Sub-Process Bar 1	2	3	4	5	6	7

Reminders

Safety Warning – See Hazards Table

☐ Picture/info below

Video Indicator

See **Tools & Materials** table

i2000sr Service Manual

See **Contact Information**

Red Link = Live (Intranet)

Blue Link = Local (DVD Set)

See **Information Details** table

Overview i2000SR Annual Preventative Maintenance (@ISA 116-128C)

7 Hours

1 Pre-Site Investigative Procedures

1.1 Review Abbottlink logs (if applicable) for issues

1.2 Prior to site visit, interview $_1$ for any on-going problems / issues

1.3 Assemble necessary parts

2 Initial On-Site Investigative Procedures

2.1 Wear appropriate PPE & follow safety requirements for area

2.2 Review customer logs noting any discrepancies

2.3 Review QC and Calibration history

2.4 Verify TSB and ISA status of instrument

2.5 Verify customer has current back-up to Hard Drive and CD

3 RV Loader *(R&R A1.05---Live Link)* / *(R&R A1.05--Local Link)*

3.1 Reference ISA 116-085(latest revision) for specific RV loader service / alignment as required

3.2 Clean (3) sensors on transport PCB ☐$_1$ ☐$_2$ ☐$_3$

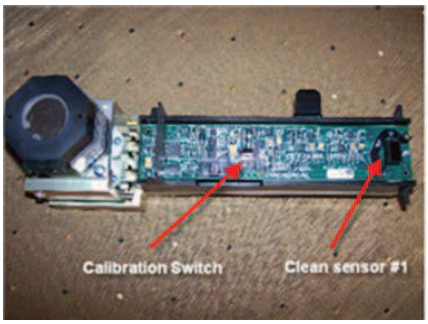
3.3 Inspect belts for alignment & cracks

3.4 Check bearing screw on loader wheel for tightness ☐$_4$

3.5 Clean RV Wheel home sensor ☐$_4$

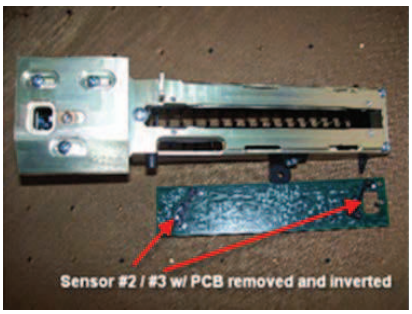
3.6 When calibrating Loader (procedure on final pg.) ensure no RV's are present in the transporter or at the process path drop point

☐$_1$ **3.2**

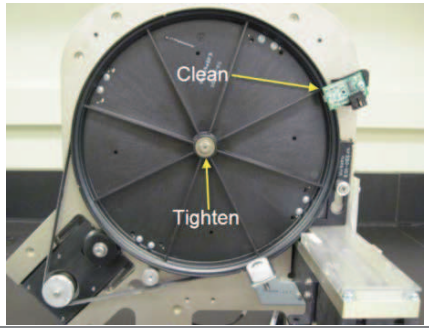


☐$_2$ **3.2**

☐$_3$ **3.2**



☐$_4$ **3.4 / 3.5**



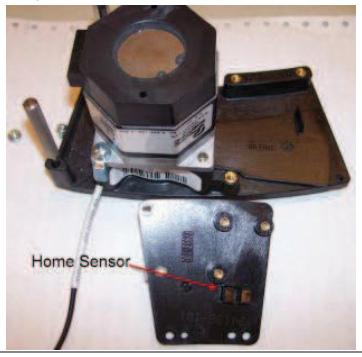
4 Wash Zone Diverter

(R&R B2.05---Live Link) / (R&R B2.05---Local Link)

4.1 Clean and verify arm movement ☐5
4.2 Inspect for cracks or wear
4.3 Clean home sensor ☐6
4.4 Verify motor screws are tight
4.5 Inspect sensor cable (W161) for damage
4.6 Inspect & Seal electrical connectors with silicone compound as needed

☐5 **4.1**

☐6 **4.3**

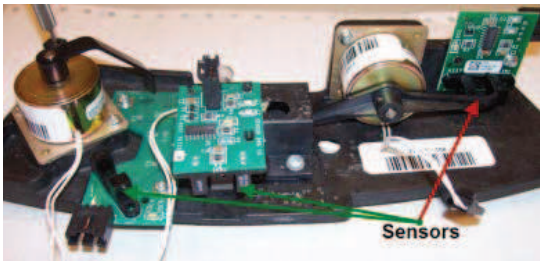


5 RV Load / Unload Diverter

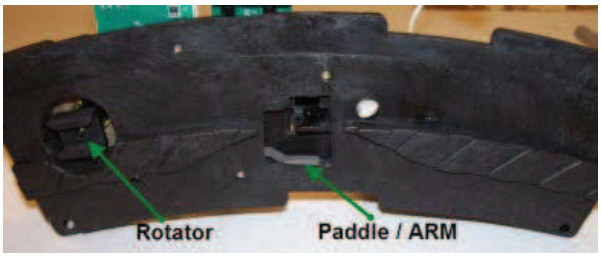
R&R B2.07 / 2.15---Live) / (R&R B2.07 / 2.15---Local)

