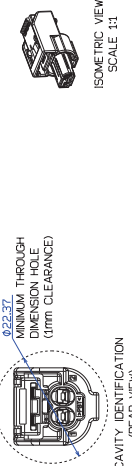


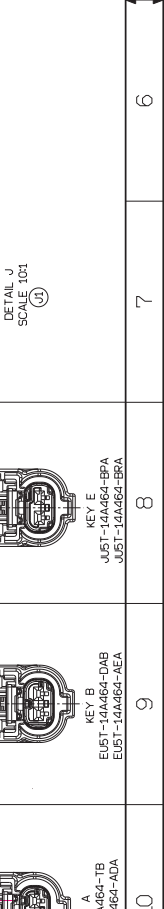
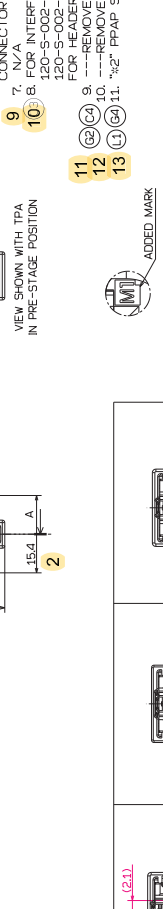
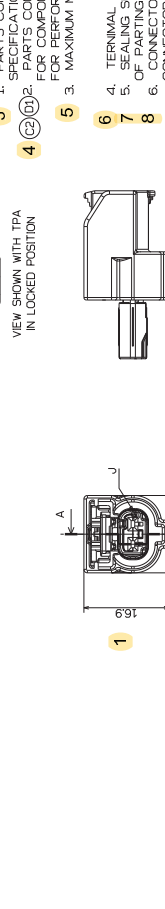
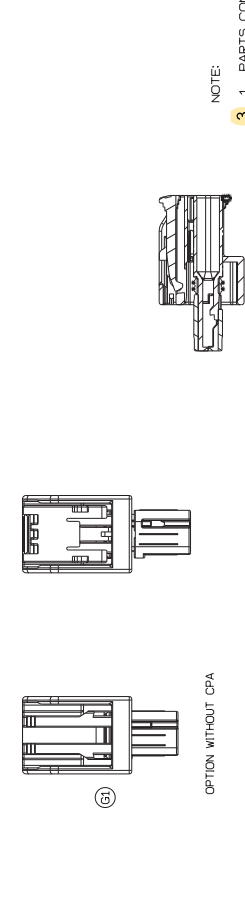
10	9	8	7	6	5	4	3	2	1
H	APPLICABLE COMPONENTS			SUPPLIER COMPONENT PART NO.			REVISIONS		
	ITEM	DESCRIPTION	MATERIAL	REF. NO.	PLATING	TERMINAL	ORIGINATOR	CHECKER	ENGR APP
	1	TRC B837/12mm (CAVITIES 12)	NO	0/35x45	N/A	N/A	A	RELEASED	20210826
	2	WIRE SEAL	NO	N/A	SILICONE	HU5T-10C930-JA	J. LANZOTTI	J. SPENCER	J. PITTINGER
	3	WIRE SEAL	NO	N/A	SILICONE	HU5T-10C930-HA	J. LANZOTTI	J. SPENCER	J. PITTINGER
G	4	WIRE SEAL	NO	N/A	SILICONE	A-0611-G	AEL-E-117B3930-287		20130425
	5	WIRE SEAL	NO	N/A	SILICONE	A-0611-F	J. LANZOTTI	M. SPENCER	J. PITTINGER
									20130425
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F									20130425
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									20130425
									20130425
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E									20130425
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ISOMETRIC VIEW
SCALE 1:1

CONNECTOR ASSEMBLY CHART			
ASSEMBLY PART NO.'S	SUPPLIER PART NO.	VIBRATION CLASS	MATING COMPONENT
EL5T-14A464-TB	6189-7456	V3	TBD
EL5T-14A464-DAB	6189-7457	V3	TBD
EL5T-14A464-ADA	6189-7458	V3	TBD
EL5T-14A464-AEA	6189-7459	V3	TBD
EL5T-14A464-BPA	6189-7460	V3	TBD
EL5T-14A464-BRA	6189-7461	V3	TBD

ITEM	DESCRIPTION	COLOR	FORD COMPONENT PART NO.	SUPPLIER COMPONENT PART NO.	MATERIAL/SPEC NO.	RECYCLING CODE	WEIGHT	NUMBER OF REPAIRS REQUIRED
1	FEMALE HOUSING KEVA	BLACK	N/A	6185-5159	PBT/WSS-M99P23-B	PBT	2.2g	1
1	FEMALE HOUSING KEVA	BLACK	N/A	6185-5163	PBT/WSS-M99P23-B	PBT	2.2g	1
1	FEMALE HOUSING KEVA	BLACK	N/A	6185-5514	PBT/WSS-M99P23-B	PBT	2.2g	1
2	FEMALE TPA KEVA	NATURAL	N/A	6910-7258	PBT/WSS-M99P23-B	PBT	0.23g	1
2	FEMALE TPA KEVA	LIGHT GRAY	N/A	6910-7262	PBT/WSS-M99P23-B	PBT	0.23g	1
2	FEMALE TPA KEVA	TBD	N/A	6910-7689	PBT/WSS-M99P23-B	PBT	0.23g	1
3	PERIMETER SEAL	BROWN	N/A	7135-0698	HS-30	VMO	0.05g	1
4	CPA	NATURAL	N/A	6910-7263	PBT/WSS-M99P23-B	PBT	0.52g	1



NOTE:

