (Resin & Raw Materials)	N/A	30	Correct Location	Material Storage		* Correct Location	* Electronic Label Scan	Each Container	Each Receipt	Electronic Label Scan	Notify Leader, Q.A., Coordinator as needed Reject / Hold Procedure
	Silo	N/A		Correct Location	Material Storage		* Correct Silo	Visual confirmation of Silo Label / BOL/PL	Each Receipt	Each Receipt	* Visual	Notify PC Manager
	Inventory Assessment Audit (Non-Silo material)			Material Condition, Location	Inventory Assessment Audit		No Damage, No missing labels, Proper storage condition, FIFO	Visual Inspection	Sample of raw material in warehouse	Weekly	Weekly Stock Assessment Sheet, SQA Inventory Audit	Notify: Shipping Receiving Leader, Supervisor & Q.A. If needed Reject / Hold Procedure

CMG Control Plan
Original: 8/9/10
Revision: 4/18/18

PART / PROCESS NUMBER	PROCESS NAME / OPERATION DESCRIPTION	MACHINE, DEVICE, JIG, TOOLS FOR MFG.	CHARACTERISTICS			SPECIAL CHAR. CLASS	METHODS					REACTION PLAN
			NO.	PRODUCT	PROCESS		PRODUCT / PROCESS SPECIFICATION / TOLERANCE	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLE		CONTROL METHOD	
									SIZE	FREQ.		
0040	Material Delivery to Manufacturing (Assign Gaylord / Bags)	Fork Truck	50	Correct Material	Assign Gaylord / bag to Hopper / Surge Bin	Correct Location / Loader (as applicable)	Compare raw material RPN # to RPN # on Loader (scan)	Each Container	Each material transfer	* Electronic scan, * Material Handling Log	Notify: Mfg. Coord., Supervisor & Q.A. if needed Reject / Hold Procedure	
	Material Delivery to Manufacturing: (Assign Silo lot to Surge Bin)	Silo		Correct Materials	Assign Silo to Hopper/ Surge Bin	Assign Material to Correct Location / Loader (as applicable)	Compare raw material RPN # to RPN # on surge bin (scan)	Each Receipt	Each Receipt	* Electronic scan	Notify: Mfg. Coord., Supervisor & Q.A. if needed Reject / Hold Procedure	
	Material Pre-drying (as applicable)	Off-line Loader / Pre-dryer		Dried Material	Pre-Drying (When applicable)	Drying Temperature set correctly.	Visual	Each unit	Monthly	PM Record	Notify Maintenance Manager	
		Central Dryer				Drying Temperature set correctly.	Visual	Each unit	Each Shift	* Checksheet * Alarm if power off	* Notify Maintenance * Line Side Dryer as alternate method	
	Loading Material (To transport barrel/buggy)	Material Barrel / Buggy		Correct Material	Raw Material Loading to Barrel / Buggy	(Barrel/Buggy): Per Shop Order Match Raw Material RPN number to appropriate barrel / buggy. (Central Feed): Per Shop Order, match raw material RPN number to dummy Barrel Label.	* Verify per shop order. * Per applicable Work Instruction	Each container	Material Change / Each material transfer	* Electronic scan, * Material Handling Log	Notify: Mfg. Coord., Supervisor & Q.A. if needed Reject / Hold Procedure	
	Move Material to Molding Machine			Correct Material	Transfer Raw Material to Molding Machine	Correct Material Part Number/Type per scan	Scan Shop Order against material tag per applicable work instruction.	Each container	Each Mold Set-up / Material transfer	* Electronic Scan, * P- Chart	Notify Leader / Coordinator	
	Machine Side Drying (where applicable)	Machine Resin Dryers		Dry Material	Drying (When applicable)	Set temperature per condition sheet.	Visual	Once	Each Mold Set-up / Each Shift	* Controller Condition Check sheet * P - Chart	Adjust Dryer, dry material and requalify.	
Dewpoint meter							Each unit	Monthly	Monthly PM			