5.1 Identify diverter as old / new style
5.2 Clean Sensors ☐7
5.3 Clean underside ridge, rotator, & paddle area ☐8
5.4 Inspect wires for cracks & wear
5.5 Inspect & Seal electrical connectors with silicone compound as needed
5.6 **NOTE:** When mounted back to the PP cover, verify the R1 & Sample probes do not contact the wires when moving through the diverter assembly

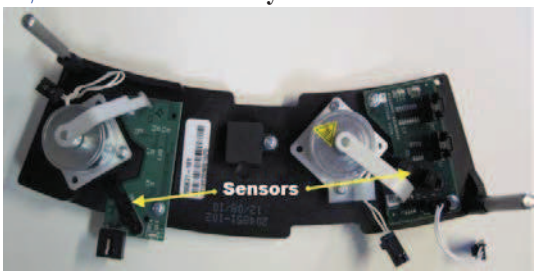
☐7 **5.2** **Old Style**



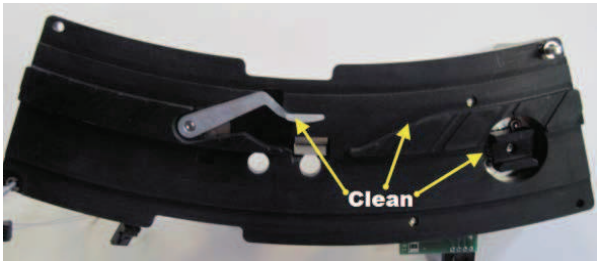
☐8 **5.3** **Old Style**



☐7 **5.2** **New Style**



☐8 **5.3** **New Style**

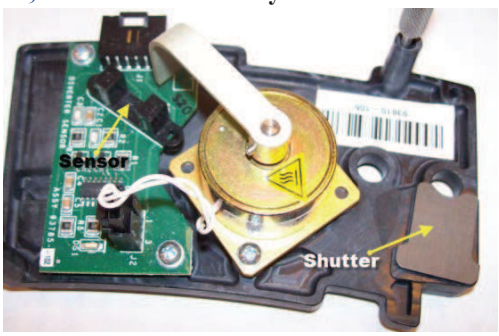


6 Stat Diverter

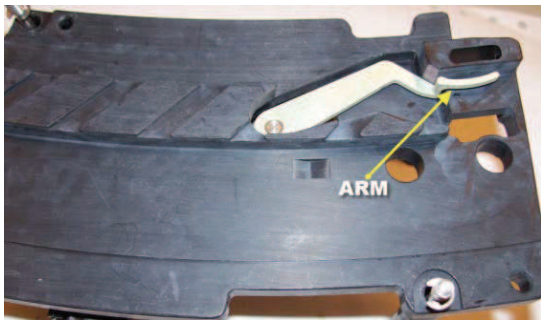
(R&R B2.19---Live Link) / (R&R B2.19---Local Link)

6.1 Identify diverter as old / new style
6.2 Clean Shutter & Sensors ☐9
6.3 Clean underside ARM & related area ☐10
6.4 Inspect & Seal electrical connectors with silicone compound as needed

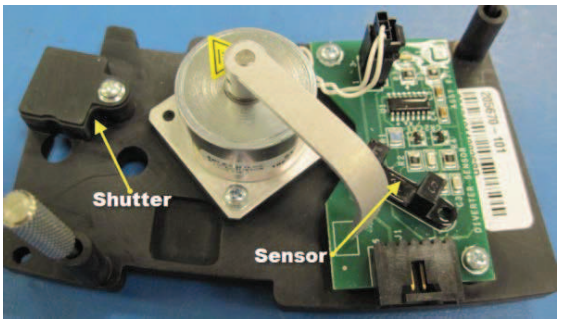
☐9 **6.2** **Old Style**



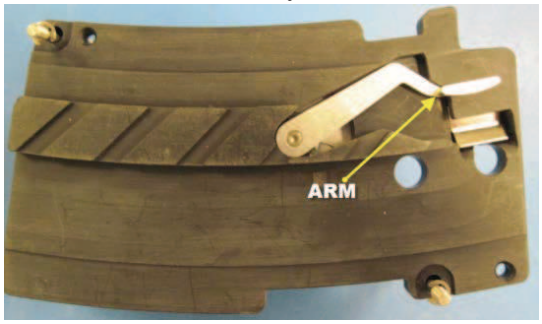
☐10 **6.3** **Old Style**



☐9 **6.2** **New Style**



☐10 **6.3** **New Style**



7 Home Sensor

(R&R B1.05---Live Link) / (R&R B1.05---Local Link)