1. PARTS CONFORM TO THE ELECTRICAL CONNECTION SYSTEM DESIGN SPECIFICATIONS (REV. 21), DATED JAN. 2011.
2. PARTS CONFORM TO THE TEST SPECIFICATIONS OF USCAR 2, REV. 5 DATED NOV 2007.
3. FOR PERFORMANCE CRITERIA AND EXCEPTIONS, SEE SUMITOMO DVPFR.
4. FOR PERFORMANCE CRITERIA AND EXCEPTIONS, SEE SUMITOMO DVPFR.
5. MAXIMUM MATING FORCE FULLY POPULATED WITH 50 TERMINALS IS 14.7N.
6. MAXIMUM MATING FORCE FULLY POPULATED WITH 50 TERMINALS IS 10.5N.
7. N/A
8. TERMINAL EXTRACTION TOOLS: 23730003
9. STRESS RELIEF SURFACES AS IDENTIFIED ON THIS DRAWING ARE SMOOTH AND FREE OF PARTING LINES.
10. CONNECTOR IS RATED AS ERGONOMIC CLASS 2 (HAND GRASP) BASED ON USCAR-25 REV. 1.
11. CONNECTOR PUSH SURFACE AREA IS 192.5mm².
12. FOR INTERFACE VIEWS PLEASE SEE EWCAP
13. 120-S-002-1-201
14. 120-S-002-1-202
15. FOR EXTRACTOR BLADE INFORMATION SEE EWCAP DRAWING EWCAP-001.
16. ---REMOVED---
17. "1" (G1) 11. "2" PPAP SUBMISSION APRIL 2018



SEWS
SEWS DRAWING / PART NUMBER
SEE CHART

SEWS RELEASE LEVEL
PRODUCTION
APPLICATION

WEIGHT (G)
SEE CHART

REFERENCE: 2WAY SEALED FEMALE 120mm
PART MUST COMPLY WITH MATERIAL SPECIFICATION WSS-M99P989-A1
TO HELP SAFEGUARD HEALTH, SAFETY AND THE ENVIRONMENT

DRAFTED IN ACCORDANCE WITH FORD MOTOR COMPANY ENGINEERING CAD AND DRAFTING STANDARDS CURRENT AT INITIAL RELEASE

CAD TYPE: CATIA
CAD LOC: PPT
CAD FILE: PPT_EU5T-14A464-TB
METAPHASE: DWG_EU5T-14A464-TB

OPER. NO.:
UNIT: mm
DRAWING: EU5T-14A464-TB

DESIGN: J.
CHECKED: MS
SAFETY: -----
DATE: 20121012
SCALE: 2:1
DIVISION: PLANT

TITLE: SLV ASY WIR CONN FEM
SHEET 1 OF 1
PLANT: Ford Motor Company

DRW SIZE: A1

Division Manager : A. Bomar

Quality Manager: L. Roth

Other Approvals:

CUSTOMER APPROVALS(IF REQUIRED)

Other Approvals:

CUSTOMER APPROVALS(IF REQUIRED)

ITEM: INJECTED MOLDING COMPONENTS

MODEL / VEHICLE: AII

F M E A # SV5 #1

PREPARED BY: LEROY ROTH

4/18/2018	Modify process number sequence	R. Gonzalez, L. Roth, P. Keith, A. Davidson
8/11/2017	Remove packaging process (moved to FRK).	J. Frim
	Updated missing RPN calculation for 0120	
12/16/2016	Add scattered per central design	L. Roth
7/18/2014	Update SC's to match control plan	L. Roth, J. Frim, D. Gillewater
5/6/2014	Add material dryer alarm, add Central Feed Interlock, review section 0050	L. Roth, C. Trekket, P. Keith
4/2/2014	Define connecting in 0080	L. Roth
11/14/2013	review process, update detection ratings	J. Frim, L. Roth, D. Gillewater
8/11/2011	Update for Setup	L. Roth
9/21/2010	Update for Setup	L. Roth
6/18/2010	Update to include add sales and mid balance as cause of failure, add design and process control settings for damage, added damage to inline check, etc	D. Gillewater, J. Frim, L. Roth, D. Duncan, A. Davidson, S. Tautsa, J. Saylor

NUMBER	PROCESS FUNCTION	POTENTIAL FAILURE MODE	POTENTIAL EFFECT(S) OF FAILURE	ISSUE/REVISION HISTORY			CHANGE POINTS			CROSS FUNCTIONAL TEAM				RESPONSIBILITY &TARGET COMPLETION DATE	ACTIONS TAKEN	S E V	O C E	D E T	R
				C L A S S	S E A V	P O T E N T I A L C A U S E (S) / M E C H A N I S M (S) O F F A I L U R E	O C C U R	C U R R E N T P R O C E S S C O N T R O L S	D E T E C T	R E P A I R	R E C O M M E N D E D A C T I O N (S)								
0010	Raw Material Receiving	1. Incorrect Raw Material Quantity Received	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	P-Supplier confirms material quantity, or weight, and creates packing list. D- 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	P-Supplier confirms material quantity, or weight, and creates packing list. D- 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	P- Packaging is designed to prevent damage. D- 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 complaint	7	IC	Insufficient Supplier Process Controls	2	P- Supplier tests each lot of material for proper mechanical and chemical properties. D- *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 complaint	3	Mislabeled Raw Material Container	2	P- Supplier confirms and matches color per their in process controls. D- QA Receiving associate visually confirms per shipment / lot referencing master samples.	7	42	NONE									
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	5	20	NONE								

