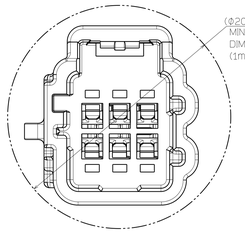
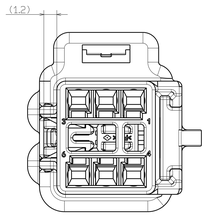
APPLICABLE COMPONENTS						
ITEM	DESCRIPTION	MANDATORY (YES/NO)	TERMINAL CAVITY MIN/MAX OD	PLATING/MATERIAL	FORD COMPONENT PART NO.	SUPPLIER COMPONENT PART NO.
1	TRC B982/ 1.2mm (APPLICABLE CAVITIES 1-6)	NO	0/2.08X2.57	REFERENCE TRC	N/A	N/A

CONNECTOR ASSEMBLY CHART							
ASSEMBLY PART NO.'S						MATING COMPONENT	
FORD COMPONENT PART NO.	SUPPLIER COMPONENT PART NO.	TEMP CLASS	VIBRATION CLASS	SEALING CLASS	BRANDING & CODING	FORD COMPONENT PART NO.	SUPPLIER COMPONENT PART NO.
MU5T-14A459-TA	6098-8622	T2	V1	S1	N/A	JU5T-14489-B5C	6098-8626
MU5T-14A459-UA	6098-8623	T2	V1	S1	N/A	MU5T-14489-BJA	6098-8627
N/A	N/A	T2	V1	S1	N/A	N/A	N/A
N/A	N/A	T2	V1	S1	N/A	N/A	N/A

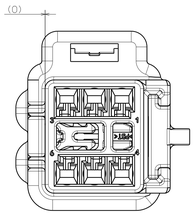
ITEM	PIA DESCRIPTION	COLOR	FORD COMPONENT PART NO.	SUPPLIER COMPONENT PART NO.	MATERIAL/SPEC NO.	RECYCLING CODE	WEIGHT	NUM. ITEMS NEED			
1	MALE HOUSING KEY A	BLACK	N/A	6098-7694	PBT/WSS-M99P23-B	PBT	3.10g	1			
	MALE HOUSING KEY B	GRAY	N/A	6098-7696	PBT/WSS-M99P23-B	PBT	3.10g		1		
	MALE HOUSING KEY C	BROWN	N/A	6098-7698	PBT/WSS-M99P23-B	PBT	3.10g			1	
	MALE HOUSING KEY D	GREEN	N/A	6098-7700	PBT/WSS-M99P23-B	PBT	3.10g				1
2	TPA	NATURAL	N/A	6910-7361	PBT/WSS-M99P23-B	PBT	0.13g	1	1	1	1

ISOMETRIC VIEW
SCALE 1:1

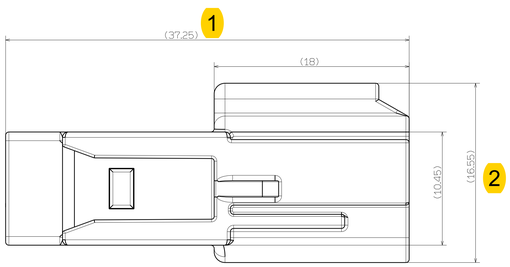


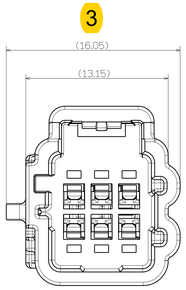


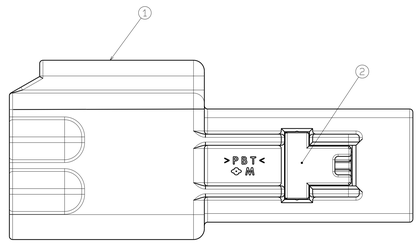
TPA IN PRE-SET POSITION

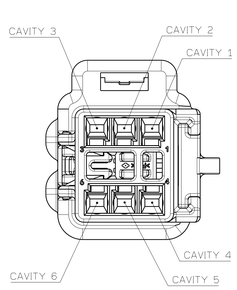


TPA IN LOCKED POSITION

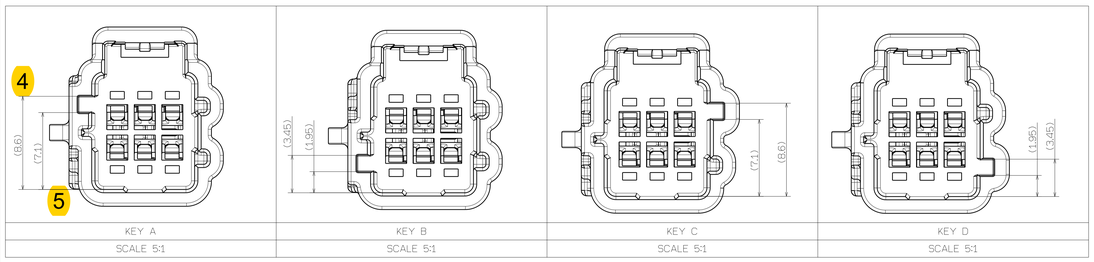








CAVITY IDENTIFICATION



KEY A
SCALE 5:1

KEY B
SCALE 5:1

KEY C
SCALE 5:1

KEY D
SCALE 5:1

NOTE:
1. PARTS CONFORM TO THE ELECTRICAL CONNECTION SYSTEM DESIGN SPECIFICATION (SDS) VER. 28
2. PARTS CONFORM TO GMW3191(2012) FOR PERFORMANCE CRITERIA AND EXCEPTIONS, SEE SUMITOMO DVP&R
3. MAXIMUM MATING FORCE FULLY POPULATED WITH TIN TERMINALS IS 28.6 N
4. TERMINAL EXTRACTION TOOL: SUMITOMO PART NUMBER 23630005
5. N/A
6. CONNECTOR IS RATED AS ERGONOMIC CLASS 2 BASED ON USCAR-25 REV 1. CONNECTOR PUSH AREA IS APPROXIMATELY 220mm2
7. CONNECTOR INCLUDES A 7mm CLIP SLOT PER USCAR EWCAP-005-7
8. PART RECEIVED AT THE FORD PLANT OR SERVICE PART PACKAGER/WAREHOUSE MUST BE FREE OF ANY CORROSION ALIGNED WITH THE FORD CUSTOMER SERVICE DIVISION (FCSD) PACKAGING AND SHIPPING GUIDE. PACKAGING AND PROTECTIVE MATERIALS MUST PRESERVE THE INTENDED FUNCTION AND APPEARANCE OF THE PART.
9. CHANGES TO DESIGN, COMPOSITION OR PROCESSING OF THE PART PREVIOUSLY APPROVED FOR PRODUDUCTION REQUIRE PRIOR APPROVAL FROM FORD MOTOR COMPANY PRODUCT ENGINEERING. REFER TO ISO/TS 16949.
10. FOR CURRENT RELEASE STATUS, SEE THE WERS ENGINEERING NOTICE
11. THIS DRAWING HAS BEEN PREPARED BY OR ON BEHALF OF FORD MOTOR COMPANY. FORD MOTOR COMPANY RETAINS ALL COMMON LAW, STATUTORY AND OTHER RESERVED RIGHTS, INCLUDING COPYRIGHTS. THIS DRAWING MUST NOT BE USED FOR ANY PURPOSE OTHER THAN PERFORMING SERVICES DIRECTLY OR INDIRECTLY TO FORD MOTOR COMPANY, WITHOUT THE EXPRESSED WRITTEN PERMISSION OF FORD MOTOR COMPANY. UNAUTHORIZED USE, COPYING OR MODIFICATION, INCLUDING THE REMOVAL OF THIS NOTE, MAY CONSTITUTE A VIOLATION OF CIVIL OR CRIMINAL LAWS ENFORCEABLE BY FORD OR GOVERNMENTAL AGENCIES
COPYRIGHT 2020 FORD MOTOR COMPANY
12. FOR THE PURPOSES OF GEOMETRIC TOLERANCING, ALL DIMENSIONAL INFORMATION CONTAINED IN THE CAD MODEL IS BASIC (THEORETICAL)

GENERAL TOLERANCES		
OVER	UP TO AND INCLUDING	THRU
	10	±0.2
10	50	±0.3

UNIQUE DESCRIPTION	SLV WIR CONN MALE PART NAME	MU5T-14A459-UA PART NUMBER

LTRS	REVISIONS			
ORIGINATOR	CHECKER	ENGR APP	MATL APP	
RELEASE				
AELE-11783930-521				20201014
M.WILLINGHAM	F.MAGDA	J.PITTENGER	SUMITOMO	

SEWS

SUMITOMO ELECTRIC WIRING SYSTEMS, LTD
248-482-1300
27360 DRAKE RD, FARMINGTON HILLS, MI 48331

ENG APP	APP DATE
GSDB CODE	SUPPLIER PART NUMBER: SEE CHART

REFERENCE 120 6-WAY UNSEALED MALE CONNECTOR			
PART MUST COMPLY WITH RESTRICTED SUBSTANCE MANAGEMENT STANDARD WSS-M99P9999-A1 TO SAFEGUARD HEALTH, SAFETY AND THE ENVIRONMENT			
DRAFTED IN ACCORDANCE WITH FORD MOTOR COMPANY ENGINEERING CAD AND DRAFTING STANDARDS VERSION 30		3RD ANGLE PROJ — DIMENSIONS ARE IN MILLIMETERS	
CAD TYPE K-CATIAS	CAD LOC. TC	CAD FILE PRT MU5T-14A459-TA / 1 DWG MU5T-14A459-TA	DTMC IS MASTER
OPER. NO. N/A	UNIT N/A	DRAWING MU5T-14A459-TA	
DESIGN –	DETAIL MW	TITLE SLV WIR CONN MALE	SHT 1 OF 1
CHECKED –	SAFETY MFG USE		N/A
SCALE 5 : 1	DATE	DIVISION N/A	
		PLANT N/A	

FORD MOTOR COMPANY

DaimlerChrysler Ford GM

Production Part Approval
Dimensional Test Results

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS
SUPPLIER/VENDOR CODE:
NAME OF INSPECTION FACILITY:
Sumitomo Electric Wiring Systems Plt. 5

PART NUMBER: 6098-8622
PART NAME: FO120A06MA-B
DESIGN RECORD CHANGE LEVEL: MU5T-14A459-TA 0 10/14/20
ENGINEERING CHANGE DOCUMENTS NA

ITEM	DIMENSION / SPECIFICATION	SPECIFICATION / LIMITS		TEST DATE	QTY. TESTED	ORGANIZATION MEASUREMENT RESULTS (DATA)						OK	NOT OK
1	37.25	-0.30	0.30	1/9/23	8	37.19	37.13	37.15	37.17	37.18	37.15	O	
	37.25	-0.30	0.30			37.15	37.18					O	
2	16.55	-0.30	0.30			16.77	16.74	16.74	16.74	16.74	16.74	O	
	16.55	-0.30	0.30			16.75	16.77					O	
3	16.05	-0.30	0.30			15.89	15.83	15.85	15.86	15.90	15.87	O	
	16.05	-0.30	0.30			15.86	15.90					O	
4	8.60	-0.20	0.20			8.77	8.76	8.77	8.76	8.77	8.76	O	
	8.60	-0.20	0.20			8.76	8.75					O	
5	7.10	-0.20	0.20			7.08	7.05	7.05	7.05	7.05	7.04	O	
	7.10	-0.20	0.20			7.05	7.05					O	

Blanket statements of conformance are unacceptable for any test results.