PART / PROCESS NUMBER	PROCESS NAME / OPERATION DESCRIPTION	MACHINE, DEVICE, JIG, TOOLS FOR MFG.	CHARACTERISTICS			SPECIAL CHAR. CLASS	METHODS					REACTION PLAN
			NO.	PRODUCT	PROCESS		PRODUCT / PROCESS SPECIFICATION / TOLERANCE	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLE		CONTROL METHOD	
									SIZE	FREQ.		
0050	Set-Up Injection Molding Machine	Molding Machine	60		Set Machine Parameters		Process Parameters	Per Mold # Condition	Each Mold Set-up	Each Mold Set-up	Controller Check Sheet, Set-Up Operator Check Sheet	Notify Leader / Coordinator
	Safety Checks			Safety Checks		Complete Safety Checks	Per Mold # Condition	Each Mold Set-up	Each Mold Set-up	Setup Operator Checksheet	Notify Leader / Coordinator	
	Correct Mold	Mold		Correct Mold		Per Shop Order	Visual per Shop Order	Each Mold Set-up	Each Mold Set-up	Setup Operator Checksheet	Notify Leader / Coordinator	
	Add Regrind Material to Virgin Material	Regrind Material (when applicable)		Add Regrind Material to Virgin Material		Set Mix Ratio per Mold # Condition Sheet.	Per Mold # Condition	Each Mold Start-up	Each Mold Start-up	Operator Daily Checksheet	Notify Leader / Coordinator	
	Automatic Machine Reject	Machine		Automatic Machine Reject		First 8 Shots for Molding Machines	Per Restart Verification Procedure Work Instruction & Machine Automatic Count Setting	Each Mold Start-up	Each Mold Start-up	Controller Check Sheet	Notify Leader / Coordinator	
	Set-up Validation			Set-up Inspection		No Weld Line, Short Shot, Broken Mold Pin Damage, Excessive flash	Per Critical Check Sheet / Applicable Work Instruction	10 Shots	Each Mold Start-up	Process Sheet	Notify Leader / Coordinator	
	Engineering Validation			Validation of injection function process		Engineering validation of any change to machine injection function (barrel/screw/ nozzle type / etc)	Per QAW - ROBUSTTEST	20 shots	Each change	QAF-RobustTest	Notify QA Leader, Coordinator / Above	
	Start Up Samples		Collect QA Start-up Samples		One shot	Per GA-003	One shot	Each Mold Start-up	GA-003, QA Inspection Data Sheet.	Notify Leader / Coordinator		
	Quality Assurance Inspection Fit & Function, Visual, Dimensional	Magnifier Light, Profile Projector, Caliper, Micrometer, Force Gage, Mating Parts, Various jigs as required	60	Connect or Visual, Fit & Function	Quality Assurance Inspection	C (IC, SWS, IM)	Per Q.A. Inspection Instruction Sheet	Per Q.A. Inspection Instruction Sheet	One Shot	SOP checks Per QAW - GA003	Q.A. Inspection Instruction Sheet, Data Sheets and/or Electronic Data Entry	Notify Leader, Coordinator / Above Manufacturing Coordinator
						C, C# (IC, SWS)	Per Q.A. Inspection Instruction Sheet	Per Q.A. Inspection Instruction Sheet	One Shot	SOP checksPer QAW - GA003		Reject Tag Procedure QA Hold Procedure TWI Procedure Backtrack/Recall Procedure Change/Defect Control Validation (RB) * Manual Data sheets is alternate method
0060	Mass Production Inj. Molding	Mold, Machine	70	Molded Parts	Mass Production Inj. Molding		Per Mold Condition Sheet	Visual	Each Lot	Each lot	Process Sheet	Notify Leader / Coordinator
	Operator Inspection			Molded Parts	Operator Inspection		Per Critical Position Checksheet	Visual	1 shot per lot	Each lot	Process Sheet	Notify Leader / Coordinator / Q.A. Leader / Above
	Inline Inspection			Molded Parts	100% Roving Inspection		No Short Shot, Weld Line, Flash, Damage, Broken pin or other defects	Visual per Critical Position Checksheet and / or applicable Work Instruction	1 shot per machine	Roving Floor Patrol	Process Sheet	Notify Coordinator / Leader, QA Leader. Follow Reject Tag Procedure

PART / PROCESS NUMBER	PROCESS NAME / OPERATION DESCRIPTION	MACHINE, DEVICE, JIG, TOOLS FOR MFG.	CHARACTERISTICS			SPECIAL CHAR. CLASS	METHODS					REACTION PLAN
			NO.	PRODUCT	PROCESS		PRODUCT / PROCESS SPECIFICATION / TOLERANCE	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLE		CONTROL METHOD	
									SIZE	FREQ.		
0070	Quality Assurance Inspection Fit & Function, Visual, Dimensional	Magnifier Light, Profile Projector, Calliper, Micrometer, Force Gage, Mating Parts, Various jigs as required	80	Connector Visual, Fit & Function	Quality Assurance Inspection	C (IC, SWS, IM)	Per Q.A. Inspection Instruction Sheet	Per Q.A. Inspection Instruction Sheet	One Shot	Per QAW - GA003	Q.A. Inspection Instruction Sheet, Data Sheets and/or Electronic Data Entry	Notify QA Leader, Coordinator / Above Manufacturing Coordinator
				Dimensional		C, C# (IC, SWS)	Per Q.A. Inspection Instruction Sheet	Per Q.A. Inspection Instruction Sheet	One Shot	Per QAW - GA003		-Reject Tag Procedure -QA Hold Procedure -TWI Procedure -Backtrack / Recall Procedure
	Material Staging for 100% Inspection (Where Applicable)	Cart		Molded Parts	Material Staging for 100% Inspection		Correct Location	Visual	Each Container	As needed / required	Electronic Scanning System	Notify Q.A. Leader, Coordinator / Above Manufacturing Coordinator Reject Tag Procedure
	100% Internal Inspection (When Applicable)	Under Light		Molded Parts	100% Inspection		No Short Shot No Excessive Flash No defects	Visual, Per Critical Position Checksheet / Applicable work instruction	Each piece per Lot	As needed / required	CPC / Daily Inspection Log	Notify Q.A. Leader, Coordinator / Above Manufacturing Coordinator Reject Tag Procedure QA Hold Procedure
0080	Material Staging (Parts not going to Packing Process	Cart		Molded Parts	Material Staging for Non-Bulk Packing / Labeling		Correct staging location	Visual per Location	Each Container	As Needed	Electronic Scanning System	Notify Q.A. Leader, Coordinator / Above Manufacturing Coordinator Reject Tag Procedure
0090	Transfer packaged parts to storage	Fork Truck / Cart	110	Molded Finished Product	Transfer packaged parts to storage		Correct Location	Electronic Scanning System	Each container	As needed	Electronic Scanning System	Notify Q.A. Leader, Coordinator / Above Shipping Supervisor Reject Tag Procedure
0100	Finished Goods Storage.	Material Racks		Molded Finished Product	Finished Goods Storage		Correct Location	Electronic Scanning System	Each container	As needed	Electronic Scanning System	Notify Q.A. Leader, Coordinator / Above Shipping Supervisor Reject Tag Procedure
0110	Finished Goods Inventory Assessment		130	Correct Inventory Quantities	Inventory		Correct Quantities	Inventory Assessment	As needed	As needed	Electronic Scanning System, Inventory	Notify PC Management
				Correct Packing	Product Audit (QA)		Confirm Packing, Damage	Visual Evaluation	Sample of FG Inventory	Weekly	SQA Inventory Audit SV6	Notify Leader, Coordinator / Above Reject Tag Procedure QA Hold Procedure
0120	Shipping Product Audit (S/R)		140	Finished Product Audit	Product Audit		No box damage, Skid correctly stacked Labels attached, Correct Label content	Visual Evaluation	Sample of FG Inventory	Weekly	Warehouse Stock Assessment Checklist	Notify Leader, Coordinator / Above Shipping Supervisor Reject Tag Procedure
0130	Shipping Finished Goods	Fork truck	150	All Finished Goods	Shipping Finished Goods		Correct Quantity / Labels, Skid correctly stacked, Correct P.O. number, Correct Carrier	Electronic Scanning System, Visual	Each container	As needed	Electronic Scanning System	Notify Leader, Coordinator / Above Shipping Supervisor Reject Tag Procedure