NUMBER	PROCESS FUNCTION	POTENTIAL FAILURE MODE	POTENTIAL EFFECT(S) OF FAILURE	SEVERITY	C L A S S	POTENTIAL CAUSE(S)/MECHANISM(S) OF FAILURE	O C C U R	CURRENT PROCESS CONTROLS	D E T E C T	R P N	RECOMMENDED ACTION(S)	RESPONSIBILITY & TARGET COMPLETION DATE	ACTIONS TAKEN	SEVERITY	O C C U R	D E T E C T	R P N	
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	P- 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. D- Barcode system automatically selects correct material. * 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 by the operator. Barcode Set-up and shift start. No other action is needed.							
	Material Drying (if required)	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	P- 1. Machine is interlocked not to operate if dryer is off. P- 2. Central Feed Dryer will alarm if power goes off. P- 3. Set-up operator verifies and visually confirms correct process parameters. D - 1. Parameters are reconfirmed by coordinator/leader and operator.	4	24	NONE							
0050	Set-up Injection Molding Machine	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	P- 1. Barcode system confirms raw material matches shop order. Any mismatch prevents printing of labels. D- 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	P- 1: Central Feed System interlocks prevent incorrect material feed D -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	P-1. Barcode scan mold book to machine, any mismatch prevents printing of labels, 2.Set-up Associate instructions (shop order) & visual confirmation. D - 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	P-1. Engineering established parameters selected by setup and automatically uploaded to machine. 2. Set-up Associate instructions (shop order) & visual confirmation. D - 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							

NUMBER	PROCESS FUNCTION	POTENTIAL FAILURE MODE	POTENTIAL EFFECT(S) OF FAILURE	SEVERITY	CLASSIFICATION	POTENTIAL CAUSE(S)/MECHANISM(S) OF FAILURE	OCURRENCE	CURRENT PROCESS CONTROLS	DETECTABILITY	RECOMMENDED ACTION(S)	RESPONSIBILITY & TARGET COMPLETION DATE	ACTIONS TAKEN	SEVERITY	CLASSIFICATION	REPORT NUMBER	
		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	S	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	P- 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 D- 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 SOPEOP (as applicable)	5	SEWS strictly controls processing parameters and tolerance levels and tool condition.						
				3		Improper Robot settings	3	P-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. D-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 reevaluation of robot settings.	5	NONE						
				3		Machine Wear Improper cleaning at changeover or machine PM.	2	D- Set-up operator verifies & visually confirms machine clean each Mold change/Set-up per work instructions. Maintenance PM Mold Schedule	6	NONE						
				5		Damaged or broken pins due to Age/condition of Mold	2	P- Maintenance PM Mold, QA Confirmation function SOPEOP, Operator each lot visual check, Mold condition settings.	5	SEWS maintains molds and follows strict PM schedule, Parts are also confirmed functionally to defect 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	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	P- 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 D- 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 SOPEOP (as applicable)	5	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 retainer insertion, retainer retention, engagement with mating parts (clip, etc.), Hinge, Cliplock, or Lance damage-(where Applicable)	Inj. Molding scheduled production interrupted, Impaired function of Part Customer Compliant/Dissatisfaction	3	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	P- 1. Condition adjustment restricted to engineering. 2. Confirmation system for molding set-up parameters. D-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	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.							

NUMBER	PROCESS FUNCTION	POTENTIAL FAILURE MODE	POTENTIAL EFFECT(S) OF FAILURE	SEVERITY	CAUSE(S) OF FAILURE	POTENTIAL CAUSE(S)/MECHANISM(S) OF FAILURE	OCURRENCE	CURRENT PROCESS CONTROLS	D E T E R M I N E D	R E P A I R	RECOMMENDED ACTION(S)	RESPONSIBILITY & TARGET COMPLETION DATE	ACTIONS TAKEN	SEVERITY	OCURRENCE	D E T E R M I N E D	R E P A I R
		7. Parts out-of-specification (QA/Dimension Checks)	Inj. Molding scheduled production interrupted, Impaired function of Part Customer Complaint/Dis-satisfaction	4	SWS	Machine Parameters (Over adjustment & under adjustment, limited range) Material instability Age of Mold Incorrect Mold Design	2	P. Confirmation system for molding set-up parameters. Set-up Operator instructions (shop order) & visual confirmation per CPC. D-1. Verify against Mold Book Condition Sheet & record on Condition Sheet Form. 2. QA Dimensional inspection against 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/Dis-satisfaction	5		Trapped or scattered parts/ start-up shots remaining in molding machine.	3	P - 1. Process Change System for evaluating chute/conveyor changes for potentially scattered parts. D -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	4. Parts out-of-specification (Operator appearance checks) Broken pins, Damaged mold parts, 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 Complaint/Dis-satisfaction	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	P. 1. Monthly PM by machine maintenance. 2. Confirmation system for molding set-up parameters. 3. Setup Operator instructions (shop order) & visual confirmation per CPC. 4. Confirmation of correct gate size, location, wear D- 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 parts, 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 Complaint/Dis-satisfaction	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	P. 1. Monthly PM by machine maintenance. 2. Confirmation system for molding set-up parameters. 3. Setup Operator instructions (shop order) & visual confirmation per CPC. 4. Confirmation of correct gate size, location, wear D- 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.						
0070	Quality Assurance Inspection Injection Molding	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 Complaint/Dis-satisfaction	3	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	P. 1. Monthly PM by machine maintenance. 2. Confirmation system for molding set-up parameters. 3. Setup Operator instructions (shop order) & visual confirmation per CPC. 4. Confirmation of correct gate size, location, wear D- 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. 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.						
		6. Parts out-of-specification (QA functional checks) Broken pins, Damaged mold parts, Flash, Voids, Sinks, Short Shot, Holes, Weld Lines, retainer, relation, engagement with mating parts (clip, etc.), Hinge, Cliplock, or Lance damage-(where Applicable)	Inj. Molding scheduled production interrupted, Impaired function of Part Customer Complaint/Dis-satisfaction	3	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	P- 1. Condition adjustment restricted to engineering. 2. Confirmation system for molding set-up parameters. D-1. Verify against Mold Book Condition Sheet & record on Condition Sheet Form. 2. QA Functional testing each MOP/EOP 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 and tool condition. QA also verifies part dimension and function at the start and end of production. No other action needed.						