MARCH 2006

CFG-1003

prepared by:

SIGNATURE	TITLE	DATE
Cindy Meador	PPAP Superintendent	1/9/2023

"TORAY"

Innovation by Chemistry

Toray Resin Company, 821 W. Mausoleum Road, Shelbyville, Indiana 46176

Grade {PBT Toraycon}:	1401X34TB1
Lot:	R34592
Date:	08/03/2022

Certification of Properties

Test	Method	Unit	Specification	Result
Visual	-	-	Same as Std.	Good
Color	-	-	Same as Std.	Good
MFR	Toray Method	g/10 min.	Min. 3.2 Max. 4.8	4.1
Tensile Strength	ISO 527	MPa	Min. 49	56.6
Tensile Elongation	ISO 527	%	Min. 24	32.7
Charpy, Notched	ISO 179	KJ/m2	Min. 2.7	3.6

Toray Resin Company certifies the above results are in accordance with our Quality Management System

See the BOL for ship date and quantity

POTENTIAL
FAILURE MODE AND EFFECTS ANALYSIS
(PROCESS FMEA)

ISSUE	DETAIL	DATE	AUTH
5/6/21	New AIAG format	5/6/21	R. Gonzalez

DEPARMENT	SIGNATURE	DATE
Division Manager:	N. Hagiwara	5/10/21
Quality Manager:	L. Roth	5/6/21

SUPPLIER: Sumitomo Electric Wiring Systems
PART NAME: Various resin/Connector molded parts
PART NO: Various resin/Connector molded parts

SUPPLIER C NA
MANUF. LOCA Scottsville #5 / Franklin
MODEL NA
PREPARED BY R. Gonzalez

PFMEA NO: #1 5/6/20 Updated to new AIAG format and confirmation with Control Plan
CORE TEAM: R. Gonzalez, A. Davidson, D. Hall, L. Roth, J. Fraim

PROCESS NUMBER	PROCESS FUNCTION REQUIREMENTS	POTENTIAL FAILURE MODE	POTENTIAL EFFECT(S) OF FAILURE	SEV	CLASS	POTENTIAL CAUSES(S) MECHANISM(S) OF FAILURE	OCC	CURRENT PROCESS CONTROLS PREVENTION	CURRENT PROCESS CONTROLS DETECTION	DET	RPN	RECCOMMENDED ACTION(S)	RESPONSIBILITY & TARGET COMPLETION DATE	ACTION RESULTS: ACTIONS TAKEN	SEV	OCC	DET	RPN
0010	Raw Material Receiving	1. Incorrect Raw Material	Raw Material shortage causing interruption to Inj. Molding scheduled production, leading to: *Parts shortage *Customer part delivery performance degraded.	4		Incorrect quantity shipped by Supplier	2	Supplier confirms material quantity or weight, and creates packing list.	Receiving Associate confirms BOL against Packing List (confirms each unit). Material is barcode scanned into system against open Purchase Order	6	48	NONE						
		2. Incorrect Raw Material Part Number Received	Raw Material shortage causing interruption to Inj. Molding scheduled production, leading to: *Parts shortage *Customer part delivery performance degraded.	4		Incorrect material part number shipped by Supplier	2	Supplier confirms material quantity or weight, and creates packing list.	Receiving Associate confirms BOL against Packing List (confirms each unit). Material is barcode scanned into system against open Purchase Order	6	48	NONE						
		3. Damaged Containers	Material rejected, insufficient material for production. Component produced from contaminated material. * Quality problem * Customer complaint	4		Improper Handling at point of origin and / or transportation. Improper Packaging	2	Packaging is designed to prevent damage.	Receiving associate visually confirms container for damage.	6	48	NONE						
0020	Quality Assurance Receiving Inspection	1. Raw Material Out of Specification	* Delay Scheduled Production * Brittle Parts * Customer part delivery performance degraded. * Customer compliant	7		Insufficient Supplier Process Controls	2	Supplier tests each lot of material for proper mechanical and chemical properties.	*SQA Receiving associate verifies Material cert to standard, and test Melt Flow each PBT lot. (IC) * Molding machine monitors detect process variation *QA Lab verifies product function each run.	5	70	Raw Material is confirmed to meet spec by material supplier and Melt Flow testing. QA Receiving Inspection. Molding Machine monitors will detect material variations, and QA tests the function of each part to confirm it meets the specification. No other correction action needed.						
		2. Incorrect Raw Material Color	* Delay Scheduled Production * Customer part delivery performance degraded. * Customer compliant	3		Mislabeled Raw Material Container.	2	Supplier confirms and matches color per their in process controls.	QA Receiving associate visually confirms per shipment / lot referencing master samples.	7	42	NONE						

PROCESS NUMBER	PROCESS FUNCTION REQUIREMENTS	POTENTIAL FAILURE MODE	POTENTIAL EFFECT(S) OF FAILURE	SEV	LASS	CAUSES(S) MECHANISM(S) OF FAILURE	OCC	PROCESS CONTROLS PREVENTION	PROCESS CONTROLS DETECTION	DET	RPN	RECCOMMENDED ACTION(S)	& TARGET COMPLETION DATE	ACTIONS TAKEN	SEV	OCC	DET	RPN
			Raw Material shortage causing interruption to			Incorrect quantity shipped by Supplier		Supplier confirms material quantity or weight, and creates	Receiving Associate confirms BOL against Packing List									
0030	Material Storage	1. Improper storage	*Difficulty in locating raw material *Raw material degradation.	2		*Incorrect storage location *Improper storage method.	2	Scanning system assign each part number to a specific warehouse location, controlling inventory and FIFO.	Scanning system assign each part number to a specific warehouse location, controlling inventory and FIFO.	5	20	NONE						
0040	Raw Material Loading	1. Incorrect Raw Material	* Discoloration of Parts * Brittle Parts * Impaired function of Part * Customer Complaint	7		Material handler selected incorrect raw material Mislabeled material Mixed material.	2	Shop order specifies required raw material. Barcode system confirms raw material part number when assigned to machine. Material received COA is confirmed to material spec.	* Barcode system * Visual confirmation of Raw Material ID against shop order each Set-up and Each shift.	2	28	Barcode system 100% confirms that the correct material is loaded at the machine and visual material ID checks are conducted each set-up and shift start. No other action is needed.						
	Material Drying (if required)	1. Material not dried correctly	* Burn mark, or weld line * Brittle Parts-Part breakage * Parts out of dimension.	3		Set-up operator failed to set correct process parameters : Oven Temp. Moisture Content Drying time.	2	1. Machine is interlocked not to operate if dryer is off. 2. Central Feed Dryer will alarm if power goes off. 3. Set-up operator verifies and visually confirms correct process parameters.	1. Parameters are reconfirmed by coordinator/leader and operator.	4	24	NONE						
		1. Incorrect Raw Material	* Parts out-of-specification * Discoloration of Parts * Brittle Parts * Impaired function of Part * Customer Complaint	5		Set-up Associate used incorrect raw material.	2	1. Barcode system confirms raw material matches shop order. Any mismatch prevents printing of labels.	1. Barcode system will detect wrong material . 2. Verify against Mold Book Condition Sheet & record on Condition Sheet Form and P chart. Confirmed with Material color codes & barrel colors.	5	50	NONE						
				5		Setup Operator selected incorrect central feed system raw material.	2	1: Central Feed System interlocks prevent incorrect material feed.	1: Barcode scan	5	50	NONE						
		2. Incorrect Mold placed in Machine	Incorrect Part Manufactured	2		Set-up Associate failed to use correct Mold	2	1. Barcode scan mold book to machine, any mismatch prevents printing of labels. 2.Set-up Associate instructions (shop order) & visual confirmation.	Verify against Mold Book Condition Sheet & record on Condition Sheet Form, Mold set up book and Critical check sheet	5	20	NONE						
		3. Improper Machine Process Parameters	Parts out-of-specification (Dim. & appearance) Short Shot, Discoloration of Parts, Brittle Parts, Impaired function of Part, Customer Complaint.	4		Set-up Associate failed to set correct process Parameters	3	1. Engineering established parameters selected by setup and automatically uploaded to machine. 2. Set-up Associate instructions (shop order) & visual confirmation.	1. Setup verify against Mold Book Condition Sheet & record on Condition Sheet Form 2. Leader/coordinator reverifies machine screen conditions match set up conditions.	5	60	NONE						