7.1 Clean Sensor ☐11
7.2 Inspect & Seal electrical connectors with silicone compound as needed

☐11 **7.1**

8 Trigger / Pre-Trigger, WZ#1, WZ#2 Manifolds

(R&R G1.07---Live Link) / *(R&R G1.07--- Local Link)*

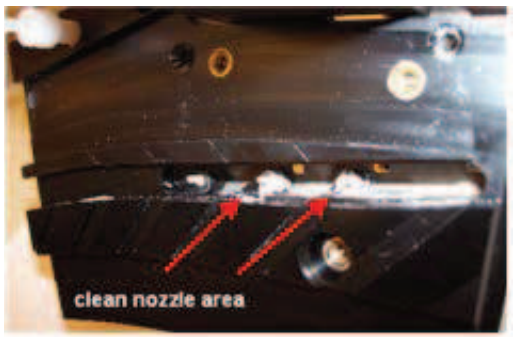
8.1 Clean & remove buffer build-up ☐12
- 8.1a Reference ISA 116-126 (latest revision) for cleaning procedure
- 8.1b Utilize wooden cuticle stick for heavy build-up removal and a soft tooth brush for finer substances
- 8.1c Caution should be taken around nozzle area to avoid altering the factory set angle
- 8.1d Reference video link for manifold cleaning tips (Cleaning Washzone Manifold - Live Link)

8.2 Inspect for cracks, leakage, & broken components. Focus special attention to thermistor cables

8.3 Inspect Trigger / Pre-Trigger Valves ONLY for date code verification ☐13
- 8.3a Replace Trigger / Pre-Trigger valves with date code > 2yrs
- 8.3b Example shown indicates a manufacturing date of November 2010
- 8.3c Write installation date on replacement Trigger / Pre-Trigger Valves for future 2 yr date verification ☐14

8.4 Inspect & Seal electrical connectors with silicone compound as needed

☐12 **8.1**



☐13 **8.3**

☐14 **8.3c**

9 Process Path

9.1 Inspect Process Path under Wash Zone Manifolds & Diverters for buffer build-up

9.2 IF excess build-up is found continue to STEP 10

9.3 IF no excess build-up is found continue to STEP 13

9.4 **NOTE**: @The entire Process Path is recommended to be cleaned once per year regardless of build-up found

10 Process Path Top Cover

(R&R B2.01--Live Link) / *(R&R B2.01---Local Link)*

10.1 Clean underside of buildup ☐15

10.2 Inspect for cracks & burrs

☐15 **10.1**

11 Process Path Disc

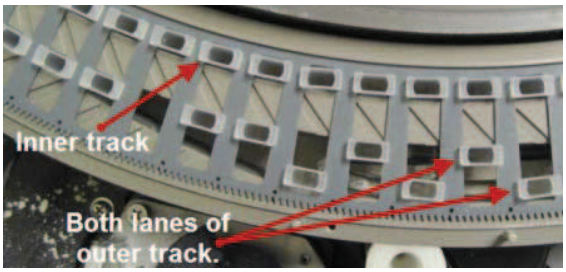
(R&R B2.02---Live Link) / *(R&R B2.02---Local Link)*

11.1 Leave RV's in disc(inner track & both lanes of outer track) & rotate CCW observing for erratic movement ☐16
- 11.1a Special attention to lane change & WZ areas
- 11.1b Areas of erratic movement should be noted for cleaning during step #11 (Process Path) ☐17

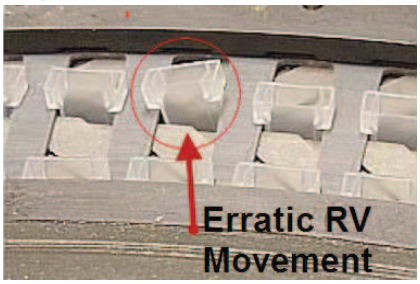
11.2 Inspect disc / gear teeth for grooves, etching & wear ☐18

11.3 Confirm all disc holes are open & free of debris ☐18
- 11.3a A hex wrench slightly smaller than the holes can be utilized to remove any debris

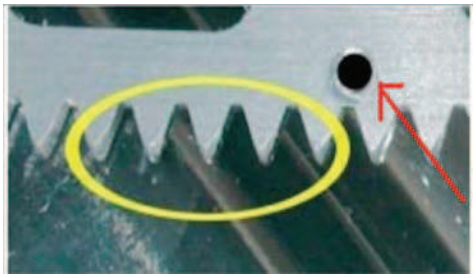
☐16 **11.1**



☐17 **11.1b**



☐18 **11.2 11.3**



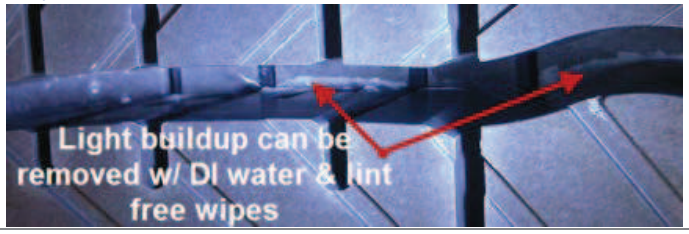
12 Process Path

12.1 Clean entire process path ☐19 ☐20
- 12.1a Special attention to areas causing erratic RV movement
- 12.1b Common problem areas: wash zones, vortexers, diverters, "S" curves, & optics
- 12.1c Reference video link for manifold cleaning tips (Cleaning Process Path - Live Link)
- 12.1d Commonly used tools: wooden cuticle sticks, lint free wipes, soft bristle tooth brush, DI water, & swabs
- 12.1e NOTE: DO NOT use metal tools in the process path as they may remove protective coating