☐ Prototype☐ Pre-Launch☒ Production**CONTROL PLAN**

Control Plan Number		Key Contact/Phone		Date (Orig.)	Date (Rev.)
Connector Manufacturing Group (CMG)		L. Roth /D. Gillenwater (270) 237-5419 x 8555 or 8563		8/9/2010	4/18/2018
Part Number/Latest Change Level		Core Team			
Various		L. Roth, P. Keith, A. Davidson, R. Gonzalez			
Part Name/Description		Supplier/Plant Approval/Date			
Various, Connector Molding		L. Roth			
Supplier/Plant		Other Approval/Date (If Req'd)			
Sumitomo Electric Wiring Systems		A. Bonar			
Revision History:					
8/9/10 Reviewed process, minor changes in bold					
9/21/10 Added Set-up Checks/sheet 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/gay/bord/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	PRODUCT / PROCESS SPECIFICATION / TOLERANCE	EVALUATION / MEASUREMENT TECHNIQUE	METHODS		REACTION PLAN	
			NO	PRODUCT	PROCESS				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	* 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 SOA Sample Plan	Each Incoming Shipment	Q.A. Inspection Instruction Sheet, Material Certifications	* Notify SOA 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, SOA Inventory Audit	Notify Shipping Receiving Leader, Supervisor & Q.A. If needed Reject / Hold Procedure

PART / PROCESS NUMBER	PROCESS NAME / OPERATION DESCRIPTION	MACHINE, 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 / Bag's)	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	* Checklist * 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, 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	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	
0060	Quality Assurance Inspection Fit & Function, Visual, Dimensional	Magnifier Light, Profile Projector, Caliper, Micrometer, Force Gage, Mating Parts, Various jigs as required	60	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	SOP checks Per QAW - GA003	Q.A. Inspection Instruction Sheet, Data Sheets and/or Electronic Data Entry	Notify Leader, Coordinator / Above Manufacturing Coordinator
				Dimensional		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 as alternate method	Reject Tag Procedure QA Hold Procedure TWI Procedure Backtrack/Recall Procedure Change/Defect Control Validation (RB) * Manual Data sheets as alternate method
	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 Checksheets	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 Checksheets 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, Caliper, Micrometer, Force Gage, Mating Parts, Various jigs as required	80	Connector Visual, Fit & Function Dimensional Molded Parts Molded Parts	Quality Assurance Inspection Material Staging for 100% Inspection 100% Inspection	C (IC, SWS, IM) C, C# (IC, SWS)	Per Q.A. Inspection Instruction Sheet Per Q.A. Inspection Instruction Sheet Correct Location No Short Shot No Excessive Flash No defects	Per Q.A. Inspection Instruction Sheet Per Q.A. Inspection Instruction Sheet Visual Visual, Per Critical Position Checksheet / Applicable work instruction	One Shot One Shot Each Container Each piece per Lot	Per QAW - GA003 Per QAW - GA003 As needed / required As needed / required	Q.A. Inspection Instruction Sheet, Data Sheets and/or Electronic Data Entry -Reject Tag Procedure -QA Hold Procedure -TWI Procedure -Backtrack / Recall -Procedure Electronic Scanning System CPC / Daily Inspection Log Reject Tag Procedure QA Hold Procedure	Notify QA Leader, Coordinator / Above Manufacturing Coordinator -Reject Tag Procedure -QA Hold Procedure -TWI Procedure -Backtrack / Recall -Procedure Notify Q.A. Leader, Coordinator / Above Manufacturing Coordinator Reject Tag Procedure 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 Correct Packing	Inventory Product Audit (QA)		Correct Quantities Confirm Packing, Damage	Inventory Assessment Visual Evaluation	As needed Sample of FG Inventory	As needed Weekly	Electronic Scanning System, Inventory SOA Inventory Audit SV6	Notify PC Management 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	
	Annual Layouts			Per Customer Drawing			Per Customer Drawing	Per Customer Requirements	SIZE	FREQ.	Customer PPAP	Notify QA Engineer/QA Manager
									Per Customer Request	Per Customer Request		

Sumitomo Electric Wiring Systems, Inc

Gage R&R Study

05/29/2018

Page 1 of 2

Study Date: 6/2/2017 12:00:00 AM

Company Part No.: Mold 268

Gage ID: 08381913

Part No.:

Gage Desc: 0 - 200 Caliper

Part Desc: HW09-RET-06F

Appraisers: 3

Trials: 3

Parts: 10

Characteristic: Length

Study Type:

Specification Limits: Min 19.6 Max 20.2

MSA Version: 4

☒ Approved

Pp (or Ppk) Target

6-Sigma Proc Variation

Appr A: Tabitha Whitney			Appr B: Toni Robinson			Appr C: Eric Skaggs		
1	20.06	20.06	20.05	20.07	20.08	20.08	20.09	20.09
2	20.03	20.03	20.03	20.03	20.03	20.03	20.03	20.03
3	19.65	19.64	19.65	19.64	19.64	19.64	19.65	19.65
4	20.05	20.04	20.05	20.08	20.08	20.08	20.08	20.08
5	19.76	19.77	19.76	19.74	19.75	19.75	19.77	19.77
6	20.04	20.04	20.03	20.05	20.04	20.05	20.05	20.05
7	20.03	20.02	20.02	20.05	20.06	20.08 *	20.09	20.09
8	19.64	19.65	19.65	19.6	19.59	19.6	19.64	19.64
9	20.06	20.07	20.08 *	20.06	20.06	20.05	20.07	20.07
10	19.63	19.64	19.65 *	19.64	19.63	19.65 *	19.65	19.65

	Std. Dev.	% Contribution	% TV	% Tol		
Repeatability (EV):	0.004136	0.1%	2.9%	4.1%	R bar:	0.007000
Reproducibility (AV):	0.008335	0.4%	5.9%	8.3%	UCL-R:	0.018060
Appraiser x Part (INT):					Study Variation:	0.140829
GRR:	0.009305	0.4%	6.6%	9.3%	Total Variation (TV):	0.140829
Part-to-Part (PV):	0.140521	99.6%	99.8%	99.6%	Tolerance/6 (Tol):	0.100000
number of distinct categories:			21.3	15.1		

* 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:

6/2/17

GRR Analysis Sheet

Study Date: 6/2/2017 12:00:00 AM Gage ID: 08381913 Gage Desc: 0 - 200 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: 19.6 20.2 6 Sigma Process Variation: Pp (or Ppk) Target:																					
R bar A = 0.011000 X bar A = 19.896000 R bar B = 0.010000 X bar B = 19.897667 R bar C = 0.000000 X bar C = 19.912000 R bar = 0.0070000 X bar Diff = 0.016000		Rp = 0.446667 Tol/6 = 0.100000																					
Measurement Unit Analysis		% Total Variation (TV)	% Tolerance																				
Repeatability - Equipment Variation (EV) $EV = R \text{ bar} \times K1$ $= 0.004136$ <table border="1" style="margin-left: 20px;"> <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	$\% EV = 100 [EV / TV]$ $= 2.9\%$	$\% EV = 100 [EV / (Tol / 6)]$ $= 4.1\%$														
Trials	K1																						
2	0.8862																						
3	0.5908																						
Reproducibility - Appraiser Variation (AV) $AV = \sqrt{[(X \text{ bar Diff} \times K2)^2 - (EV^2 / n \times r)]}$ $= 0.008335$ <table border="1" style="margin-left: 20px;"> <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. n = number of parts r = number of trials		Appraisers	2	3	K2	0.7071	0.5231	$\% AV = 100 [AV / TV]$ $= 5.9\%$	$\% AV = 100 [AV / (Tol / 6)]$ $= 8.3\%$														
Appraisers	2	3																					
K2	0.7071	0.5231																					
Repeatability and Reproducibility (GRR) $GRR = \sqrt{(EV^2 + AV^2)}$ $= 0.009305$		$\% GRR = 100 [GRR / TV]$ $= 6.6\%$	$\% GRR = 100 [GRR / (Tol / 6)]$ $= 9.3\%$																				
Part Variation (PV) $PV = Rp \times K3$ $= 0.140521$	<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	$\% PV = 100 [PV / TV]$ $= 99.8\%$	$\% PV = 100 [PV / (Tol / 6)]$ $= 99.6\%$
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, $PV = \text{SQRT}[(Tol / 6)^2 - (GRR)^2]$																					
		$ndc = 1.41(PV/GRR)$ $= 21.3$	$ndc = 1.41(PV/GRR)$ $= 15.1$																				
Total Variation (TV) $TV = \sqrt{(GRR^2 + PV^2)}$ $= 0.140829$		If the 6 sigma process variation is known, then TV $= [6 \text{ sigma process variation}] / 6.00$ and $PV = \text{SQRT}[(TV^2) - (GRR)^2]$.																					



Production Part Approval Dimensional Test Results

[illegible]

TERMINAL TO HOUSING INSERTION FORCE DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)

Specification: 30 N MAX

PART Name/Desc: FOW120A02FB-B

Tested by/Date: Payom / 5 Feb'19

PART NO (s): 6189-7457, 6189-7674

Design Rec. Change level/date: EU5T-14A464-TB 11/9/19

Mold #: 1747-B

Eng. Change Documents: NA

SV5

CAVITY #	M33	M34	M35	M36	M37	M38	M39	M40
1	8.4 7.5	8.0 8.4	8.5 8.4	7.5 8.6	7.8 8.6	8.5 8.4	9.5 10.4	10.0 9.5
2	7.6 10.4	10.4 9.3	9.4 9.8	7.6 10.3	9.2 9.4	8.0 9.4	9.6 7.5	8.8 8.9

AVERAGE 8.9
MIN 7.5
MAX 10.4

FRANKLIN

CAVITY #	M33	M34	M35	M36	M37	M38	M39	M40
1	9.2 10.1	10.7 9.6	9.5 9.4	10.2 8.4	9.0 9.3	8.6 9.1	9.2 8.8	8.9 9.1
2	10.3 9.8	8.6 9.7	10.4 10.2	9.9 9.7	8.5 9.6	10.3 9.5	9.6 9.4	9.0 9.3

AVERAGE 9.5
MIN 8.4
MAX 10.7

TERMINAL TO HOUSING RETENTION FORCE DATA

With Lance / TPA

Specification: 60 N MIN

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)