PROCESS NUMBER	PROCESS FUNCTION REQUIREMENTS	POTENTIAL FAILURE MODE	POTENTIAL EFFECT(S) OF FAILURE	S E V	L A S S	CAUSES(S) MECHANISM(S) OF FAILURE	O C C	PROCESS CONTROLS PREVENTION	PROCESS CONTROLS DETECTION	D E T	R P N	RECCOMMENDED ACTION(S)	& TARGET COMPLETION DATE	ACTIONS TAKEN	S E V	O C C	D E T	R P N
0050	Set-up Injection Molding Machine		Raw Material shortage causing interruption to			Incorrect quantity shipped by Supplier		Supplier confirms material quantity or weight, and creates	Receiving Associate confirms BOL against Packing List									
		4. Parts out-of-specification (Set-Up appearance checks): Broken pins, Damaged mold pins, Flash, Voids, Sinks, Short Shot, Holes, Weld Lines, Robot Damage and other visual defects. Confirmation of parts for contamination/grease/oil	Inj. Molding scheduled production interrupted. Impaired function of Part. Customer Compliant/Dissatisfaction.	3		Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design Gate size, location, wear (affects material flow) or Combination of above. Flow variation due to change of injection function components (barrel,screw, nozzle type,etc)	3	1.Monthly PM by machine maintenance. 2.Confirmation system for molding set-up parameters. 3.Set-up Operator instructions (shop order) & visual confirmation per CPC. 4.Confirmation of correct gate size, location, wear	1.Verify against Mold Book Condition Sheet & record on Condition Sheet Form. 2.Engineering validation of injection function changes per internal robust test procedure. 3. Metal detector checks at SOP/EOP (as applicable)	5	45	NONE						
				3		Improper Robot settings	3	1. Setup confirms robot setting per condition sheet. 2.Utilize soft drop conveyors. 3.Confirmation of Set-up of auxiliary equipment. 4.PM for robot clamp. 5.Utilization of pick and place robots where applicable.	1. Set-up operator visual confirms first 10 shots. 2.Molding operator checks last shot each basket and QA check at each SOP per GA003 & Inspection Standard. 3.Leader/ coordinator reverification of robot settings.	5	45	NONE						
				3		Machine Wear Improper cleaning at changeover or machine PM.	2		Set-up operator verifies & visually confirms machine clean each Mold change/Set-up per work instructions. Maintenance PM Mold Schedule	6	36	NONE						
				5		Damaged or broken pins due to Age/condition of Mold	2	Maintenance PM Mold, QA Confirmation function SOP/EOP, Operator each lot visual check, Mold condition settings.		5	50	SEWS maintains molds and follows strict PM schedule. Parts are also confirmed functionally to detect for out of spec parts due to broken molds.						
		5. Parts out-of-specification (QA appearance checks) Broken pins, Flash, Voids, Sinks, Short Shot, Holes, Weld Lines and other visual defects.	Inj. Molding scheduled production interrupted. Impaired function of Part Customer Compliant/Dissatisfaction.	3	C, C# (IC / SW S / IM)	Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design Gate size, location, wear (affects material flow) or Combination of above. Flow variation due to change of injection function components (barrel,screw, nozzle type,etc).	3	1.Monthly PM by machine maintenance. 2.Confirmation system for molding set-up parameters. 3.Set-up Operator instructions (shop order) & visual confirmation per CPC. 4.Confirmation of correct gate size, location, wear	1.Verify against Mold Book Condition Sheet & record on Condition Sheet Form. 2..QA Visual Inspection per CPC and QA IIS at SOP per GA003 & Inspection Standard. 3.Engineering validation of injection function changes per internal robust test procedure. 4. Metal detector checks at SOP/EOP (as applicable)	5	45	SEWS strictly controls processing parameters and tolerance levels and tool condition. QA also verifies part dimension and function at the start and end of production. No other action needed.						
		6. Parts out-of-specification (QA function checks) : terminal insertion, terminal retention, retainer insertion, retainer retention, engagement with mating parts (clip, etc.). Hinge, Clip/lock, or Lance damage-(where Applicable).	Inj. Molding scheduled production interrupted. Impaired function of Part Customer Compliant/Dissatisfaction.	3	C, C# (IC / SW S / IM)	Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design Gate size, location, wear (affects material flow) or Combination of above. Flow variation due to change of injection function components (barrel, screw, nozzle type,etc).	2	1. Condition adjustment restricted to engineering. 2. Confirmation system for molding set-up parameters.	1.Verify against Mold Book Condition Sheet & record on Condition Sheet Form. 2.QA Functional testing each SOP per GA003 & Inspection Standard 3. Engineering validation of injection function changes per internal robust test procedure.	5	30	SEWS strictly controls processing parameters and tolerance levels. QA also verifies part dimension and function at the start and end of production. No other action needed.						

PROCESS NUMBER	PROCESS FUNCTION REQUIREMENTS	POTENTIAL FAILURE MODE	POTENTIAL EFFECT(S) OF FAILURE	SEV	LASS	CAUSES(S) MECHANISM(S) OF FAILURE	OCC	PROCESS CONTROLS PREVENTION	PROCESS CONTROLS DETECTION	DET	RPN	RECCOMMENDED ACTION(S)	& TARGET COMPLETION DATE	ACTIONS TAKEN	SEV	OCC	DET	RPN
			Raw Material shortage causing interruption to			Incorrect quantity shipped by Supplier		Supplier confirms material quantity or weight, and creates	Receiving Associate confirms BOL against Packing List									
		7. Parts out-of-specification (QA Dimension Checks).	Inj. Molding scheduled production interrupted. Impaired function of Part Customer Complaint / Dissatisfaction.	4		Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design	2	Confirmation system for molding set-up parameters. Set-up Operator instructions (shop order) & visual confirmation per CPC.	1. Verify against Mold Book Condition Sheet & record on Condition Sheet Form. 2. QA Dimensional measurement each SOP per GA003 & Inspection Standard	6	48	SEWS strictly controls processing parameters and tolerance levels. QA also verifies part dimension and function at the start and end of production. No other action needed.						
		8. Mixed Parts.	Mixed Parts delivered to the customer Customer Complaint / Dissatisfaction.	5		Trapped or scattered parts / start-up shots remaining in molding machine.	3	1. Process Change System for evaluating chute/conveyor changes for potentially scattered parts.	1. Set up checks at each change over.	5	75	SEWS performs checks of each machine prior to each SOP to ensure start up shots/previous product is not scattered in machine.						
0060	Mass Production Injection Molding	1. Parts out-of-specification (Operator appearance checks): Broken pins, Damaged mold pins, Flash, Voids, Sinks, Short Shot, Holes, Weld Lines, Robot Damage and other visual defects. Confirmation of parts for contamination/grease/oil	Inj. Molding scheduled production interrupted. Impaired function of Part Customer Compliant/Dissatisfaction.	3		Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design Gate size, location, wear (affects material flow) or Combination of above. Flow variation due to change of injection function components (barrel,screw, nozzle type,etc).	3	1. Monthly PM by machine maintenance. 2.Confirmation system for molding set-up parameters. 3.Set-up Operator instructions (shop order) & visual confirmation per CPC. 4.Confirmation of correct gate size, location, wear.	1. Verify parts against CPC. 2. Metal detector alarm (as applicable).	6	54	SEWS strictly controls processing parameters and tolerance levels and tool condition. QA also verifies part dimension and function at the start and end of production. No other action needed.						
	Inline Inspection	1. Parts out-of-specification (In-Line Roving Patrol) Broken pins, Damaged mold pins, Flash, Voids, Sinks, Short Shot, Holes, Weld Lines, Robot Damage and other visual defects. Confirmation of parts for contamination/grease/oil	Inj. Molding scheduled production interrupted. Impaired function of Part Customer Compliant/Dissatisfaction.	3		Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design Gate size, location, wear (affects material flow) or Combination of above. Flow variation due to change of injection function components (barrel,screw, nozzle type,etc)	3	1. Monthly PM by machine maintenance. 2.Confirmation system for molding set-up parameters. 3.Set-up Operator instructions (shop order) & visual confirmation per CPC. 4.Confirmation of correct gate size, location, wear.	1. Verify parts against CPC.	5	45	SEWS strictly controls processing parameters and tolerance levels and tool condition. QA also verifies part dimension and function at the start and end of production. No other action needed.						
		1. Parts out-of-specification (QA appearance checks) Broken pins, Flash, Voids, Sinks, Short Shot, Holes, Weld Lines and other visual defects	Inj. Molding scheduled production interrupted. Impaired function of Part Customer Compliant/Dissatisfaction.	3	C, C# (IC / SWS / IM)	Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design Gate size, location, wear (affects material flow) or Combination of above. Flow variation due to change of injection function components (barrel,screw, nozzle type,etc).	3	1. Monthly PM by machine maintenance. 2.Confirmation system for molding set-up parameters. 3.Set-up Operator instructions (shop order) & visual confirmation per CPC. 4.Confirmation of correct gate size, location, wear.	1. Verify against Mold Book Condition Sheet & record on Condition Sheet Form. 2..QA Visual Inspection per CPC and QA IIS at MOP/EOP per GA003, Inspection Standard & any applicable Work Instruction and/or Quality Alert. 3.Engineering validation of injection function changes per internal robust test procedure.	5	45	SEWS strictly controls processing parameters and tolerance levels and tool condition. QA also verifies part dimension and function at the start and end of production. No other action needed.						