12.2 Reference ISA 116-065 (latest revision) for details

☐19 **12.1**

☐20 **12.1**



13 Inner Reagent Carousel *(R&R D1.02---Live Link)* / *(R&R D1.02---Local Link)*

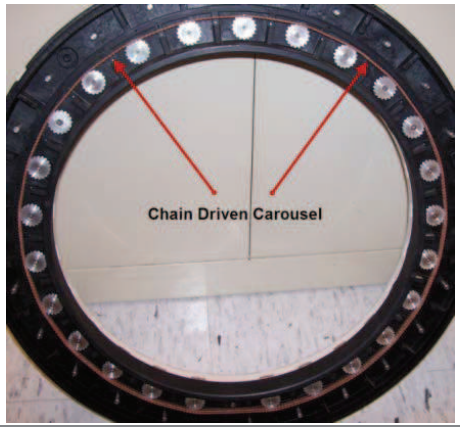
13.1 Remove & clean carousel
13.2 Inspect V-Ridge area for wear, chips & cracks ☐21
13.3 If metal band is present, check for wear and separation of the band

☐21 **13.2**

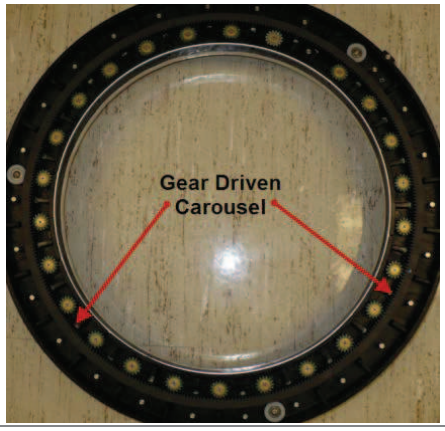
14 Dispersion Carousel *(R&R D1.03---Live Link)* / *(R&R D1.03---Local Link)*

14.1 Remove Dispersion Carousel
14.2 Determine carousel drive type – (Gear vs. Chain) ☐22 ☐23
14.2a IF Chain Drive go to STEP 15
14.2b IF Gear Drive go to STEP 16

☐22 **14.2**



☐23 **14.2**



15 Chain Drive - Dispersion Carousel

15.1 @Inspect & Lubricate chain assembly. Replace as required. Reference ISA 116-098 (latest revision) ⓘ1

15.1a Utilize silicone compound as lubricant

15.2 @Inspect & Replace station bearings as required ☐24

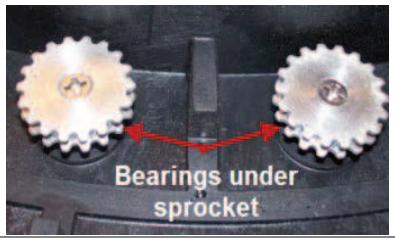
15.2a Spin sprocket assemblies identifying slow & erratic movement

15.2b Replace identified sprocket assembly bearings

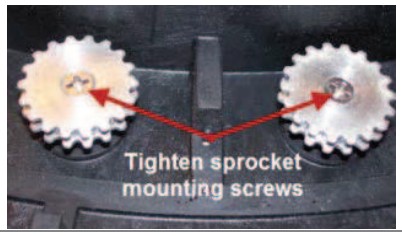
15.3 Tighten all sprocket mounting screws ☐25

15.4 Inspect V-Ridge area for wear, chips & cracks. If metal band is present check for fit, wear, and band separation

☐24 **15.2**



☐25 **15.3**



16 Gear Drive – Dispersion Carousel

16.1 @Inspect & Replace (3) Support Wheels as required. Reference portions of TSB 116-043B (latest revision) ☐26 ⓘ2

16.2 Inspect & Replace station bearings as required ☐27

16.2a Spin sprocket assemblies identifying slow & erratic movement

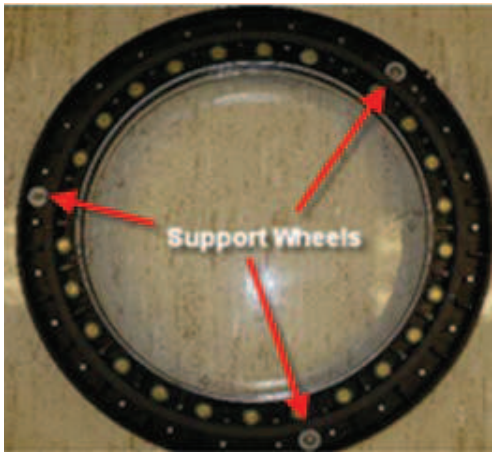
16.2b Replace identified sprocket assembly bearings