Tested by/Date: Payom / 5 Feb'19

PART Name/Desc: FOW120A02FB-B

Design Rec. Change level/date:

PART NO (s): 6189-7457, 6189-7674

EU5T-14A464-TB



11/9/19

Mold #: 1747-B

Eng. Change Documents: NA

SV5

CAVITY #	M33	
1	71.4	72.4
2	72.5	73.5

AVERAGE 73.5
MIN 71.4
MAX 75.5

M34	
73.5	73.8
72.1	71.7

M35	
72.4	72.3
72.2	73.7

M36	
74.4	73.2
73.9	73.9

M37	
75.5	74.9
73.8	73.7

M38	
74.4	73.8
73.4	75.5

M39	
75.1	73.2
73.7	74.8

M40	
74.3	73.6
72.8	74.0

FRANKLIN

CAVITY #	M33	
1	74.7	74.9
2	76.7	74.4

AVERAGE 74.6
MIN 72.8
MAX 76.7

M34	
75.9	75.3
73.9	74.9

M35	
73.7	74.6
75.0	74.0

M36	
73.4	74.7
74.1	75.2

M37	
72.8	74.6
76.3	74.4

M38	
74.0	75.4
73.1	75.2

M39	
75.3	74.4
75.5	74.2

M40	
74.1	74.4
73.2	75.3

CONNECTOR OPERATION FORCE DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: **FW120A02FB-B**
PART NO (s): **6189-7457, 6189-7674**
Mold #: **1747-B**

Tested by/Date: Payom/ 14 Feb'19
Design Rec. Change level/date: **△4** 11/9/19
Eng. Change Documents: NA

Specification: SEE BELOW

CONNECTOR INSERTION FORCE (WITH TERMINALS AND LOCK) FORCE SPEC: 45 N MAX																	
SV5										FRANKLIN							
CAVITY # →	M33	M34	M35	M36	M37	M38	M39	M40		M33	M34	M35	M36	M37	M38	M39	M40
1	18.2	20.4	20.8	19.2	14.6	18.4	15.4	17.2		17.3	17.6	19.2	20.3	17.7	19.4	17.4	17.3
2	16.8	14.6	15.6	16.6	15.4	15.0	17.0	15.0		19.0	18.4	17.5	19.8	20.0	18.5	19.2	18.2

AVERAGE 16.9 18.5
MIN 14.6 17.3
MAX 20.8 20.3

CONNECTOR EXTRACTION (WITH TERMINALS, WITHOUT LOCK) FORCE SPEC: 75 N MAX																	
SV5										FRANKLIN							
CAVITY #	M33	M34	M35	M36	M37	M38	M39	M40		M33	M34	M35	M36	M37	M38	M39	M40
1	18.1	14.5	10.7	11.8	12.1	12.8	11.2	11.6		16.3	15.7	14.5	20.1	20.1	21.5	17.2	18.3
2	16.3	11.9	13.9	11.1	11.9	10.4	12.3	13.3		17.2	16.9	15.5	20.2	19.3	20.3	19.6	18.3

AVERAGE 12.7 18.2
MIN 10.4 14.5
MAX 18.1 21.5

TPATO HOUSING FUNCTION FORCE DATA

Specification: SEE BELOW

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT:5)
PART Name/Desc: FOW120A02FB-B
PART NO (s): 6189-7457, 6189-7674
Mold #: 1747-B

Tested by/Date: Payom/ 14 Feb'19
Design Rec. Change level/date: 11/9/19
EUST-14A464-TB
Eng. Change Documents: NA

PRE-ASSEMBLED STATUS TO ASSEMBLED STATUS (WITH TERMINALS) FORCE SPEC: 60 N MAX											
SV5											
CAVITY # →	M33	M34	M35	M36	M37	M38	M39	M40	FRANKLIN		
	M33	M34	M35	M36	M37	M38	M39	M40	M33	M34	M35
1	29.1	27.4	28.8	29.1	29.8	27.9	29.9	27.8	30.4	30.6	28.3
2	28.6	28.9	28.6	29.8	30.4	29.7	28.2	29.1	29.9	30.9	29.6
AVERAGE	28.9								29.1		
MIN	27.4								25.2		
MAX	30.4								30.9		

AVERAGE 29.1

MIN 25.2

MAX 30.9

ASSEMBLED STATUS TO PRE-ASSEMBLED STATUS (INITIAL) FORCE SPEC: 60 N MAX											
SV5											
CAVITY # →	M33	M34	M35	M36	M37	M38	M39	M40	FRANKLIN		
	M33	M34	M35	M36	M37	M38	M39	M40	M33	M34	M35
1	40.1	43.3	45.1	41.4	42.9	43.7	40.4	41.4	39.9	43.5	43.8
2	42.9	40.3	41.6	38.4	41.2	43.3	39.4	45.2	40.3	41.6	41.4
AVERAGE	41.9								40.6		
MIN	38.4								28.2		
MAX	45.2								43.8		

AVERAGE 41.9

MIN 38.4

MAX 45.2

ASSEMBLED STATUS TO PRE-ASSEMBLED STATUS (SECOND) FORCE SPEC: 18 N MIN											
SV5											
CAVITY # →	M33	M34	M35	M36	M37	M38	M39	M40	FRANKLIN		
	M33	M34	M35	M36	M37	M38	M39	M40	M33	M34	M35
1	25.2	21.5	23.1	25.3	23.6	25.1	25.1	23.4	21.5	25.9	28.1
2	28.4	27.2	27.2	21.2	26.1	24.7	25.8	21.5	23.2	25.0	25.6
AVERAGE	24.6								25.8		
MIN	21.2								21.5		
MAX	28.4								28.1		