PROCESS NUMBER	PROCESS FUNCTION REQUIREMENTS	POTENTIAL FAILURE MODE	POTENTIAL EFFECT(S) OF FAILURE	SEV	LASS	CAUSES(S) MECHANISM(S) OF FAILURE	OCC	PROCESS CONTROLS PREVENTION	PROCESS CONTROLS DETECTION	DET	RPN	RECCOMMENDED ACTION(S)	& TARGET COMPLETION DATE	ACTIONS TAKEN	SEV	OCC	DET	RPN
0070			Raw Material shortage causing interruption to			Incorrect quantity shipped by Supplier		Supplier confirms material quantity or weight, and creates	Receiving Associate confirms BOL against Packing List									
	Quality Assurance Inspection Injection Molding	2. Parts out-of-specification (QA function checks) : terminal insertion, terminal retention, retainer insertion, retainer retention, engagement with mating parts (clip, etc.). Hinge, Clip/lock, or Lance damage- (where Applicable).	Inj. Molding scheduled production interrupted. Impaired function of Part Customer Compliant/Dissatisfaction.	3	C, C# (IC / SWS / IM)	Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design Gate size, location, wear (affects material flow) or Combination of above. Flow variation due to change of injection function components (barrel, screw, nozzle type,etc).	2	1. Condition adjustment restricted to engineering. 2. Confirmation system for molding set-up parameters.	1. Verify against Mold Book Condition Sheet & record on Condition Sheet Form. 2..QA Visual Inspection per CPC and QA IIS at MOP/EOP per GA003, Inspection Standard & any applicable Work Instruction and/or Quality Alert. 3.Engineering validation of injection function changes per internal robust test procedure.	5	30	SEWS strictly controls processing parameters and tolerance levels. QA also verifies part dimension and function at the start and end of production. No other action needed.						
		3. Parts out-of-specification (QA Dimension Checks).	Inj. Molding scheduled production interrupted. Impaired function of Part Customer Complaint / Dissatisfaction.	4	C, C# (IC / SWS / IM)	Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design.	2	Confirmation system for molding set-up parameters. Set-up Operator instructions (shop order) & visual confirmation per CPC.	1. Verify against Mold Book Condition Sheet & record on Condition Sheet Form. 2..QA Visual Inspection per CPC and QA IIS at MOP/EOP per GA003, Inspection Standard & any applicable Work Instruction and/or Quality Alert.	6	48	SEWS strictly controls processing parameters and tolerance levels. QA also verifies part dimension and function at the start and end of production. No other action needed.						
	Material Staging for 100% Inspection (where applicable)	1. Incorrect Storage Location	Wrong Part/Mixed Parts delivered to customer Compliant/Dissatisfaction	3		Material Handler failed to place product in correct location.	2	P- Material Handler verifies correct location per electronically scanning Part number into system (BPCS)		5	30	NONE						
	100% Inspection (where applicable)	1. Parts out-of-specification (Inspector) Broken pins, Damaged mold pins, Flash, Voids, Sinks, Short Shot, Holes, Weld Lines, Robot Damage and other visual defects. Confirmation of parts for contamination/grease/oil.	Inj. Molding scheduled production interrupted. Impaired function of Part Customer Compliant/Dissatisfaction.	3		Machine Parameters (Over adjustment & under adjustment, limited range) Material Instability Age of Mold Incorrect Mold Design Gate size, location, wear (affects material flow) or Combination of above. Flow variation due to change of injection function components (barrel,screw, nozzle type,etc).	3	1. Monthly PM by machine maintenance. 2.Confirmation system for molding set-up parameters. 3.Set-up Operator instructions (shop order) & visual confirmation per CPC. 4.Confirmation of correct gate size, location, wear.	1. Verify parts against CPC / TWI.	5	45	SEWS strictly controls processing parameters and tolerance levels and tool condition. QA also verifies part dimension and function at the start and end of production. No other action needed.						
0080	Packaging and labeling at Machine	1. Incorrect Box Label	Wrong Part delivered to internal customer Customer Complaint / Dissatisfaction.	5		Molding operator failed to place correct label on bag / box	3	To generate label requires to scan shop order against mold book and machine.	1. Set up confirms mold number and part number are correct. 2. QA confirmation against CPC	5	75	NONE						
		2. Incorrect Quantity	Impact assembly/packing process Cause inventory variation.	5		Set up failed to correctly set lot quantity	3	Lot quantity set in machine memory.	1. Lot quantity confirmed each SOP by set up. Details are recorded on the set up condition check sheet. 2. Bags are 100% counted by machine.	5	75	NONE						
	Material Staging for Non-Bulk Packing / Labeling	1. Incorrect Storage Location	Delay in locating material, possible delay of shipment.	3		Material Handler failed to place product in correct location.	2	P- Each part is assigned to a specific location though barcode scan system.		5	30	NONE						

PROCESS NUMBER	PROCESS FUNCTION REQUIREMENTS	POTENTIAL FAILURE MODE	POTENTIAL EFFECT(S) OF FAILURE	SEV	LASS	CAUSES(S) MECHANISM(S) OF FAILURE	OCC	PROCESS CONTROLS PREVENTION	PROCESS CONTROLS DETECTION	DET	RPN	RECCOMMENDED ACTION(S)	& TARGET COMPLETION DATE	ACTIONS TAKEN	SEV	OCC	DET	RPN
			Raw Material shortage causing interruption to			Incorrect quantity shipped by Supplier		Supplier confirms material quantity or weight, and creates	Receiving Associate confirms BOL against Packing List									
0090	Transfer packaged parts to storage	1. Incorrect Storage Location	Delay in locating material, possible delay of shipment.	3		Material Handler failed to place product in correct location.	2		Material Handler verifies correct location per electronically scanning Part number into system (BPCS).	5	30	NONE						
0100	Finished Goods Storage	1. Incorrect Storage Location	Wrong Part delivered to customer Customer Complaint / Dissatisfaction.	3		Material Handler failed to place product in correct location.	2		Material Handler verifies correct location per electronically scanning Part number into system (BPCS)	5	30	NONE						
		2. Deterioration of packaging.	Damaged to box, potential delay of shipment.	3		Environmental conditions, handling errors.	2	Climate controlled warehouse, FIFO barcode controlled, monthly shelf life assessment.	Weekly audit and inventory assessment.	5	30	NONE						
0110	Finished Goods Inventory (Shipping)	1. Finished Goods Shortage	Inj. Molding scheduled production interrupted & intermittent leading to: *Parts shortage *Customer part shortage & assembly line shutdown *Customer part delivery performance degraded. * Customer complaint	3		BPCS SYSTEM not 100% dependable	2	Inventory Control System.	Manual inventory taken, Operator manual / visual inventory.	5	30	NONE						
0120	Finished Goods Dock Audit- (Weekly) Random box per skid)	1. Incorrect Part in box.	Customer Complaint / Dissatisfaction.	3		Operator failed to verify shipping label present, clear, correct and legible.	2	Packing Barcode Scanning operation, confirming inventory label to shipping label.	Operator visually confirms per instructions.	5	30	NONE						
		2. Incorrect Quantity in box and / or Damaged Box.	Customer Complaint / Dissatisfaction.	3		Shipping Operator failed to verify no damaged boxes & correct quantity shipped.	2		Operator electronically scans Box Label number to Print AIAG part number, includes cross verification system.	5	30	NONE						
		3. Incorrect AIAG Label (where Applicable).	Customer Complaint / Dissatisfaction.	3		Operator failed to verify AIAG label present, clear, correct and legible.	4		Operator electronically scans Box Label number to Print AIAG part number, includes cross verification system.	5	60	NONE						
0130	Shipping Finished Goods	1. Missing Box Label	Possible delayed shipment or shortage or parts.	3		Operator failed to verify shipping label is present, clear, correct and legible	2		Operator visually checks for damage & scans label / verifies correct quantity acceptance.	5	30	NONE						
		2. Damaged Boxes	Customer Complaint / Dissatisfaction.	3		Shipping Operator failed to verify no damaged boxes shipped.	2		Operator visually checks for damage & scans label / verifies correct quantity acceptance.	5	30	NONE						
		3. Incorrect AIAG Label (where Applicable)	Customer Complaint / Dissatisfaction.	3		Operator failed to verify AIAG label present, clear, correct and legible.	3	Operator electronically scans Box Label number to Print AIAG part number.		5	45	NONE						

PROCESS FLOW DIAGRAM

KEY CONTACT/DEPT. LOC. Debbie Gillenwater /-QA Dept.

PRODUCT : Molded Component Parts

PROCESS: Injection Molding Group 1
Supplier/Loc. SEWS-Scottsville#5
Mfg. Sup.: Alan Bomar
Prepared By: John Fraim

ISSUE/REVISION HISTORY		
DATE	CHANGE POINTS	CORE / DEVELOPMENT TEAM
6/04/1999	ISSUED WITH FORMAT CHANGES/UPDATED INFRO	T.Gravil, D. Lyons, T. Nall, K. Cantrell
1/8/2000	ISSUED WITH FORMAT CHANGES	T.Day
2/06/2001	Update Information	T.Gravil
3/13/2001	Update Information	T. Gravil, R. Ramsey, D.Lyons
4/7/2004	Update information	D Gillenwater, G Smith, J Renfrow
1/25/2005	Update Information	J Fraim L Roth, J Renfrow, D Gillenwater
8/25/2005	Update Information	J Fraim , J Saylors
9/27/2005	Update Information	D Karleskint
1/25/2008	Update process 101	J Fraim
3/30/2011	Update process - Packing	L. Roth
4/3/2014	Update process - Packing	L. Roth
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
2/28/2020	Annual review	R. Gonzalez, A. Davidson, F. Jones, C. Basham, D. Hudson, D. Hall

SUPPLIER APPROVALS;
General Plant Manager Nobuaki Hagiwara
Quality Manager Leroy Roth
Other Approvals
CUSTOMER APPROVALS:(IF REQUIRED)

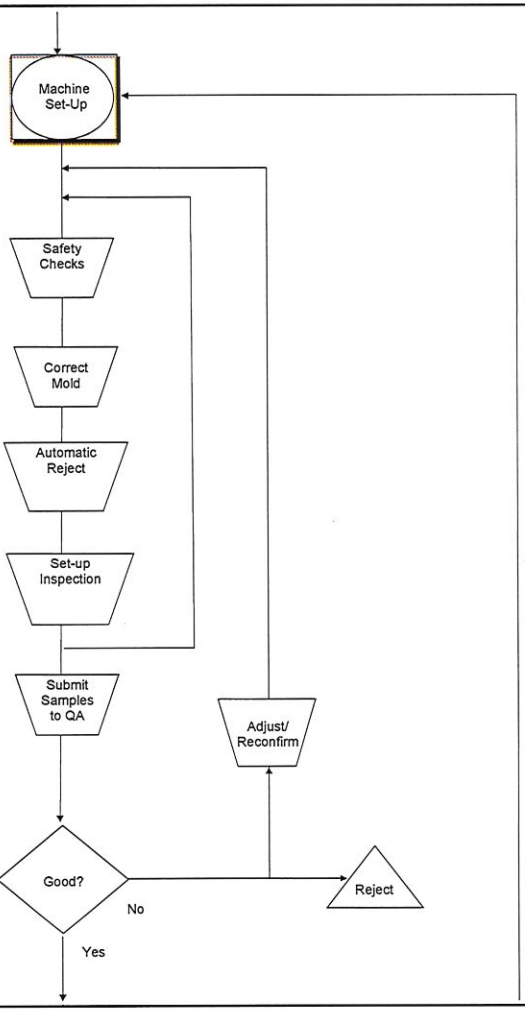
PART AD ASS'D | PART AD REC'D | OPERATION | INSPECTION | OPERATION/ INSPECTION | DECISION | STORAGE | DELAY | TRANSPORTATION | OPERATION STEP | OPERATOR