16.3 Tighten all sprocket mounting screws ☐27

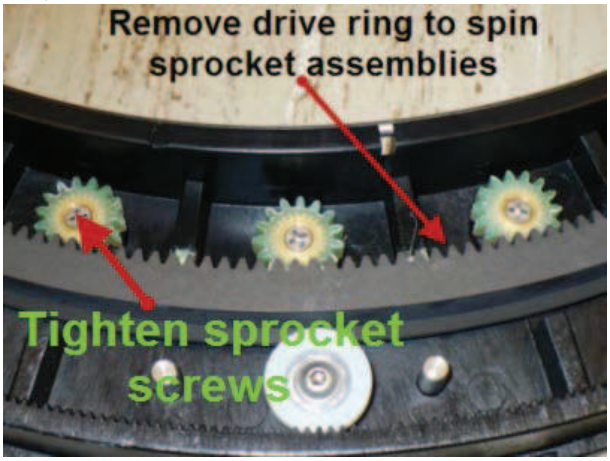
16.4 Lubricate ring gear with aqua lube grease

16.5 Inspect V-Ridge area for wear, chips & cracks. If metal band is present check for fit, wear, and band separation

☐26 **16.1**



☐27 **16.2 16.3**



17 Base Plate Area

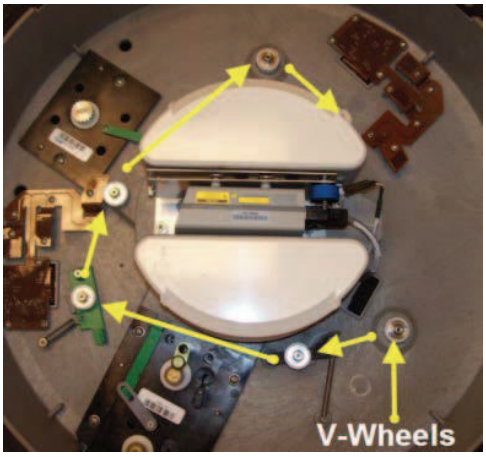
17.1 Inspect (6) V-Wheels & replace as needed ☐28

17.2 Inspect & Clean R1 / R2 LLS Antennas ☐29

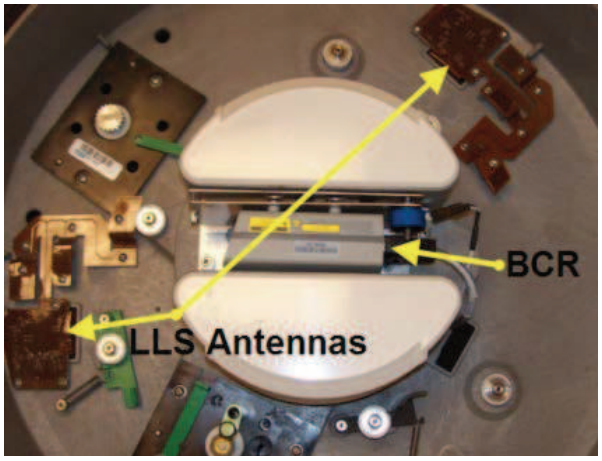
17.3 Clean barcode reader with lint free tissue ☐29

17.4 Clean / Vacuum base plate

☐28 **17.1**



☐29 **17.2 17.3**



18 Vortexers

(R&R B2.10---Live Link) / *(R&R B2.10---Local Link)*

18.1 Remove (4) i2000SR vortexers
18.2 Determine if vortexer is *Stabilized* or *Original Design Cup* type ☐30 ☐31
  18.2a IF Original Design Cup type
  18.2b Remove (4) screws retaining motor cover & remove cover ☐32
  18.2c If corrosion is found replace vortexer
18.3 Verify cup will fully extend & retract
18.4 Return Vortexers to their original positions.
  18.4a If vortexer #3 at Pre-Trigger location is original style, ensure the cup is metal and NOT plastic
  18.4b If original style is present and the cup is determine to be plastic, replace with new Stabilized style vortexer
18.5 Inspect & Seal electrical connectors with silicone compound as needed

☐30 **18.2**

☐31 **18.2**

☐32 **18.2b**

19 Wash Cups

(R&R K1.14---Live Link) / *(R&R K1.14---Local Link)*

19.1 Remove & clean (4) wash stations
19.2 Inspect for cracks
19.3 Verify ground resistance utilizing ISA 116-122 (latest revision)

20 CMIA Reader / Shutter

(R&R C1.01---Live Link) / *(R&R C1.01---Local Link)*

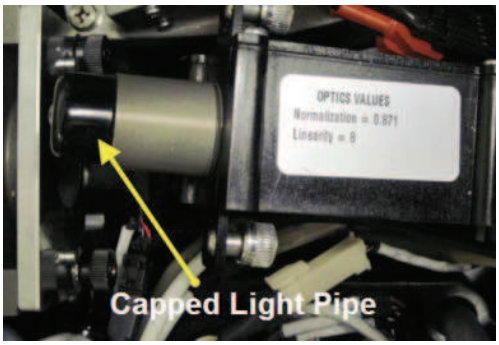
20.1 Inspect CMIA Reader / Shutter with assemblies remaining attached to process path area
20.2 IF no residual build-up is noted continue to step 21
20.3 IF residual build-up is noted continue to step 20.4