AVERAGE 24.6

MIN 21.2

MAX 28.4

CPA TO HOUSING FUNCTION FORCE DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)
PART Name/Desc: FOW120A02FB-B
PART NO (s): applicable for 6189-7459
Mold #: 1747-B

Specification: SEE BELOW
Tested by/Date: Payom/ 14 Feb'19
Design Rec. Change level/date: 1.4 11/9/19
Eng. Change Documents: NA

PRE-ASSEMBLED STATUS TO ASSEMBLED STATUS (W/CONNECTOR MATED) FORCE SPEC: 22 N MAX																
SV5																
FRANKLIN																
CAVITY #	M33	M34	M35	M36	M37	M38	M39	M40	M33	M34	M35	M36	M37	M38	M39	M40
1	10.2	10.4	13.4	13.6	13.0	14.8	14.8	14.2	12.6	11.6	14.2	13.6	12.6	14.1	14.0	12.5
2	11.0	14.8	13.4	13.8	14.0	14.8	14.0	13.8	13.2	13.4	13.6	13.5	13.9	14.1	13.5	12.6
AVERAGE	13.4								AVERAGE	13.3						
MIN	10.2								MIN	11.6						
MAX	14.8								MAX	14.2						

ASSEMBLED STATUS TO PRE-ASSEMBLED STATUS FORCE SPEC: 10 N TO 30 N																
SV5									FRANKLIN							
CAVITY # ↑	M33	M34	M35	M36	M37	M38	M39	M40	M33	M34	M35	M36	M37	M38	M39	M40
1	11.7	13.9	12.5	12.4	11.8	12.6	13.3	12.4	10.5	10.2	11.1	10.1	10.5	10.4	10.4	10.3
2	11.6	11.9	12.3	12.3	13.3	12.2	12.3	11.6	10.5	10.3	10.7	10.2	10.4	10.4	10.2	10.6
AVERAGE	12.4								10.4							
MIN	11.6								10.1							
MAX	13.9								11.1							

PRE-ASSEMBLED STATUS TO ASSEMBLED STATUS (W/O CONNECTOR MATED) FORCE SPEC: 50 N MIN																
SV5																
FRANKLIN																
CAVITY #	M33	M34	M35	M36	M37	M38	M39	M40	M33	M34	M35	M36	M37	M38	M39	M40
1	57.0	56.8	59.0	57.8	54.2	52.4	53.4	58.6	51.9	54.8	55.4	56.1	54.8	59.5	51.3	54.6
2	53.6	62.2	57.0	54.7	56.4	55.0	53.2	51.3	58.6	51.9	50.1	59.3	53.7	54.4	54.6	51.9
AVERAGE	55.8								AVERAGE	54.6						
MIN	51.3								MIN	50.1						
MAX	62.2								MAX	59.5						

WATERPROOF PROPERTY FORCE DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)

PART Name/Desc:

FOW120A02FB-B

PART NO (s):

6189-7457, 6189-7674

Mold #:

1747-B

Tested by/Date:

Payom/ 14 Feb'19

Design Rec. Change level/date:

EU5T-14A464-TB

L4

11/9/19

Eng. Change Documents:

NA

Specification:

48 kpa min

SV5							
CAVITY # →	M33	M34	M35	M36	M37	M38	M39 M40
1	100.0	100.0	100.0	100.0	100.0	100.0	100.0 100.0
2	100.0	100.0	100.0	100.0	100.0	100.0	100.0 100.0

AVERAGE 100.0
MIN 100.0
MAX 100.0

FRANKLIN							
CAVITY # →	M33	M34	M35	M36	M37	M38	M39 M40
1	100.0	100.0	100.0	100.0	100.0	100.0	100.0 100.0
2	100.0	100.0	100.0	100.0	100.0	100.0	100.0 100.0

AVERAGE 100.0
MIN 100.0
MAX 100.0

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)

Tested by/Date:

Payom/ 14 Feb'19

PART Name/Desc: **FOW120A02FB-B**

Design Rec. Change level/date:

PART NO (s): **6189-7457, 6189-7674**

EU5T-14A464-TB



11/9/2019

Mold #: **1747-B**

Eng. Change Documents: NA

CAVITY #:

SV5

FRANKLIN

M33-M40	15.40		16.90		15.40		16.90							
	+0.3	-0.3	+0.3	-0.3	+0.3	-0.3	+0.3	-0.3						
1	15.37		16.86		15.38		16.85							
2	15.38		16.85		15.39		16.86							
3	15.38		16.86		15.39		16.86							
4	15.38		16.86		15.38		16.85							
5	15.38		16.86		15.39		16.85							
6	15.38		16.86		15.38		16.86							
7	15.38		16.88		15.39		16.86							
8	15.38		16.85		15.38		16.84							
9	15.38		16.85		15.39		16.86							
10	15.38		16.85		15.38		16.82							
11	15.38		16.86		15.39		16.83							
12	15.38		16.85		15.39		16.82							
13	15.38		16.85		15.38		16.82							
14	15.39		16.85		15.39		16.83							
15	15.38		16.85		15.38		16.83							
16	15.38		16.85		15.38		16.83							
17	15.38		16.87		15.38		16.84							
18	15.38		16.88		15.38		16.83							
19	15.38		16.85		15.38		16.82							
20	15.38		16.84		15.36		16.83							
21	15.38		16.84		15.37		16.83							
22	15.39		16.85		15.35		16.82							
23	15.38		16.87		15.36		16.83							
24	15.37		16.85		15.36		16.83							
25	15.37		16.85		15.35		16.83							
26	15.39		16.85		15.36		16.83							
27	15.37		16.85		15.35		16.83							
28	15.38		16.84		15.36		16.84							
29	15.37		16.84		15.39		16.85							
30	15.37		16.85		15.38		16.85							