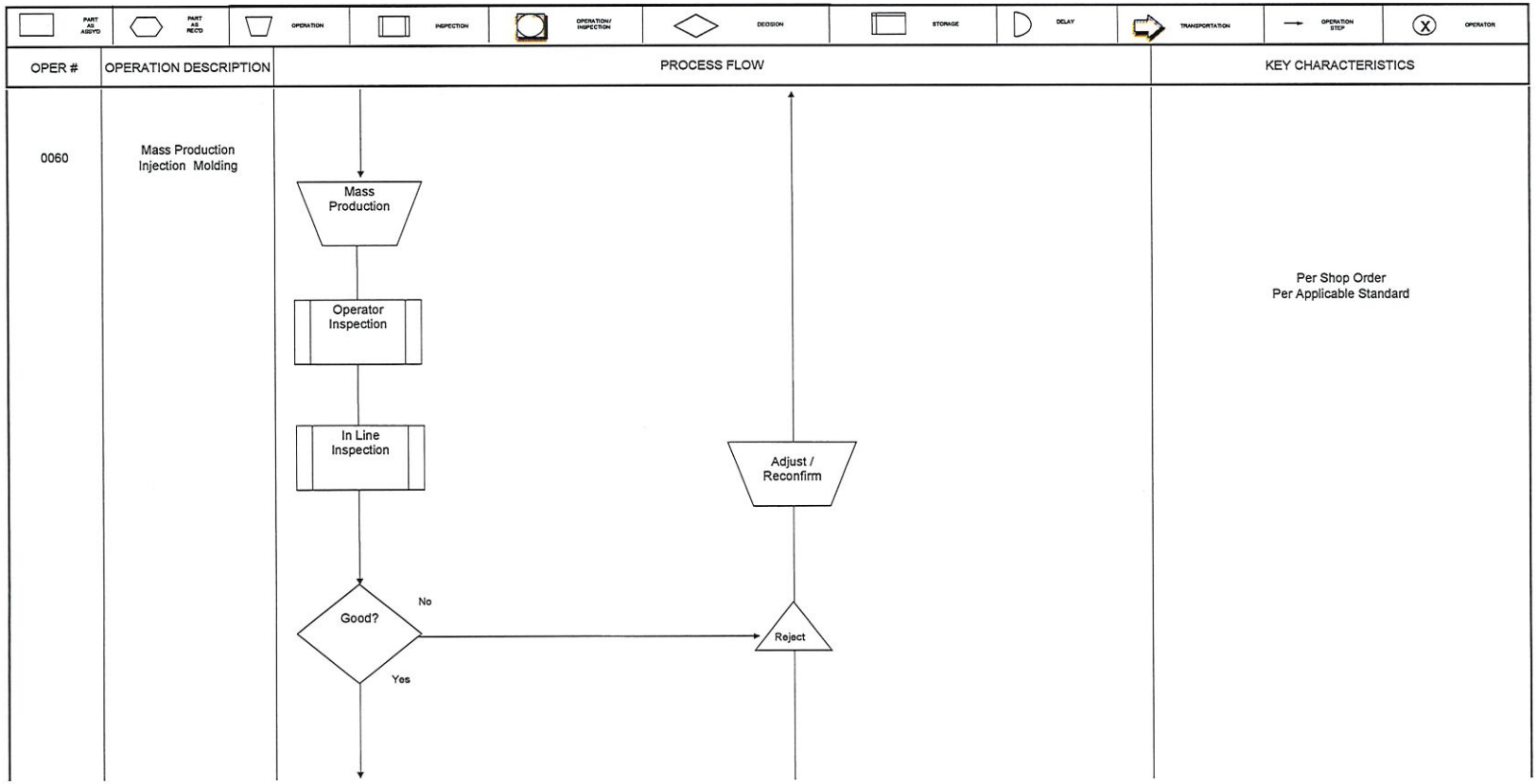
OPER #	OPERATION DESCRIPTION	PROCESS FLOW	KEY CHARACTERISTICS
010	Receive Raw Material	Purchased Raw Material	Visual Comparison Against Packing List Shipping-Receiving
	Reject for non-conformance	Good? No → Reject; Yes	Notify Quality Assurance Red Tag Procedure & Return to Vendor
0020	Quality Assurance Receiving Inspection	QA Receiving Inspection	
	Packaging, Identification, Visual Inspection, # Characteristics		Per QA Inspection Instruction Sheet-Receiving
	Reject for non-conformance	Good? No → Reject; Yes	Red Tag Procedure/Return to Vendor
0030	Raw Material Storage	Material Storage	
	Raw Material Inventory Assessment	Raw Material Inventory Assessment	

PART AS ADD'D | PART AS REC'D | OPERATION | INSPECTION | OPERATION/ INSPECTION | DECISION | STORAGE | DELAY | TRANSPORTATION | OPERATION STEP | OPERATOR

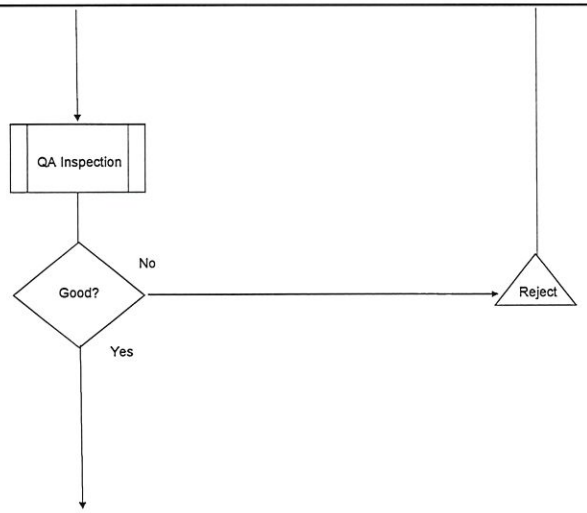
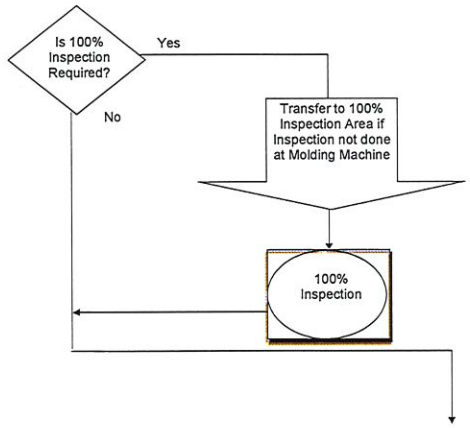
OPER #	OPERATION DESCRIPTION	PROCESS FLOW	KEY CHARACTERISTICS
	Material Staging	Deliver to Raw Material Staging Area	
0040	Raw Material Loading	MATERIAL LOADING	Injection Molding Machine

PART AS ASSY'D | PART AS RECD | OPERATION | INSPECTION | OPERATION/ INSPECTION | DECISION | STORAGE | DELAY | TRANSPORTATION | OPERATION STEP | OPERATOR

OPER #	OPERATION DESCRIPTION	PROCESS FLOW	KEY CHARACTERISTICS
0050	Set-up Injection Molding Machine		
	Raw Material Mold Numbers Process Parameters Regrind Ratio Raw Material Dryers		Per Shop Order Per Applicable Standard
			# Part Dimension / Function
	Reject for non-conformance		Make Adjustments, Reverify Parts, Mold Sent to Maintenance or Stop Production if applicable


PART AS ASSY'D
PART AS RECV'D
OPERATION
INSPECTION
OPERATION/ INSPECTION
DECISION
STORAGE
DELAY
TRANSPORTATION
OPERATION STEP
OPERATOR
OPER #
OPERATION DESCRIPTION
PROCESS FLOW
KEY CHARACTERISTICS
0060
Mass Production
Injection Molding
Mass Production
Operator Inspection
In Line Inspection
Good?
No
Yes
Reject
Adjust / Reconfirm
Per Shop Order
Per Applicable Standard

PART AS ASSY'D | PART AS REC'D | OPERATION | INSPECTION | OPERATION/ INSPECTION | DECISION | STORAGE | DELAY | TRANSPORTATION | OPERATION STEP | OPERATOR

OPER #	OPERATION DESCRIPTION	PROCESS FLOW	KEY CHARACTERISTICS
0070	Quality Assurance Inspection Reject for non-conformance		# Part Dimension / Function / Visual Notify Manufacturing Leader /QA Eng. Reject Tag Procedure
	Material Staging for Inspection 100% Inspection (when applicable)		Visual Inspection

PART AS ASS'D | PART AS REC'D | OPERATION | INSPECTION | OPERATION/ INSPECTION | DECISION | STORAGE | DELAY | TRANSPORTATION | OPERATION STEP | OPERATOR

OPER #	OPERATION DESCRIPTION	PROCESS FLOW	KEY CHARACTERISTICS
0080	Material Staging for Bulk Packaging / Labeling	Package and Labeling at Machine	Per Packaging Style and Shop Order
	Packaging and Labeling at Machine	Material Staging	
0090	Transfer Packaged Parts to Storage	Transfer to Finished Goods Storage; Transfer to Shipping	
0100	Finished Goods Storage	Finished Goods/ Storage.	
0110	Finish Goods Inventory Assessment	Finished Goods Inventory Assessment	
		Finished goods may be in-house or an off site warehouse.	
0120	Finished Goods Dock Audit (weekly) Random	Shipping Dock Audit	Quantity Identification
0130	Finished Goods Shipping	Finished Goods/ Shipping	Shipping Label
		Shipped to Customer	

☐ Prototype ☐ Pre-Launch ☑ Production

CONTROL PLAN

Control Plan Number CMG Connector Manufacturing Group (SV5 / Franklin)		Key Contact/Phone L. Roth /D. Gillenwater (270) 237-5419 x 8555 or 8563	Date (Orig.) 8/9/2010	Date (Rev.) 4/27/2021
Part Number/Latest Change Level Various		Core Team L. Roth, R. Gonzalez, M. Ryan, M. Dodson, D. Hudson, A. Davidson, F. Jones, D. Hall, K. Keen, D. Gillenwater	Customer Engineering Approval/Date (If Req'd.)	
Part Name/Description Various / Connector Molding		Supplier/Plant Approval/Date L. Roth 5-5-21	Customer Quality Approval/Date (If Req'd.)	
Supplier/Plant Sumitomo Electric Wiring Systems	Supplier Code	Other Approval/Date (If Req'd.) N. Hagawara 5-5-2021	Other Approval/Date (If Req'd.)	