20.4 Remove CMIA Reader
- 20.4a Ensure cap is added to light pipe ASAP. ☐33
- 20.4b Remove cap & clean Light Pipe with lint free wipes or swabs
- 20.4c Reinstall light pipe cap

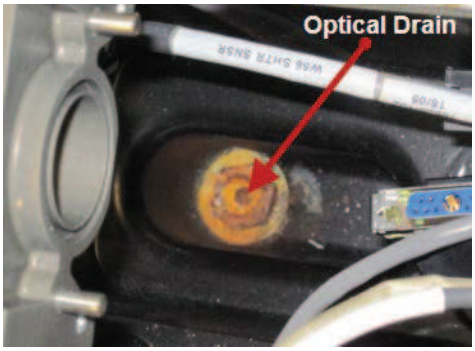
20.5 Remove shutter
- 20.5a Clean home sensor & lubricate drive rod with Super Lube Grease ☐34
- 20.5b Verify / Straighten vertical fins ☐34

20.6 Inspect & Seal Shutter (NOT CMIA READER) electrical connector with silicone compound as needed
20.7 Prior to installing shutter / CMIA reader, ensure optics drain is not occluded ☐35

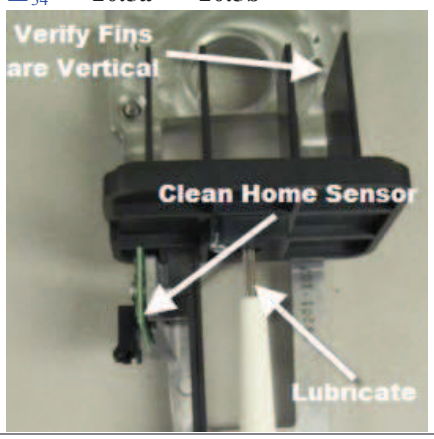
☐33 **20.4a**



☐35 **20.7**



☐34 **20.5a** **20.5b**



21 Pipettors

21.1 Inspect probes for obstructions & straightness
21.2 Inspect & clean probe clamps
21.3 Verify tightness of crash sensor locknut (underside of probe arm)
21.4 Clean & lubricate shafts ☐36
- 21.4a Clean shafts with methanol
- 21.4b Lubricate metal shafts with Super Lube Oil
- 21.4c DO NOT lubricate Teflon (plastic) lead screw

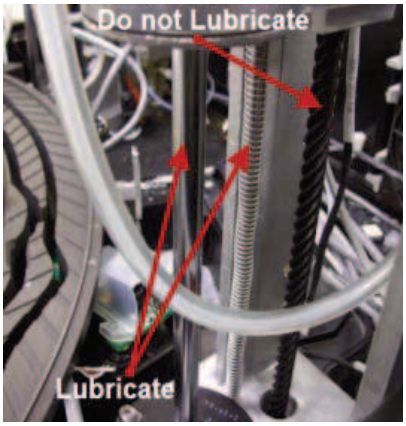
21.5 Check (3) screws @ Z-nut for tightness ☐37
- 21.5a If Z-nut is worn it is available as an individual part to avoid replacement of entire pipettor assembly

21.6 Inspect Pressure Monitors for tubing tightness & leakage ☐38

21.6a If leaking -- replace – DO NOT apply teflon tape to attempt a fix

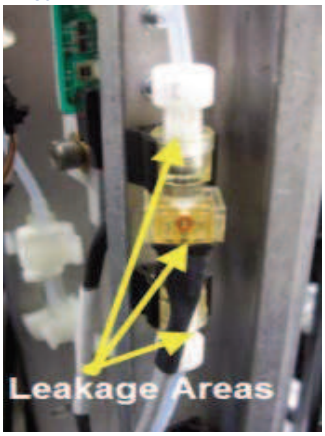
21.7 Inspect all tubing / fittings for tightness & leakage

☐36 **21.4**



☐37 **21.5**

☐38 **21.6**



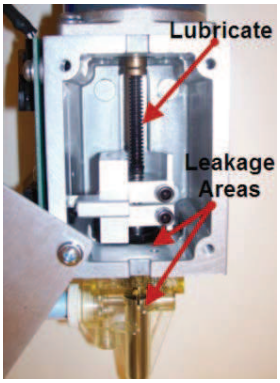
22 Syringes

(R&R E3.02---Live Link) / *(R&R E3.02---Local Link)*

22.1 Remove & inspect (4) syringes for leakage

22.2 Clean & Lubricate lead screw with Super Lube Grease ☐39

☐39 **22.2**



23 Pump Bay

23.1 Inspect all FMI / Buffer pumps for leakage ☐40

23.1a Verify tightness of pump tubings

23.1b Inspect & Seal electrical connectors with silicone compound as needed

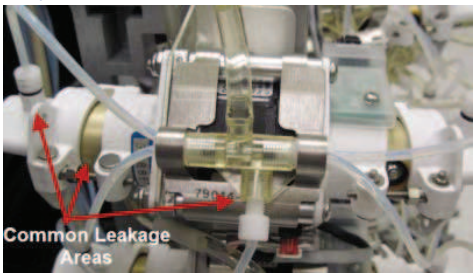
23.2 Inspect gutters & entire pump bay for leakage ☐41