PART / PROCESS NUMBER	PROCESS NAME / OPERATION DESCRIPTION	MACHINE, DEVICE, JIG, TOOLS FOR MFG.	CHARACTERISTICS			SPECIAL CHAR. CLASS	METHODS					REACTION PLAN
			NO.	PRODUCT	PROCESS		PRODUCT / PROCESS SPECIFICATION / TOLERANCE	EVALUATION / MEASUREMENT TECHNIQUE	SAMPLE		CONTROL METHOD	
									SIZE	FREQ.		
	Annual Layouts			Per Customer Drawing			Per Customer Drawing	Per Customer Requirements	Per Customer Request	Per Customer Request	Customer PPAP	Notify QA Engineer/QA Manager

Sumitomo Electric Wiring Systems, Inc

Gage R&R Study

04/03/2019

Page 1 of 2

Study Date: 1/8/2019 12:00:00 AM

Company Part No.: Mold 268

Gage ID: 05476117

Part No.:

Gage Desc: 0 - 150 Caliper

Part Desc: HW09-RET-06F

Appraisers: 3

Trials: 3

Parts: 10

Characteristic: Length

Study Type:

Specification Limits: Min 19.7

Max 20.1

MSA Version: 4

☒ Approved

Pp (or Ppk) Target

6-Sigma Proc Variation

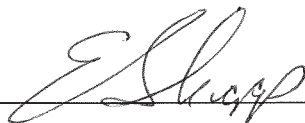
Appr A: T. Holland			Appr B: E Skaggs			Appr C: M Haddix		
1	20.1	20.09	20.09	20.09	20.1	20.09	20.09	20.09
2	20.03	20.02	20.02	20.02	20	20.03	20.03	20.03
3	19.68	19.67	19.67	19.67	19.68	19.68	19.68	19.67
4	20.08	20.07	20.07	20.07	20.07	20.08	20.07	20.07
5	19.81	19.81	19.8	19.8	19.81	19.81	19.8	19.8
6	20.04	20.03	20.03	20.03	20.04	20.05	20.05	20.04
7	20.09	20.09	20.09	20.09	20.1	20.08	20.09	20.1
8	19.64	19.64	19.65	19.63	19.63	19.64	19.63	19.64
9	20.08	20.08	20.08	20.07	20.08	20.07	20.08	20.08
10	19.67	19.67	19.68	19.68	19.68	19.68	19.67	19.68

	Std. Dev.	% Contribution	% TV	% Tol		
Repeatability (EV):	0.005317	0.1%	3.7%	8.0%	R bar:	0.009000
Reproducibility (AV):	0.001448	0.0%	1.0%	2.2%	UCL-R:	0.023220
Appraiser x Part (INT):					Study Variation:	0.143074
GRR:	0.005511	0.1%	3.9%	8.3%	Total Variation (TV):	0.143074
Part-to-Part (PV):	0.142968	99.9%	99.9%	99.7%	Tolerance/6 (Tol):	0.066667
number of distinct categories:			36.6	17.0		

* Limit of individual R's (range values). An (*) is used to identify those sets of measurements that have a Range value that exceeds the UCL-R limit value. Correct by repeating those readings using the same appraiser and part or discard the values and recalculate the study results and the value UCL-R.

Comments:

Approved By:



Date:

4/3/19

GRR Analysis Sheet

Study Date: 1/8/2019 12:00:00 AM Gage ID: 05476117 Gage Desc: 0 - 150 Caliper Appraisers: 3 Trials: 3 Study Type: Long-AIAG 4		Company Part No.: Mold 268 Part No.: Part Desc: HW09-RET-06F Characteristic: Length Specification Limits: 19.7 20.1																					
R bar A = 0.008000 X bar A = 19.919000 R bar B = 0.010000 X bar B = 19.916667 R bar C = 0.009000 X bar C = 19.920000 R bar = 0.0090000 X bar Diff = 0.003333		6 Sigma Process Variation: Pp (or Ppk) Target: Rp = 0.454443 Tol/6 = 0.066667																					
Measurement Unit Analysis		% Total Variation (TV)	% Tolerance																				
Repeatability - Equipment Variation (EV) EV = R bar x K1 = 0.005317 <table border="1" style="float: right; margin-top: 10px;"> <tr><td>Trials</td><td>K1</td></tr> <tr><td>2</td><td>0.8862</td></tr> <tr><td>3</td><td>0.5908</td></tr> </table>		Trials	K1	2	0.8862	3	0.5908	% EV = 100 [EV / TV] = 3.7%	% EV = 100 [EV / (Tol / 6)] = 8.0%														
Trials	K1																						
2	0.8862																						
3	0.5908																						
Reproducibility - Appraiser Variation (AV) $AV = \sqrt{[(X \text{ bar Diff} \times K2)^2 - (EV^2 / n \times r)]}$ = 0.001448 <table border="1" style="float: right; margin-top: 10px;"> <tr><td>Appraisers</td><td>2</td><td>3</td></tr> <tr><td>K2</td><td>0.7071</td><td>0.5231</td></tr> </table> Note: If a negative value is calculated under the square root sign, AV defaults to zero. <table border="1" style="float: right;"> <tr><td>n = number of parts</td></tr> <tr><td>r = number of trials</td></tr> </table>		Appraisers	2	3	K2	0.7071	0.5231	n = number of parts	r = number of trials	% AV = 100 [AV / TV] = 1.0%	% AV = 100 [AV / (Tol / 6)] = 2.2%												
Appraisers	2	3																					
K2	0.7071	0.5231																					
n = number of parts																							
r = number of trials																							
Repeatability and Reproducibility (GRR) $GRR = \sqrt{(EV^2 + AV^2)}$ = 0.005511		%GRR = 100 [GRR / TV] = 3.9%	% GRR = 100 [GRR / (Tol / 6)] = 8.3%																				
Part Variation (PV) PV = Rp x K3 = 0.142968	<table border="1"> <tr><td>Parts</td><td>K3</td></tr> <tr><td>2</td><td>0.7071</td></tr> <tr><td>3</td><td>0.5231</td></tr> <tr><td>4</td><td>0.4467</td></tr> <tr><td>5</td><td>0.4030</td></tr> <tr><td>6</td><td>0.3742</td></tr> <tr><td>7</td><td>0.3534</td></tr> <tr><td>8</td><td>0.3375</td></tr> <tr><td>9</td><td>0.3249</td></tr> <tr><td>10</td><td>0.3146</td></tr> </table>	Parts	K3	2	0.7071	3	0.5231	4	0.4467	5	0.4030	6	0.3742	7	0.3534	8	0.3375	9	0.3249	10	0.3146	% PV = 100 [PV / TV] = 99.9%	% PV = 100 [PV / (Tol / 6)] = 99.7%
Parts	K3																						
2	0.7071																						
3	0.5231																						
4	0.4467																						
5	0.4030																						
6	0.3742																						
7	0.3534																						
8	0.3375																						
9	0.3249																						
10	0.3146																						
		In MSA4, for % Tolerance, PV = SQRT [(Tol / 6)^2 - (GRR)^2]																					
		ndc = 1.41(PV/GRR) = 36.6	ndc = 1.41(PV/GRR) = 17.0																				
Total Variation (TV) $TV = \sqrt{(GRR^2 + PV^2)}$ = 0.143074		If the 6 sigma process variation is known, then TV = [6 sigma process variation] / 6.00 and PV = SQRT[(TV^2) - (GRR)^2].																					

Production Part Approval Dimensional Test Results

[illegible]

Blanket statements of conformance are unacceptable for any test results.

TERMINAL TO HOUSING INSERTION FORCE DATA

Specification: 30 N MAX

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)

Tested by/Date: CRYSTAL MACKIN 1/8

PART Name/Desc: FOW120A02FA-B

Design Rec. Change level/date:

PART NO (s): 6189-7456, 6189-7673

EU5T-14A464-TB

Mold #: 1770-A

Eng. Change Documents: NA

SV5

CAVITY #	M49		M50		M51		M52		M53		M54		M55		M56	
1	14.1	12.6	14.0	12.0	13.0	10.3	10.2	9.7	9.4	9.6	13.2	11.1	10.9	10.1	10.2	9.1
CAVITY #	M57		M58		M59		M60		M61		M62		M63		M64	
1	9.9	9.5	11.7	13.3	9.8	8.5	10.6	12.0	10.0	8.8	11.5	12.5	10.0	10.4	11.6	9.4

AVERAGE 10.9
MIN 8.5
MAX 14.1

FRANKLIN

CAVITY #	M49		M50		M51		M52		M53		M54		M55		M56	
1	8.9	8.9	8.7	9.4	9.6	8.5	8.3	8.6	8.5	8.8	8.8	9.9	8.8	9.6	9.8	9.1
CAVITY #	M57		M58		M59		M60		M61		M62		M63		M64	
1	8.6	8.9	9.5	8.8	8.7	8.4	9.3	8.4	9.7	9.1	10.2	8.5	8.0	10.3	8.6	9.9

AVERAGE 9.0
MIN 8.0
MAX 10.3

TERMINAL TO HOUSING RETENTION FORCE DATA

with lance only

Specification: 30 n min

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)

Tested by/Date: CRYSTAL MACKIN 1/9/20

PART Name/Desc: **FOW120A02FA-B**

Design Rec. Change level/date:

PART NO (s): 6189-7456, 6189-7673

EU5T-14A464-TB  6/7/19

Mold #: 1770-A

Eng. Change Documents: NA

SV5

CAVITY # →	M49		M50		M51		M52		M53		M54		M55		M56	
1	73.9	76.6	72.4	75.7	76.3	72.3	74.4	72.5	74.1	72.1	73.9	70.8	74.2	75.5	74.3	76.0
CAVITY # →	M57		M58		M59		M60		M61		M62		M63		M64	
1	72.4	75.9	73.8	78.6	79.1	75.8	76.7	75.0	77.5	75.1	78.5	74.2	76.4	74.7	75.4	77.6

AVERAGE 75.1
MIN 70.8
MAX 79.1

FRANKLIN

CAVITY # →	M49		M50		M51		M52		M53		M54		M55		M56	
1	81.8	79.9	83.2	78.6	80.9	80.1	80.7	79.7	81.7	77.6	83.3	77.9	81.3	78.4	81.3	78.5
CAVITY # →	M57		M58		M59		M60		M61		M62		M63		M64	
1	80.8	78.5	81.7	78.4	81.5	79.8	81.1	79.9	80.0	77.9	80.9	78.7	80.2	79.2	81.4	78.1