Revision History:

8/9/10. Reviewed process, minor changes in bold

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)

2/28/20. Annual review

5/8/20. 0050 Added Metal Detector validation, 0060 process machine checks & 0070 waterproof tester machine.

5/26/20. Combined SV5 and Franklin Control Plans, added packing process, included metal detectors

8/19/20. 0060 Update Inline Inspection process

4/27/21. 0020 for receiving inspection, 0040 Material loading, 0050 Jet selector setting, 0050 & 0070 for special characteritics, 0080 improved flow of operation, and add 0140 for annual layouts.

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 SIZE	SAMPLE FREQ.	CONTROL METHOD	
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	* Correct color & type * Correct Part Number * No Damage * No contamination * Material Certification	* Visual comparison to box/skid label * Visual check of packaging * Review of Material Cert.	Per QRW-RAINBOW SQA Sample Plan	Each Incoming Shipment	QRP check in plastics Q.A. Inspection Instruction Sheet, Material Certifications stored electronically in QA drive.	* Notify SQA Coordinator, QA Leader or QA Manager. * Return to Supplier * Issue PIR to Supplier * Reject / Hold Procedure
		Melt Flow Tester				IC	* Melt Flow (As applicable per IISRP)	* MFR Test	Each Lot	Each Lot		
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
0040	Material Delivery to Manufactuing (Assign Gaylord / Bags)	Fork Truck	40	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. Coor., Supervisor & Q.A. if needed Reject / Hold 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 SIZE	SAMPLE FREQ.	CONTROL METHOD		
	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. Coor., 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
	Material Loading	Material Barrel / Buggy / Central Feed		Correct Material	Material Barrel / Buggy / Central Feed		(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. Coor., 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		
0050	Set-Up Injection Molding Machine	Molding Machine	50		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 Jet Selector per mold # condition sheet to pull virgin/regrind materials (as applicable)	Per Mold # Condition	Each Mold Start-up	Each Mold Start-up	Operator Daily Checksheet Controller Check Sheet		Notify Leader / Coordinator

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 SIZE	SAMPLE FREQ.	CONTROL METHOD	
	Automatic Machine Reject	Machine			Automatic Machine Reject		Set Auto Machine Reject to first 8 Shots. (Any exceptions are identified on Mold Condition Sheet)	Per Restart Verification Procedure Work Instruction & Machine Automatic Count Setting	Each Mold Start-up	Each Mold Start-up	Controller Check Sheet Process 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	P - Chart	Notify Leader / Coordinator
	Metal Detector confirmation	Metal Detector			Validate metal detector function.		Metal detector correctly operating	Metal detector validation per M1W-METDETCHECKS (Machines with Metal Detectors identified on ENW-METDETACTIVELIST	Once	SOP, EOP	MIF - BPMETDET	Notify Leader / Coordinator / follow MIW - METDETALARM
	Engineering Validation				Validation of injection function process		Engineering validation of any critical change to machine injection function (barrel/screw/ nozzle type / etc)	Per QAW - ROBUSTTEST	21 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, MM800, Profile, Force Gage, Mating Parts, waterproof tester, Various jigs as required		Connector Visual, Fit & Function	Quality Assurance Inspection	C, C# (IC, SWS, IM)	Per Q.A. Inspection Instruction Sheet	Per Q.A. Inspection Instruction Sheet	One Shot	SOP checks Per QAW - GA003	GA-003, Q.A. Inspection Instruction Sheet, Data Sheets and/or Electronic Data Entry	Notify Leader, Coordinator / Above Manufacturing Coordinator
				Dimensional		C, C# (IC, SWS, IM)	Per Q.A. Inspection Instruction Sheet	Per Q.A. Inspection Instruction Sheet	One Shot	SOP checksPer QAW - GA003	Any applicable Work Instruction, Temporary Work Instruction and/or Quality Alert	Abnormal Procedure, QA Hold Procedure TWI Procedure Backtrack/Recall Procedure Change/Defect Control Validation (RB) Reject Tag Procedure * Manual Data sheets as alternate method
0060	Mass Production Inj. Molding	Mold, Machine	60	Molded Parts	Mass Production Inj. Molding		Per Mold Condition Sheet	Visual	Each Lot	Each lot	P-Chart	Notify Leader / Coordinator
	Process Machine Checks	Mold, Machine		Molded Parts	Machine Checks		Confirm each item per the checksheet, M1F - MOLDPROCESSSHEET Confirm dryer settings, mold temperature settings, barrel temperature settings, monitor conditions, material, etc.	Checksheet: M1F - MOLDPROCESSSHEET	Each Machine on Production	Each Shift	P-Chart	Notify Leader / Coordinator
	Operator Inspection			Molded Parts	Operator Inspection		Per Critical Position Checksheet	Visual	1 shot per lot	Each lot	P - Chart	Notify Leader / Coordinator / Q.A. Leader / Above

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 SIZE	SAMPLE FREQ.	CONTROL METHOD	
	Inline Inspection			Molded Parts	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	P - Chart	Notify Coordinator / Leader, QA Leader. Follow Reject Tag Procedure
0070	Quality Assurance Inspection Fit & Function, Visual, Dimensional	Magnifier Light, Caliper, Keyence, Micrometer, MM800, Profile, Force Gage, Mating Parts, Waterproof tester, Various jigs as required	70	Connector Visual, Fit & Function	Quality Assurance Inspection	C, C# (IC, SWS, IM)	Per Q.A. Inspection Instruction Sheet	Per Q.A. Inspection Instruction Sheet	One Shot	Per QAW - GA003	GA-003, Q.A. Inspection Instruction Sheet, Data Sheets and/or Electronic Data Entry	Notify Leader, Coordinator / Above Manufacturing Coordinator
				Dimensional		C, C# (IC, SWS, IM)	Per Q.A. Inspection Instruction Sheet	Per Q.A. Inspection Instruction Sheet	One Shot	Per QAW - GA003	Any applicable Work Instruction, Temporary Work Instruction and/or Quality Alert	Abnormal Procedure, QA Hold Procedure TWI Procedure Backtrack/Recall Procedure Change/Defect Control Validation (RB) Reject Tag Procedure * Manual Data sheets as alternate method
	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	Packaging & Labeling at Molding Machine	Traveller label, Boxes, Plastic Bags	80	Molded Parts	Packaging & Labeling at Molding Machine		Per shop Order, No mixed parts	Visual	Each container	Each container	P-Chart, Electronic Scanning System	Notify Q.A. Leader, Coordinator / Above Manufacturing Coordinator 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.			
	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
	Bulk Packaging / Labeling	Weigh Scale, Label Printer, Scanner		Molded Parts	Bulk packing of product into finished good boxes.		Correct Number of Parts, No mixed parts	Verify correct weight/ quantity. (Set up scale per M1W-SCALESETUP)	Each container	Each container	Electronic Scanning System, Packing Log, Connector ID Sheet.		Notify Q.A. Leader, Coordinator / Above Manufacturing Coordinator Reject Tag Procedure
	Automatic Packaging / Labeling	Weigh Scale, Label Printer, Scanner		Molded Parts	Automatic Packaging (small quantity bags)		Correct Number of Parts, No mixed parts	Automatic Machine Count, verify correct weight/quantity using scale. (Set up scale per M1W-SCALESETUP)	Each bag	Each bag	Electronic Scanning System, Packing Log		Notify Q.A. Leader, Coordinator / Above Manufacturing Coordinator Reject Tag Procedure
	Manual Packing / Labeling	Weigh Scale, Label Printer, Scanner		Molded Parts	Manual Packing (small quantity bags)		Correct Number of Parts, No mixed parts	Verify correct weight/quantity. (set up scale per M1W-SCALE SETUP MAN PACK)	Each bag	Each bag	Record confimation on Changeover Checksheet		Notify Manufacturing Coordinator
	Bulk Packaging / Labeling (Subcontractor)	Weigh Scale, Label Printer, Scanner		Molded Parts	Subcontractor Bulk packing of product into finished good boxes.		Correct Number of Parts, No mixed parts	Verify correct weight/ quantity. (Set up scale per subcontractor work instruction)	Each container	Each container	Electronic Scanning System, Packing Log		Notify SV5 SQA Group
0090	Transfer packaged parts to storage	Fork Truck / Cart	90	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	100	Molded Finished Product	Finished Goods Storage (Scottsville SVW)		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		110	Correct Inventory Quantities	Inventory (Scottsville SVW)		Correct Quantities	Inventory Assessment	As needed	As needed	Electronic Scanning System, Inventory		Notify PC Management
				Correct Packing	Product Audit (QA) (Scottsville SVW)		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)		120	Finished Product Audit	Product Audit (Scottsville SVW)		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	130	All Finished Goods	Shipping Finished Goods (Scottsville SVW)		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
0140	Annual Layouts	Caliper, Keyence, Micrometer, MM800, Profile, Various jigs as required		Per Customer Drawing			Per Customer Drawing	Per Customer Requirements	Per Customer Request	Per Customer Request	PPAP Prep (Annual Layouts)		Notify QA Engineer/QA Coordinator or above

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: **FO120A06MA-B**
PART NO (s): **6098-8622**
Mold #: **1489-A**

Prepared by: Cindy Meador 1/9/2023
Design Rec. Change level/date:
MU5T-14A459-TA △0 10/14/2020
Eng. Change Documents: NA