23.2a Utilize ISA 116-111 & TSB 116-079 (latest revisions) for leaking gutter repairs

23.3 Inspect drain manifold for leakage & cracks ☐42

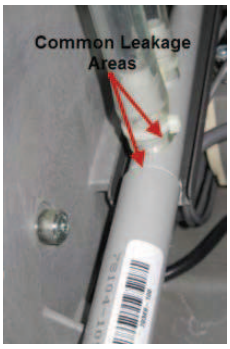
23.3a Replace manifold foam plug if dirty or worn ☐43

☐40 **23.1**



☐41 **23.2**

☐42 **23.3**

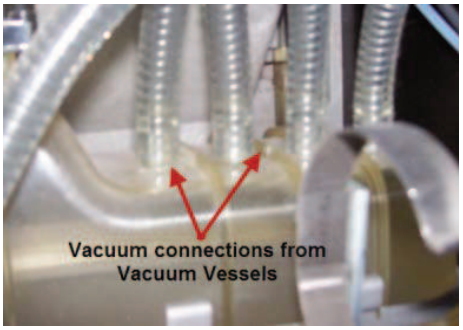


☐43 **23.3a**

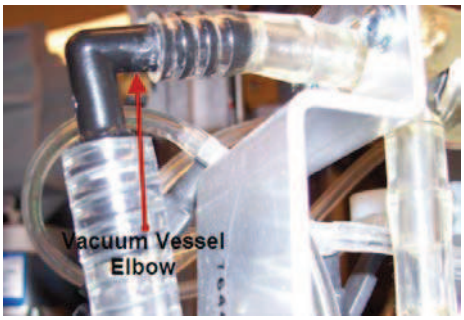
24 Vacuum System

24.1 Inspect tubing from vacuum vessels #1/#2 to vacuum accumulator ☐44
  24.1a Remove tubing at vacuum vessel elbow and vacuum accumulator ☐45
  24.1b Flush tubing & elbow with DI water and remove any build-up
24.2 Inspect vacuum accumulator for blockage and remove any water present
24.3 @Inspect vacuum pump, rebuild or replace as necessary.
24.4 Inspect vacuum vessel fittings for leaks & blockage ☐46
24.5 Remove & clean vacuum vessel solenoids ☐47
  24.5a Clean internal plunger / spring assembly ☐48
23.7 Remove & clean vacuum accumulator drain valve ☐49

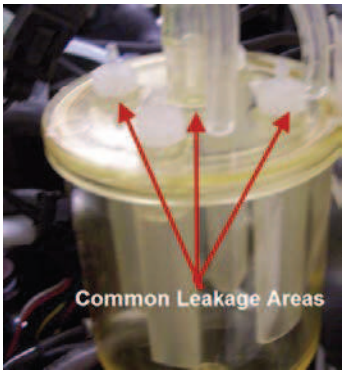
☐44 **24.1**



☐45 **24.1a**

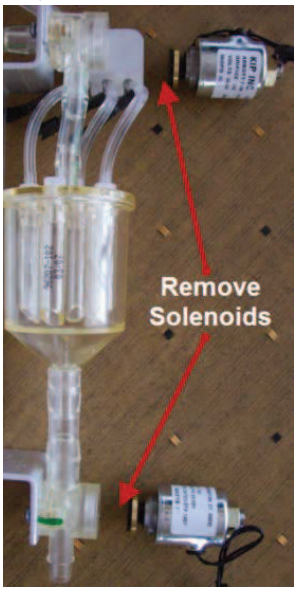


☐46 **24.4**



☐48 **24.5a**

☐47 **24.5**

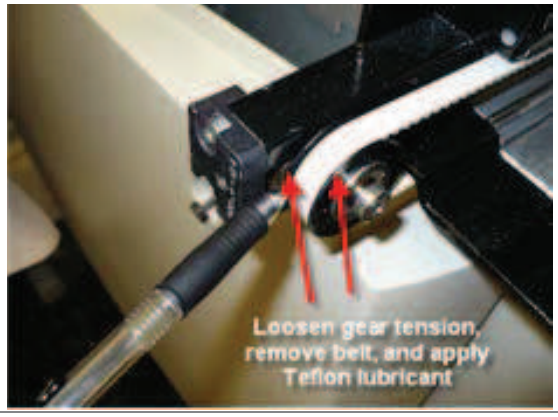


☐49 **23.7**

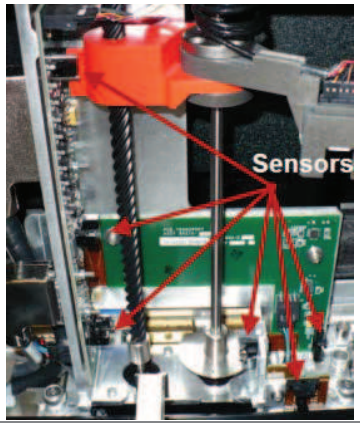
25 RSH

25.1 Clean RSH components utilizing M&D 6311
25.2 Perform pulley lubrication ☐50
  25.2a Release belt tension & apply Super Lube Oil
  25.2b Retention belt
25.3 Clean transport sensors & rails ☐51
25.4 Vacuum bays & rack sensor area