AVERAGE 80.1
MIN 77.6
MAX 83.3

TERMINAL TO HOUSING RETENTION FORCE DATA

with lance and tpa

Specification: 60 n min

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)

Tested by/Date: CRYSTAL MACKIN 1/9/20

PART Name/Desc: **FOW120A02FA-B**

Design Rec. Change level/date:

PART NO (s): 6189-7456, 6189-7673

EU5T-14A464-TB  6/7/19

Mold #: 1770-A

Eng. Change Documents: NA

SV5

CAVITY # →	M49		M50		M51		M52		M53		M54		M55		M56	
1	76.7	78.7	76.0	77.1	78.5	73.8	73.9	77.8	75.4	77.3	74.8	75.9	78.3	75.9	77.3	76.5
CAVITY # →	M57		M58		M59		M60		M61		M62		M63		M64	
1	75.7	76.9	77.6	74.7	76.0	76.8	76.1	76.6	75.0	75.8	72.2	74.6	73.4	76.0	74.8	74.8

AVERAGE 76.0
MIN 72.2
MAX 78.7

FRANKLIN

CAVITY # →	M49		M50		M51		M52		M53		M54		M55		M56	
1	81.0	80.8	81.0	80.2	80.3	79.4	80.4	80.5	81.0	78.8	81.9	79.7	81.8	80.9	82.1	80.5
CAVITY # →	M57		M58		M59		M60		M61		M62		M63		M64	
1	81.3	80.7	81.5	79.3	80.1	80.1	80.8	79.7	81.0	79.8	80.6	78.9	81.2	79.2	82.1	76.9

AVERAGE 80.4
MIN 76.9
MAX 82.1

CONNECTOR OPERATION FORCE DATA

Specification: see below

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)

Tested by/Date: CRYSTAL MACKIN 1/9/20PART Name/Desc: FOW120A02FA-B

Design Rec. Change level/date:

PART NO (s): 6189-7496, 6189-7673

EUST-1:J4A64-1B 6/7/19

Mold #: 1770-AEng. Change Documents: NA

CONNECTOR INSERTION FORCE (WITH TERMINALS AND LOCK) 45 N MAX.

SV5

CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	12.9	16.8	18.3	16.3	15.5	13.0	12.6	17.4	14.5	14.8	12.3	13.0	15.5	15.7	15.4	15.2

AVERAGE 15.0
MIN 12.3
MAX 18.3

FRANKLIN

CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	11.2	13.8	14.2	14.9	10.8	13.3	11.0	12.0	11.8	14.8	13.4	12.4	15.1	12.2	11.6	13.8

AVERAGE 12.9
MIN 10.8
MAX 15.1

CONNECTOR EXTRACTION FORCE (WITH TERMINALS, WITHOUT LOCK) 75 N MAX.

SV5

CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	16.2	18.7	20.5	19.9	14.1	18.6	21.0	24.7	18.1	22.3	17.0	18.1	15.5	16.6	22.9	15.2

AVERAGE 18.8
MIN 14.1
MAX 24.7

FRANKLIN

CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	8.1	9.7	8.2	8.3	11.4	8.2	9.6	8.9	8.7	8.4	10.6	7.7	9.1	10.9	11.1	10.0

AVERAGE 9.3
MIN 7.7
MAX 11.4

HOUSING LOCK RETENTION FORCE (HOUSING ONLY) 110 N MIN.

SV5

CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	182.5	194.1	185.0	152.8	175.9	189.7	178.3	174.2	164.8	169.6	189.3	182.8	181.0	189.9	193.0	189.9

AVERAGE 176.4
MIN 152.8
MAX 194.1

FRANKLIN

CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	157.4	159.5	164.0	176.2	165.5	168.0	162.5	154.0	166.9	175.7	182.6	187.7	164.6	165.7	163.3	167.1

AVERAGE 165.0
MIN 154.0
MAX 176.2

TPA TO HOUSING FUNCTION DATA

Specification: SEE BELOW

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)

Tested by/Date: CRYSTAL MACKIN 1/8/20 -1/10/20

PART Name/Desc: FOW120A02FA-B

Design Rec. Change level/date:

PART NO (s): 6189-7456, 6189-7673

EU5T-14A464-TB

Mold #: 1770-A

Eng. Change Documents:

NA

Preassembled to Assembled w/o terminals 15 N min

SV5																
CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	33.6	35.0	32.0	30.2	29.7	34.9	31.8	30.6	32.7	32.6	30.6	32.0	30.2	28.3	29.8	28.0

AVERAGE 31.4
MIN 28.0
MAX 35.0

FRANKLIN																
CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	34.7	35.1	34.9	39.5	34.8	32.3	35.2	39.7	42.9	35.3	35.1	40.1	34.9	38.9	36.8	35.1

AVERAGE 36.6
MIN 32.3
MAX 42.9

Preassembled to assembled with terminal 60 N max

SV5																
CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	31.9	34.1	32.2	31.2	30.0	34.3	33.2	36.1	34.7	33.0	30.8	33.8	35.0	33.4	33.3	35.2

AVERAGE 33.3
MIN 30.0
MAX 36.1

FRANKLIN																
CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	42.1	41.2	34.1	42.6	33.3	40.4	44.8	41.5	47.5	48.6	38.8	44.4	39.5	41.2	38.5	38.8

AVERAGE 41.1
MIN 33.3
MAX 48.6

Assembled to Preassembled initial 60 N max

SV5																
CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	24.3	35.2	36.5	37.2	36.1	32.4	32.0	33.8	31.9	31.6	32.3	34.4	33.4	32.6	35.1	33.6