CAVITY #:↓

all	37.25 +0.3 -0.3	16.55 +0.3 -0.3							
1	37.18	16.76							
2	37.16	16.75							
3	37.17	16.75							
4	37.19	16.76							
5	37.16	16.76							
6	37.18	16.76							
7	37.17	16.76							
8	37.17	16.76							
9	37.17	16.77							
10	37.17	16.76							
11	37.17	16.77							
12	37.17	16.76							
13	37.11	16.74							
14	37.10	16.74							
15	37.11	16.74							
16	37.12	16.74							
17	37.11	16.74							
18	37.12	16.74							
19	37.11	16.74							
20	37.12	16.73							
21	37.11	16.74							
22	37.12	16.74							
23	37.12	16.74							
24	37.12	16.74							
25	37.11	16.73							
26	37.11	16.74							
27	37.11	16.74							
28	37.11	16.73							
29	37.11	16.74							
30	37.11	16.73							

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: **FO120A06MA-B**
PART NO (s): **6098-8622**
Mold #: **1489-A**

Prepared by: Cindy Meador 1/9/2023
Design Rec. Change level/date:
MU5T-14A459-TA △0 10/14/2020
Eng. Change Documents: NA

CAVITY #:↓

all	37.25 +0.3 -0.3	16.55 +0.3 -0.3							
31	37.11	16.73							
32	37.11	16.72							
33	37.11	16.73							
34	37.12	16.73							
35	37.11	16.72							
36	37.12	16.74							
37	37.17	16.75							
38	37.16	16.76							
39	37.17	16.75							
40	37.17	16.75							
41	37.17	16.75							
42	37.18	16.75							
43	37.16	16.76							
44	37.18	16.75							
45	37.16	16.76							
46	37.18	16.76							
47	37.18	16.75							
48	37.17	16.75							
49	37.15	16.72							
50	37.15	16.73							
51	37.15	16.73							
52	37.15	16.72							
53	37.16	16.73							
54	37.16	16.74							
55	37.14	16.73							
56	37.16	16.72							
57	37.17	16.73							
58	37.17	16.73							
59	37.17	16.73							
60	37.15	16.74							

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: **FO120A06MA-B**
PART NO (s): **6098-8622**
Mold #: **1489-A**

Prepared by: Cindy Meador 1/9/2023
Design Rec. Change level/date:
MU5T-14A459-TA △0 10/14/2020
Eng. Change Documents: NA

CAVITY #:↓

all	37.25 +0.3 -0.3	16.55 +0.3 -0.3							
61	37.16	16.74							
62	37.16	16.73							
63	37.17	16.74							
64	37.17	16.73							
65	37.16	16.72							
66	37.17	16.75							
67	37.15	16.74							
68	37.14	16.75							
69	37.13	16.74							
70	37.15	16.73							
71	37.14	16.72							
72	37.16	16.71							
73	37.12	16.71							
74	37.20	16.74							
75	37.21	16.75							
76	37.11	16.74							
77	37.16	16.75							
78	37.18	16.74							
79	37.16	16.74							
80	37.12	16.72							
81	37.17	16.73							
82	37.12	16.75							
83	37.18	16.74							
84	37.17	16.74							
85	37.15	16.74							
86	37.13	16.72							
87	37.18	16.72							
88	37.13	16.74							
89	37.17	16.76							
90	37.17	16.76							

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: **FO120A06MA-B**
PART NO (s): **6098-8622**
Mold #: **1489-A**

Prepared by: Cindy Meador 1/9/2023
Design Rec. Change level/date:
MU5T-14A459-TA △0 10/14/2020
Eng. Change Documents: NA

CAVITY #:↓

all	37.25 +0.3 -0.3	16.55 +0.3 -0.3							
91	37.17	16.76							
92	37.16	16.75							
93	37.17	16.75							
94	37.20	16.77							
95	37.18	16.77							
96	37.20	16.76							
97	37.20	16.76							
98	37.17	16.77							
99	37.18	16.76							
100	37.18	16.76							

average	37.15	16.74
minimum	37.10	16.71
maximum	37.21	16.77
range	0.11	0.06
std dev	0.03	0.01
LSL	**36.95**	**16.25**
NOM	**37.25**	**16.55**
USL	**37.55**	**16.85**
CPK	2.420657399	2.474365389

TERMINAL TO HOUSING FUNCTION DATA

Specfication: **SEE BELOW**

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: **FO120A06MA-B**
PART NO (s): **6098-8622**
Mold #: **1489-A**

Prepared by: Cindy Meador 1/9/2023
Design Rec. Change level/date:
MU5T-14A459-TA △0 10/14/20
Eng. Change Documents: NA

TERMINAL INSERTION TO HOUSING 15 N MAX

CAVITY #	M1						M2						M3						M4					
1	7.6	7.7	8.8	10.5	10.1	7.7	8.2	7.7	8.1	8.5	9.5	8.8	7.8	8.8	8.7	8.5	8.1	7.9	9.1	8.1	8.4	7.8	8.0	8.5
CAVITY #	M5						M6						M7						M8					
1	8.2	8.9	8.7	8.8	9.1	7.5	8.4	10.2	8.6	8.6	8.5	8.9	7.7	8.2	8.6	7.7	7.1	7.8	7.2	8.5	8.1	7.5	7.3	8.0

AVERAGE 8.4
MIN 7.1
MAX 10.5

TERMINAL RETENTION FORCE PRIMARY LOCK (LANCE ONLY) 50 N MIN

CAVITY #	M1						M2						M3						M4					
1	58.4	57.2	59.1	62.8	61.7	63.2	57.5	56.2	58.8	61.0	57.5	57.6	60.3	60.1	57.8	57.7	55.5	57.6	57.5	58.5	57.1	62.2	56.1	58.2
CAVITY #	M5						M6						M7						M8					
1	57.3	56.9	54.2	60.5	59.6	59.2	57.5	59.5	60.4	59.9	59.1	57.1	58.6	58.5	56.2	60.6	61.2	61.5	57.7	58.2	57.8	59.0	55.7	58.2

AVERAGE 58.6
MIN 54.2
MAX 63.2

TERMINAL RETENTION FORCE SECONDARY LOCK (LANCE & TPA) 80 N MIN

CAVITY #	M1						M2						M3						M4					
1	90.3	90.1	92.7	93.4	93.9	94.5	87.0	91.0	92.0	93.6	92.4	96.3	87.7	89.6	90.3	90.6	87.7	99.2	92.8	94.3	90.8	93.8	96.5	106.8
CAVITY #	M5						M6						M7						M8					
1	88.2	91.6	88.6	92.6	88.7	96.6	92.4	93.7	90.4	92.3	93.6	94.6	88.6	96.9	95.4	88.5	91.1	91.1	94.2	93.4	94.5	88.5	88.6	93.0

AVERAGE 92.4
MIN 87.0
MAX 106.8

CONNECTOR FUNCTION DATA

Specfication: **SEE BELOW**

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: **FO120A06MA-B**
PART NO (s): **6098-8622**
Mold #: **1489-A**

Prepared by: Cindy Meador 1/9/2023
Design Rec. Change level/date:
MU5T-14A459-TA △0 10/14/20
Eng. Change Documents: NA

CONNECTOR INSERTION (with terminals and lock) 45 N MAX

CAVITY # →	M1	M2	M3	M4	M5	M6	M7	M8
1	20.2	18.0	20.5	18.5	15.9	14.0	17.2	15.9

AVERAGE 17.5
MIN 14.0
MAX 20.5

CONNECTOR EXTRACTION FORCE (with terminals, without lock) 45 N MAX

CAVITY # →	M1	M2	M3	M4	M5	M6	M7	M8
1	17.1	24.5	11.8	10.8	8.6	9.3	10.0	8.9

AVERAGE 12.6
MIN 8.6
MAX 24.5

HOUSING LOCK RETENTION (housing only) 110 N MIN

CAVITY # →	M1	M2	M3	M4	M5	M6	M7	M8
1	135.7	125.7	165.5	154.3	136.7	139.5	133.5	146.0

AVERAGE 142.1
MIN 125.7
MAX 165.5

TPA FUNCTION DATA

Specfication: **see below**

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: **FO120A06MA-B**
PART NO (s): **6098-8622**
Mold #: **1489-A**

Prepared by: Cindy Meador 1/9/2023
Design Rec. Change level/date:
MU5T-14A459-TA △0 10/14/20
Eng. Change Documents: NA

PRE-ASSEMBLED STATUS TO ASSEMBLED STATUS
20 N - 45 N

CAVITY # →	M1	M2	M3	M4	M5	M6	M7	M8
1	37.8	38.7	36.7	38.1	37.5	37.3	37.9	36.7

AVERAGE 37.6
MIN 36.7
MAX 38.7

ASSEMBLED STATUS TO PRE-ASSEMBLED STATUS
20 N - 45 N

CAVITY # →	M1	M2	M3	M4	M5	M6	M7	M8
1	29.9	24.0	23.8	26.9	28.4	30.4	27.9	30.0

AVERAGE 27.7
MIN 23.8
MAX 30.4

PRE-ASSEMBLED STATUS TO EXTRACTION
20 N MIN

CAVITY # →	M1	M2	M3	M4	M5	M6	M7	M8
1	23.7	28.2	28.1	23.0	22.0	21.9	30.1	25.6

AVERAGE 25.3
MIN 21.9
MAX 30.1

RETAINER TO HOUSING RETENTION FORCE DATA

Specfication: **50 N min**

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: **FO120A06MA-B**
PART NO (s): **6098-8622**
Mold #: **1489-A**

Prepared by: Cindy Meador 1/9/23
Design Rec. Change level/date:
MU5T-14A459-TA △0 10/14/20
Eng. Change Documents: NA

	Clip Retention 50 N Min							
CAVITY # →	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
1	68.1	70.8	62.2	64.7	66.6	65.9	78.3	74.3

AVERAGE 68.9
MIN 62.2
MAX 78.3

Sumitomo Electric Wiring Systems, Inc

Gage R&R Study

01/26/2022

Study Date: 1/25/2022 12:00:00 AM
Gage ID: B17085920
Gage Desc: 0 - 150 Caliper
Appraisers: 3 **Trials:** 3 **Parts:** 10
Study Type:
MSA Version: 4

Company Part No.: Mold 268
Part No.:
Part Desc: HW09-RET-04
Characteristic: Length
Specification Limits: **Min** 19.7 **Max** 20.1