☐50 **25.2**



☐51 **25.3**



26 Miscellaneous

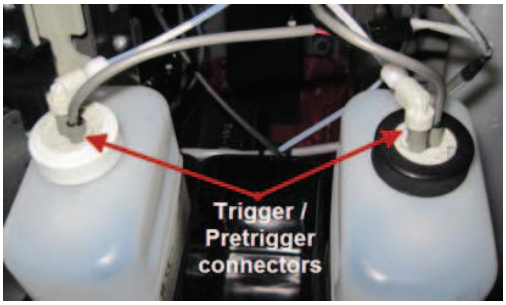
26.1 Clean refrigerator cooling fins ☐52
  26.1a Located directly behind internal buffer storage tank
26.2 Clean card cage air filter
26.3 Clean card cage ventilation screen
  26.3a Located above card cage filter & below card cage <u>in certain units</u>
  26.3b NOTE: <u>DO NOT</u> use a vacuum in / around the card cage unless it is an <u>anti-static model</u>
26.4 Verify waste chute is free of debris & clean waste chute sensor ☐53
26.5 Inspect Trigger / Pre-Trigger straws and bulk solution connections ☐54
26.6 Verify lid shield grounding utilizing TSB-116-029 (latest revision) ☐55
26.7 Verify UPS system batteries are functional

26.7a Reference UPS operations manual delivered with system for procedures

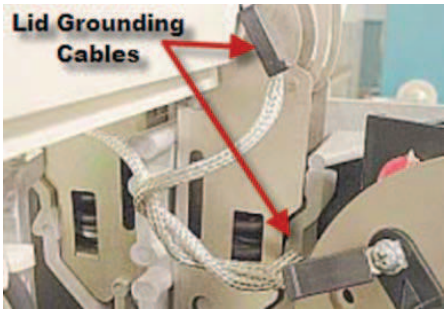
☐52 **26.1**

☐53 **26.4**

☐54 **26.5**



☐55 **26.6**



27 System Checks

27.1 Calibrate RV Loader (P-40)
27.2 Perform M&D 1119 RSH Transport Calibration
27.3 Perform M&D 2055 Wash Zone Valve Pressure Check for Wash Zone Manifold Valves ONLY
27.3a Replace any valves that fail pressure check M&D
NOTE: TSB 116-099 (latest revision) must be installed to utilize M&D 2055
27.4 Perform M&D 1020 Optics Background Test
27.5 Verify ARM / Transfer Pump Operation
27.5a Verify Internal Buffer Tank has capacity to add buffer
27.5b ARM PRESENT: manually instruct ARM to fill internal buffer tank
27.5c ARM NOT PRESENT: mix external solution and transfer to internal buffer tank

28 Verify Performance

28.1 Complete QC run of one (2) step assay & one stat assay if available
28.1a Utilize all control levels for each assay

29 System Backup

29.1 Backup system to hard drive & CD (M&D 6004)

30 Exit Interview

30.1 Review PM checklist with customer
30.2 Review customers current consumable part inventory
30.3 Have customer verify instrument operation

✓ Pre-Checks (before starting this procedure)

- ☐ Verify On-Hand Consumable Supplies
- ☐ Verify On-Hand PM Parts

Tools & Materials

CONSUMABLE SUPPLIES

☐	(7-14233-01)	Aqua Lube Grease
☐	(7-204410-01)	Silicone Compound (in 35ml syringe)
☐	(14237-015)	Super Lube Oil
☐	(2-94851-02)	Super Lube Grease
☐	(N/A)	Canned Air / Source Locally

@RECOMMENDED ON-HAND PARTS

☐	(7-78016-XX)	Carousel Support Wheel Kit ⓘ2
☐	(7-201782-XX)	Vacuum Pump Kit
☐	(7-200826-XX)	5 Strand Dispersion Chain ⓘ1
☐	(7-200602-XX)	Bearing Kit (25 Stations)
☐	(7-90038-XX)	Anti Foam Plug
☐	(7-77612-XX)	Manifold Valve
☐	(7-64293-XX)	V-Wheels (6 / pack)

People (required or to be notified)

- ☐ 1 Customer: Manager / Supervisor

ⓘ Information Details

ⓘ1	**Used only w/chain drive dispersion carousel system**
ⓘ2	**Used only w/ gear drive dispersion carousel system**

Hazards

	Potential Biohazard- Identifies an activity or area where potentially infectious materials may be present. Refer to Biological Hazard
	Class 2 Laser Product - Warns against direct viewing into the barcode laser beam or reflections from the beam. Refer to Laser Hazard
	Chemical Hazard - Identifies an activity or area where hazardous chemicals are present. Refer to the Material Safety Data Sheet (MSDS) or package insert for specific safety information. Refer to Chemical Hazard
	Electrostatic Discharge - Identifies an activity or area where operator must wear a ground strap while servicing the system Refer to Electrostatic Discharge
	Hot Surface - Identifies an area where a hot surface is present. Refer to Hot Surface

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