AVERAGE 33.3
MIN 24.3
MAX 37.2

FRANKLIN																
CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	38.1	36.2	37.0	37.6	38.1	36.4	38.6	34.8	34.5	35.6	37.8	38.5	36.7	37.6	36.8	37.3

AVERAGE 37.0
MIN 34.5
MAX 38.6

Assembled to Preassembled second retention 18 N min

SV5																
CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	24.6	23.1	21.9	24.4	23.7	25.7	31.2	22.7	23.3	27.4	29.9	21.9	21.8	23.6	22.3	21.0

AVERAGE 24.3
MIN 21.0
MAX 31.2

FRANKLIN																
CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	21.0	21.1	21.7	23.0	24.4	21.8	25.5	21.7	21.2	23.7	25.7	23.5	21.3	24.6	23.9	24.1

AVERAGE 23.0
MIN 21.0
MAX 25.7

preassembled to extraction 25 N min

SV5																
CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	37.1	34.6	37.4	35.6	35.5	36.3	36.4	32.9	38.0	34.9	37.9	37.6	36.1	35.7	36.7	36.4

AVERAGE 36.2
MIN 32.9
MAX 38.0

FRANKLIN																
CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	32.7	34.1	35.8	33.9	34.7	33.9	34.9	34.9	33.5	35.4	32.2	35.2	33.0	33.2	34.3	33.3

AVERAGE 34.1
MIN 32.2
MAX 35.8

CPA TO HOUSING FUNCTION DATA

Specification: see below

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)

PART Name/Desc: FW120A02FA-BPART NO (s): applicable to 6189-7456 onlyMold #: 1770-A

Tested by/Date: _____

Design Rec. Change level/date: _____

EU5T-14A464-TB



6/7/19

Eng. Change Documents: _____

NA

PREASSEMBLED TO ASSEMBLED 50 N MIN UNMATED

SV5

CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	68.3	70.0	69.5	68.5	64.8	67.3	70.7	67.4	66.1	64.8	69.5	68.7	64.0	69.6	67.0	67.0

AVERAGE 67.7
MIN 64.0
MAX 70.7

FRANKLIN

CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	64.3	76.6	77.5	78.1	74.2	71.3	72.9	71.7	70.5	72.4	73.5	71.3	74.0	71.4	73.9	72.0

AVERAGE 72.9
MIN 64.3
MAX 78.1

PREASSEMBLED TO EXTRACTION 60 N MIN UNMATED

SV5

CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	124.1	120.9	121.8	121.8	123.4	122.2	123.9	122.3	121.9	124.0	115.5	123.2	122.5	124.6	122.0	123.2

AVERAGE 122.3
MIN 115.5
MAX 124.6

FRANKLIN

CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	127.6	125.8	126.9	125.0	125.3	125.1	126.1	122.0	121.7	123.0	120.6	124.2	122.8	121.7	123.4	122.4

AVERAGE 124.0
MIN 120.6
MAX 127.6

PREASSEMBLED TO ASSEMBLED 22 MAX MATED

SV5

CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	15.3	14.3	12.8	14.0	13.9	14.4	13.8	14.3	14.8	12.7	15.6	13.4	14.4	14.1	14.9	13.3

AVERAGE 14.1
MIN 12.7
MAX 15.6

FRANKLIN

CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	16.3	12.7	13.3	14.7	11.4	19.1	14.7	11.6	12.6	16.1	15.8	12.3	15.8	17.4	13.4	17.6

AVERAGE 14.7
MIN 11.4
MAX 19.1

ASSEMBLED TO PRE ASSEMBLED 10-30 MATED

SV5

CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	20.7	17.3	13.4	12.6	13.3	12.3	19.5	19.9	19.9	18.5	22.3	14.4	18.9	18.2	17.5	18.5

AVERAGE 17.3
MIN 12.3
MAX 22.3

FRANKLIN

CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	14.0	16.4	15.0	13.9	15.4	13.3	12.2	14.3	14.0	12.8	14.7	14.3	14.6	14.0	13.9	13.2

AVERAGE 14.1
MIN 12.2
MAX 16.4

WATERPROOF TEST

Specification: 48 KPA MIN

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
 PART Name/Desc: FOW120A02FA-B
 PART NO (s): 6189-7456, 6189-7673
 Mold #: 1770-A

Tested by/Date: CRYSTAL MACKIN 1/13/20
 Design Rec. Change level/date: EU5T-14A464-TB
 Eng. Change Documents: NA

SV5

CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	106.0	105.0	107.0	109.0	100.0	103.0	109.0	107.0	106.0	102.0	102.0	101.0	102.0	106.0	104.0	104.0

AVERAGE 104.6
 MIN 100.0
 MAX 109.0

FRANKLIN

CAVITY #	M49	M50	M51	M52	M53	M54	M55	M56	M57	M58	M59	M60	M61	M62	M63	M64
1	109.0	106.0	107.0	107.0	104.0	105.0	107.0	108.0	106.0	102.0	104.0	111.0	109.0	108.0	106.0	108.0

AVERAGE 106.7
 MIN 102.0
 MAX 111.0

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)

Tested by/Date: CRYSTAL MACKIN 1/8/2020

PART Name/Desc: FOW120A02FA-B

Design Rec. Change level/date:

PART NO (s): 6189-7456, 6189-7673

EU5T-14A464-TB



6/7/2019

Mold #: 1770-A

Eng. Change Documents: NA

CAVITY #:	SV5				FRANKLIN					
49~64	15.40	16.90			15.40	16.90				
	+3 -3	+3 -3			+3 -3	+3 -3				
1	15.36	16.87			15.35	16.85				
2	15.37	16.88			15.32	16.81				
3	15.38	16.88			15.36	16.84				
4	15.37	16.88			15.35	16.81				
5	15.37	16.88			15.36	16.84				
6	15.36	16.89			15.33	16.81				
7	15.37	16.89			15.34	16.82				
8	15.37	16.86			15.34	16.82				
9	15.37	16.86			15.34	16.81				
10	15.37	16.87			15.32	16.81				
11	15.37	16.86			15.32	16.82				
12	15.38	16.86			15.32	16.81				
13	15.36	16.86			15.34	16.81				
14	15.38	16.86			15.33	16.81				
15	15.35	16.85			15.33	16.81				
16	15.38	16.87			15.34	16.81				
17	15.37	16.86			15.36	16.81				
18	15.37	16.87			15.33	16.81				
19	15.37	16.86			15.36	16.82				
20	15.39	16.87			15.36	16.82				
21	15.37	16.85			15.32	16.82				
22	15.36	16.85			15.34	16.82				
23	15.38	16.86			15.33	16.81				
24	15.39	16.87			15.33	16.81				
25	15.38	16.86			15.33	16.81				
26	15.38	16.87			15.36	16.83				
27	15.36	16.86			15.33	16.81				
28	15.37	16.87			15.34	16.82				
29	15.38	16.88			15.32	16.82				
30	15.39	16.88			15.31	16.80				

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)

Tested by/Date: CRYSTAL MACKIN 1/8/2020

PART Name/Desc: FOW120A02FA-B

Design Rec. Change level/date:

PART NO (s): 6189-7456, 6189-7673

EU5T-14A464-TB



6/7/2019

Mold #: 1770-A

Eng. Change Documents: NA

CAVITY #:	SV5				FRANKLIN					
49~64	15.40 +.3 -.3	16.90 +.3 -.3			15.40 +.3 -.3	16.90 +.3 -.3				
31	15.37	16.87			15.34	16.81				
32	15.37	16.87			15.32	16.81				
33	15.37	16.87			15.33	16.82				
34	15.38	16.87			15.35	16.81				
35	15.36	16.86			15.31	16.80				
36	15.37	16.87			15.35	16.82				
37	15.38	16.87			15.33	16.82				
38	15.37	16.87			15.35	16.83				
39	15.39	16.86			15.33	16.80				
40	15.37	16.84			15.31	16.80				
41	15.38	16.85			15.34	16.80				
42	15.39	16.85			15.36	16.83				
43	15.38	16.86			15.36	16.81				
44	15.39	16.86			15.35	16.80				
45	15.38	16.86			15.33	16.80				
46	15.37	16.86			15.34	16.82				
47	15.35	16.84			15.34	16.80				
48	15.37	16.85			15.34	16.80				
49	15.38	16.87			15.32	16.80				
50	15.35	16.85			15.36	16.82				
51	15.38	16.88			15.35	16.82				
52	15.37	16.88			15.35	16.80				
53	15.36	16.87			15.34	16.83				
54	15.37	16.88			15.34	16.84				
55	15.37	16.89			15.35	16.83				
56	15.35	16.87			15.33	16.83				
57	15.36	16.87			15.34	16.81				
58	15.38	16.87			15.32	16.82				
59	15.38	16.87			15.36	16.82				
60	15.39	16.88			15.35	16.81				

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)

Tested by/Date: CRYSTAL MACKIN 1/8/2020

PART Name/Desc: FOW120A02FA-B

Design Rec. Change level/date:

PART NO (s): 6189-7456, 6189-7673

EU5T-14A464-TB



6/7/2019

Mold #: 1770-A

Eng. Change Documents: NA

CAVITY #:	SV5				FRANKLIN					
49~64	15.40 +.3 -.3	16.90 +.3 -.3			15.40 +.3 -.3	16.90 +.3 -.3				
61	15.37	16.87			15.34	16.81				
62	15.37	16.87			15.36	16.81				
63	15.36	16.87			15.35	16.82				
64	15.37	16.89			15.35	16.81				
65	15.35	16.88			15.33	16.81				
66	15.39	16.90			15.35	16.81				
67	15.38	16.89			15.35	16.81				
68	15.38	16.88			15.33	16.81				
69	15.38	16.89			15.34	16.82				
70	15.39	16.90			15.35	16.81				
71	15.35	16.87			15.31	16.80				
72	15.37	16.88			15.33	16.82				
73	15.34	16.86			15.34	16.82				
74	15.34	16.85			15.34	16.83				
75	15.37	16.88			15.35	16.84				
76	15.38	16.87			15.32	16.81				
77	15.39	16.88			15.36	16.82				
78	15.39	16.88			15.36	16.82				
79	15.38	16.88			15.32	16.81				
80	15.37	16.87			15.36	16.83				
81	15.38	16.88			15.33	16.81				
82	15.36	16.88			15.32	16.81				
83	15.38	16.88			15.33	16.81				
84	15.38	16.87			15.33	16.81				
85	15.36	16.86			15.34	16.81				
86	15.39	16.87			15.35	16.81				
87	15.38	16.88			15.33	16.81				
88	15.38	16.88			15.32	16.80				
89	15.38	16.87			15.35	16.81				
90	15.36	16.87			15.34	16.81				

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)

Tested by/Date: CRYSTAL MACKIN 1/8/2020

PART Name/Desc: FOW120A02FA-B

Design Rec. Change level/date:

PART NO (s): 6189-7456, 6189-7673

EU5T-14A464-TB



6/7/2019

Mold #: 1770-A

Eng. Change Documents: NA

CAVITY #:	SV5				FRANKLIN					
49~64	15.40	16.90			15.40	16.90				
	+3 -3	+3 -3			+3 -3	+3 -3				
91	15.37	16.87			15.34	16.80				
92	15.38	16.87			15.33	16.81				
93	15.38	16.88			15.32	16.81				
94	15.36	16.87			15.34	16.82				
95	15.39	16.89			15.34	16.81				
96	15.38	16.89			15.33	16.81				
97	15.36	16.86			15.33	16.82				
98	15.37	16.87			15.35	16.82				
99	15.36	16.86			15.34	16.82				
100	15.39	16.88			15.35	16.81				

average	15.37	16.87	15.34	16.81
minimum	15.34	16.84	15.31	16.80
maximum	15.39	16.90	15.36	16.85
range	0.05	0.06	0.05	0.05
std dev	0.01	0.01	0.01	0.01

LSL	15.10	16.60	15.10	16.60
NOM	15.40	16.90	15.40	16.90
USL	15.70	17.20	15.70	17.20

CPK	7.823813708	7.799135909	5.757596767	6.950989353
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WORK INSTRUCTION

AREA:	QUALITY ASSURANCE LAB
TITLE	LABORATORY SCOPE - SCOTTSVILLE (SV5, SV5-2, SV5-Franklin)

PURPOSE: To summarize the testing capabilities available at Scottsville Plant (SV5, SV5-2, SV5-Franklin), and to clarify the equipment, tests performed, standards, recording method and reaction plan.	APPLICATION: Scottsville (SV5, SV5-2, SV5-Franklin)
	RULE ENFORCER: QA Coordinator / Above

SV5 Tests Performed

TESTS PERFORMED	EQUIPMENT USED	TEST METHODS / STANDARD	RECORDING METHOD	REACTION METHOD
Melt Flow Rate	Tinius Olsen Extrusion Plastometer	QRW - MELTFLOW	Melt Index Record	Reject Tag Procedure
Waterproof Test	Waterproof Tester	QAW - WATERPROOFTST	Inspection Data Sheet	Reject Tag Procedure
Moisture Analysis (Reference Only)	Moisture Tester	F-A-SV5-010	Moisture Test Data Sheet	Reject Tag Procedure
Insertion / Retention Test	Force Gage Instron Tester	QAW - INSERTRETPROC QAW - InstronOperation	Inspection Data Sheet Data storage	Reject Tag Procedure
Dimensional Measurement	Profile / Caliper / Micrometer / Depth Gage / Keyence Measurement System	Inspection Instruction Sheet	Inspection Data Sheet	Reject Tag Procedure
Part Weight	Scale	Inspection Instruction Sheet	Inspection Data Sheet	Reject Tag Procedure
Freeze Test	Freezer	SWS Inspection Standard	Inspection Data Sheet	Reject Tag Procedure

SV5 - Franklin Tests Performed

TESTS PERFORMED	EQUIPMENT USED	TEST METHODS / STANDARD	RECORDING METHOD	REACTION METHOD
Melt Flow Rate	Tinius Olsen Extrusion Plastometer	QRW - MELTFLOW	Melt Index Record	Reject Tag Procedure
Waterproof Test	Waterproof Tester	QAW - WATERPROOFTST	Inspection Data Sheet	Reject Tag Procedure
Insertion / Retention Test	Force Gage Instron Tester	QAW - INSERTRETPROC QAW - InstronOperation	Inspection Data Sheet Data storage	Reject Tag Procedure

WORK INSTRUCTION

AREA:	QUALITY ASSURANCE LAB			
TITLE	LABORATORY SCOPE - SCOTTSVILLE (SV5, SV5-2, SV5-Franklin)			
Dimensional Measurement	Caliper / Micrometer / Depth Gage / Keyence Measurement System	Inspection Instruction Sheet	Inspection Data Sheet	Reject Tag Procedure
Part Weight	Scale	Inspection Instruction Sheet	Inspection Data Sheet	Reject Tag Procedure
Freeze Test	Freezer	SWS Inspection Standard	Inspection Data Sheet	Reject Tag Procedure

SV5 (Building 2) Tests Performed

TESTS PERFORMED	EQUIPMENT USED	TEST METHODS / STANDARD	RECORDING METHOD	REACTION METHOD
Hardness Test	Hardness Tester	H-A-001	Hardness Test Data Sheet	Reject Tag Procedure
Dimensional Measurement	Profile / Caliper / Micrometer / Depth Gage / Nikon MM-400	Inspection Instruction Sheet	Inspection Data Sheet	Reject Tag Procedure
Contact Force Test	Contact Force Gage	MSW-Force Gage	Inspection Data Sheet	Reject Tag Procedure
Dimensional Measurement	Profile / Keyence System / OGP / Caliper / Micrometer / Depth Gage / Slip Gages	SWS Inspection Standard	Inspection Data Sheet	Reject Tag Procedure

Equipment Calibrations

	EQUIPMENT USED	TEST METHODS / STANDARD	RECORDING METHOD	REACTION METHOD
Calipers, Micrometers, Depth Gages, Weigh Scales, other process tools/jigs.	Certified Gages (Gage Blocks & Weights)	Per Calibration Procedure	Calibration Record and Gagetrak	Reject Tag Procedure
Keyence Microscope	Certified Gages			
Force Gages	Certified Weights			
Freezer	Certified Meter			
Melt Indexer	Outside Vendor			
Moisture Analyzer	Outside Vendor			
Water Pressure Gage	Outside Vendor			
Hardness Tester	Outside Vendor			
Optical Comparator (Profile)	Outside Vendor			
Keyence Measurement Scope	Outside Vendor			
OGP	Outside Vendor			
NIKON MM-400	Outside Vendor			
INSTRON Tensile Tester	Outside Vendor			