☑ Approved **Pp (or Ppk) Target** **6-Sigma Proc Variation**

	Appr A:	A. Zappa		Appr B:	D. Nipper		Appr C:	M Hadddix	
1	20.07	20.08	20.06	20.07	20.07	20.08	20.06	20.07	20.05
2	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03
3	19.66	19.65	19.66	19.65	19.66	19.65	19.65	19.65	19.66
4	20.06	20.05	20.06	20.05	20.06	20.05	20.06	20.06	20.05
5	19.78	19.79	19.78	19.79	19.78	19.79	19.78	19.79	19.79
6	20.06	20.06	20.06	20.04	20.05	20.05	20.05	20.06	20.05
7	20.07	20.07	20.08	20.08	20.07	20.07	20.07	20.07	20.08
8	19.63	19.62	19.62	19.62	19.61	19.63	19.63	19.63	19.62
9	20.07	20.07	20.07	20.06	20.06	20.07	20.07	20.07	20.06
10	19.67	19.66	19.65	19.66	19.65	19.67	19.66	19.65	19.66

	Std. Dev.	% Contribution	% TV	% Tol		
Repeatability (EV):	0.005908	0.2%	4.2%	8.9%	**R bar:**	0.010000
Reproducibility (AV):	0.000571	0.0%	0.4%	0.9%	**UCL-R:**	0.025800
Appraiser x Part (INT):					**Study Variation:**	0.141695
GRR:	0.005936	0.2%	4.2%	8.9%	**Total Variation (TV):**	0.141695
Part-to-Part (PV):	0.141570	99.8%	99.9%	99.6%	**Tolerance/6 (Tol):**	0.066667
	number of distinct categories:		33.6	15.8		

* 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: E Shupp Date: 1/26/2022

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GRR Analysis Sheet

Study Date: 1/25/2022 12:00:00 AM
Gage ID: B17085920
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-04
Characteristic: Length
Specification Limits: 19.7 20.1
6 Sigma Process Variation:
Pp (or Ppk) Target:

R bar A = 0.009000 X bar A = 19.908333
R bar B = 0.011000 X bar B = 19.906000
R bar C = 0.010000 X bar C = 19.906333
R bar = **0.0100000** X bar Diff = **0.002333**

Rp = **0.450001** Tol/6 = **0.066667**

Measurement Unit Analysis	% Total Variation (TV)	% Tolerance
Repeatability - Equipment Variation (EV) EV = R bar x K1 = **0.005908** Trials K1: 2 0.8862; 3 0.5908	**% EV = 100 [EV / TV]** **= 4.2%**	**% EV = 100 [EV / (Tol / 6)]** **= 8.9%**
Reproducibility - Appraiser Variation (AV) AV = $\sqrt{[(X\ bar\ Diff \times K2)^2 - (EV^2 / n \times r)]}$ = **0.000571** Appraisers 2 3; K2 0.7071 0.5231 Note: If a negative value is calculated under the square root sign, AV defaults to zero. n = number of parts; r = number of trials	**% AV = 100 [AV / TV]** **= 0.4%**	**% AV = 100 [AV / (Tol / 6)]** **= 0.9%**
Repeatability and Reproducibility (GRR) GRR = $\sqrt{(EV^2 + AV^2)}$ = **0.005936**	**%GRR = 100 [GRR / TV]** **= 4.2%**	**% GRR = 100 [GRR / (Tol / 6)]** **= 8.9%**
Part Variation (PV) PV = Rp x K3 = **0.141570** 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)]** **= 99.6%**
	In MSA4, for % Tolerance, PV = SQRT [(Tol / 6)^2 - (GRR)^2]	
	ndc = 1.41(PV/GRR) **= 33.6**	**ndc = 1.41(PV/GRR)** **= 15.8**
Total Variation (TV) TV = $\sqrt{(GRR^2 + PV^2)}$ = 0.141695	If the 6 sigma process variation is known, then TV = [6 sigma process variation] / 6.00 and PV = SQRT[(TV^2) - (GRR)^2].	

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WORK INSTRUCTION

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

PURPOSE:	APPLICATION:
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.	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	QAW-ABNORMALPROC
Waterproof Test	Waterproof Tester	QAW - WATERPROOFTEST	Inspection Data Sheet	QAW-ABNORMALPROC
Moisture Analysis (Reference Only)	Moisture Tester	QAW - LABSCOPE	Moisture Test Data Sheet	QAW-ABNORMALPROC
Insertion / Retention Test	Force Gage Instron Tester	QAW - INSERTRETPROC QAW - InstronOperation	Inspection Data Sheet Data storage	QAW-ABNORMALPROC
Dimensional Measurement	Profile / Caliper / Micrometer / Depth Gage / Keyence Measurement System	Inspection Instruction Sheet	Inspection Data Sheet	QAW-ABNORMALPROC
Part Weight	Scale	Inspection Instruction Sheet	Inspection Data Sheet	QAW-ABNORMALPROC
Freeze Test	Freezer	SWS Inspection Standard	Inspection Data Sheet	QAW-ABNORMALPROC

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	QAW-ABNORMALPROC
Waterproof Test	Waterproof Tester	QAW - WATERPROOFTEST	Inspection Data Sheet	QAW-ABNORMALPROC
Insertion / Retention Test	Force Gage Instron Tester	QAW - INSERTRETPROC QAW - InstronOperation	Inspection Data Sheet Data storage	QAW-ABNORMALPROC

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	QAW-ABNORMALPROC
Part Weight	Scale	Inspection Instruction Sheet	Inspection Data Sheet	QAW-ABNORMALPROC
Freeze Test	Freezer	SWS Inspection Standard	Inspection Data Sheet	QAW-ABNORMALPROC

SV5 (Building 2) Tests Performed

TESTS PERFORMED	EQUIPMENT USED	TEST METHODS / STANDARD	RECORDING METHOD	REACTION METHOD
Hardness Test	Hardness Tester	QRF-IDSRM	Hardness Test Data Sheet	QAW-ABNORMALPROC
Dimensional Measurement	Profile / Caliper / Micrometer / Depth Gage / Measurement Microscope/ Keyence System/ OGP	SWS Inspection Standard / Inspection Instruction Sheet	Inspection Data Sheet / Excel Data Files	QAW-ABNORMALPROC
Contact Force	Contact Force Gage	MSW-Force Gage	Inspection Data Sheet	QAW-ABNORMALPROC
Insertion / Retention Test	Push / Pull Gage	MSW-InsertRetention	Inspection Data Sheet	QAW-ABNORMALPROC

Equipment Calibrations

	EQUIPMENT USED	TEST METHODS / STANDARD	RECORDING METHOD	REACTION METHOD
Micrometers, Depth Gages, Weigh Scales, other process tools/jigs.	Certified Gages (Gage Blocks & Weights)	Per Calibration Procedure	Calibration Record and Gagetrak	QAW-ABNORMALPROC
Assembly Master Samples	Calipers, Profile			
Caliper	Gage Block, Profile, Measuring Microscope			
Slip Gages	Micrometer			
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	Gage Pins			
OGP	Outside Vendor			
NIKON Measurment Microscope	Outside Vendor			
INSTRON Tensile Tester	Outside Vendor			

CERTIFICATE

This is to certify that

Sumitomo Electric Wiring Systems

Components Business Unit
2687 Old Gallatin Road
Scottsville, KY 42164
United States of America

has implemented and maintains a **Quality Management System**.

Scope:
The design and manufacture of connectors, connector components, and terminals.

An audit, conducted and documented in a report, has verified that this quality management system fulfills the requirements of the following International Automotive Standard:

IATF 16949:2016
(with product design)

Certificate registration no.	10001349 IATF16
Main certificate registration no.	10003837 IATF16
Issuing date	2021-06-23
This certificate is valid until	2024-06-22
IATF No.	0406733

2-IAO-QMC-01001

For and on behalf of DQS

Brad McGuire
Managing Director, DQS Inc.

Michael Drechsel
Managing Director, DQS Holding GmbH

IATF Contract Office: DQS Holding GmbH, Konrad-Adenauer-Allee 8-10, 61118 Bad Vilbel, Germany
Issuing Office: DQS Inc., 1500 McConnor Parkway, Suite 400, Schaumburg, IL 60173 USA

2017-03-09

Annex to certificate registration no.: 10001349 IATF16
IATF-No.: 0406733

Sumitomo Electric Wiring Systems

Components Business Unit
2687 Old Gallatin Road
Scottsville, KY 42164
United States of America

2-IAO-QMC-01001

Remote Location	Scope
10003837 **Sumitomo Electric Wiring Systems** **1018 Ashley Street** **Bowling Green, KY 42102** **United States of America**	Information Technology, Internal Audit Management, Management Review, Policy Making, Purchasing, Quality System Management, Strategic Planning and Training.
10004404 **Sumitomo Electric Wiring Systems** **27360 Drake Road** **Farmington Hills, MI 48331** **United States of America**	Product Design, Purchasing, and Warranty Management.
10004405 **Sumitomo Wiring Systems (USA), Inc.** **7500 Viscount Drive, Suite 192** **El Paso, TX 79925** **United States of America**	Customer Service.
10004406 **Sumitomo Wiring Systems (USA), Inc.** **39555 Orchard Hill Place** **Suite L60** **Novi, MI 48375** **United States of America**	Contract Review.
10013991 **Sumitomo Electric Wiring Systems** **120 Industrial Drive** **Scottsville, KY 42164** **United States of America**	Warehousing.
10017459 **Sumitomo Wiring Systems, Ltd.** **Components Group** **1820 Nakanoike, Mikkaichi-cho** **Suzuka-City** **Mie Pref 513-8631** **Japan**	Product Design.

Annex to certificate registration no.: 10001349 IATF16
IATF-No.: 0406733

Sumitomo Electric Wiring Systems

Components Business Unit
2687 Old Gallatin Road
Scottsville, KY 42164
United States of America

2-IAO-QMC-01001

Extended manufacturing site

10012558
Sumitomo Electric Wiring Systems
796 Smith Grove Rd.
Scottsville, KY 42164
United States of America

10015246
Sumitomo Electric Wiring Systems
265 Garvin Lane
Franklin, KY 42134
United States of America