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)

Tested by/Date:

Payom/ 14 Feb'19

PART Name/Desc: **FOW120A02FB-B**

Design Rec. Change level/date:

PART NO (s): **6189-7457, 6189-7674**

EU5T-14A464-TB



11/9/2019

Mold #: **1747-B**

Eng. Change Documents: NA

CAVITY #:

SV5

FRANKLIN

M33-M40	15.40		16.90		15.40		16.90							
	+0.3	-0.3	+0.3	-0.3	+0.3	-0.3	+0.3	-0.3						
31	15.37		16.85		15.39		16.86							
32	15.37		16.85		15.38		16.85							
33	15.37		16.85		15.39		16.86							
34	15.37		16.85		15.38		16.85							
35	15.37		16.85		15.38		16.85							
36	15.37		16.84		15.38		16.85							
37	15.37		16.85		15.39		16.86							
38	15.37		16.84		15.38		16.85							
39	15.38		16.87		15.38		16.85							
40	15.37		16.85		15.39		16.85							
41	15.37		16.85		15.38		16.87							
42	15.38		16.85		15.38		16.84							
43	15.37		16.84		15.39		16.85							
44	15.37		16.85		15.39		16.85							
45	15.38		16.85		15.38		16.85							
46	15.37		16.85		15.38		16.85							
47	15.37		16.85		15.38		16.85							
48	15.38		16.85		15.38		16.84							
49	15.37		16.84		15.39		16.85							
50	15.37		16.84		15.39		16.85							
51	15.37		16.85		15.39		16.85							
52	15.37		16.85		15.38		16.85							
53	15.37		16.85		15.38		16.85							
54	15.37		16.85		15.39		16.84							
55	15.38		16.85		15.39		16.83							
56	15.37		16.85		15.38		16.84							
57	15.37		16.85		15.38		16.83							
58	15.38		16.85		15.39		16.83							
59	15.37		16.85		15.39		16.83							
60	15.37		16.85		15.39		16.83							

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)

Tested by/Date: _____ Payom/ 14 Feb'19

PART Name/Desc: **FOW120A02FB-B**

Design Rec. Change level/date: _____

PART NO (s): **6189-7457, 6189-7674**

EU5T-14A464-TB  11/9/2019

Mold #: **1747-B**

Eng. Change Documents: _____ NA

CAVITY #:

SV5

FRANKLIN

M33-M40	15.40		16.90		15.40		16.90							
	+0.3	-0.3	+0.3	-0.3	+0.3	-0.3	+0.3	-0.3						
61	15.37		16.85		15.39		16.83							
62	15.37		16.85		15.39		16.83							
63	15.37		16.85		15.39		16.83							
64	15.38		16.85		15.39		16.83							
65	15.37		16.84		15.39		16.84							
66	15.37		16.84		15.36		16.83							
67	15.38		16.85		15.36		16.83							
68	15.38		16.85		15.37		16.84							
69	15.37		16.85		15.36		16.83							
70	15.37		16.84		15.36		16.82							
71	15.37		16.85		15.37		16.84							
72	15.37		16.85		15.36		16.83							
73	15.37		16.85		15.36		16.83							
74	15.37		16.85		15.37		16.83							
75	15.38		16.84		15.37		16.83							
76	15.37		16.84		15.37		16.83							
77	15.37		16.85		15.37		16.84							
78	15.38		16.85		15.36		16.82							
79	15.38		16.85		15.39		16.85							
80	15.38		16.85		15.39		16.85							
81	15.37		16.85		15.38		16.86							
82	15.38		16.85		15.38		16.85							
83	15.37		16.84		15.39		16.84							
84	15.38		16.85		15.39		16.85							
85	15.37		16.85		15.39		16.86							
86	15.37		16.84		15.39		16.84							
87	15.37		16.85		15.39		16.85							
88	15.37		16.85		15.39		16.85							
89	15.37		16.84		15.38		16.86							
90	15.38		16.85		15.38		16.85							

CPK DATA

ORGANIZATION: SUMITOMO ELECTRIC WIRING SYSTEMS (PLT.5)

Tested by/Date: Payom/ 14 Feb'19

PART Name/Desc: **FOW120A02FB-B**

Design Rec. Change level/date:

PART NO (s): **6189-7457, 6189-7674**

EU5T-14A464-TB  11/9/2019

Mold #: **1747-B**

Eng. Change Documents: NA

CAVITY #:↓

SV5

FRANKLIN

M33-M40	15.40		16.90		15.40		16.90					
	+0.3	-0.3	+0.3	-0.3	+0.3	-0.3	+0.3	-0.3				
91	15.38		16.85		15.39		16.84					
92	15.38		16.85		15.39		16.85					
93	15.38		16.85		15.38		16.85					
94	15.37		16.85		15.38		16.85					
95	15.37		16.85		15.38		16.82					
96	15.38		16.85		15.39		16.82					
97	15.38		16.88		15.39		16.83					
98	15.37		16.86		15.39		16.83					
99	15.37		16.85		15.36		16.83					
100	15.38		16.84		15.35		16.84					

average	15.38	16.85	15.38	16.84
minimum	15.37	16.84	15.35	16.82
maximum	15.39	16.88	15.39	16.87
range	0.02	0.05	0.04	0.04
std dev	0.00	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	18.46458053	10.46360907	8.59223396	6.48480335
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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			