सत्यमेव जयते

भारत सरकार
रेल मंत्रालय

GOVERENMENT OF INDIA

MINISTRY OF RAILWAYS

SPECIAL MAINTENANCE INSTRUCTIONS FOR HEATLESS REGENERATIVE TWIN TOWER TYPE COMPRESSED AIR DRYER FOR ELECTRIC LOCOMOTIVES APPLICATION

SMI NO. RDSO/2017/EL/SMI/0305 Rev. '0' Dated 17.04.2017

विघुत निदेशालय
अनुसंधान अभिकल्प एवं मानक संगठन
लखनऊ – 226 011

Electric Loco Directorate
RESEARCH DESIGNS & STANDARDS ORGANISATION
LUCKNOW - 226 011

1.0 Amendment History:

S. No.	Amendment Date	Version	Reasons for Amendment
1.	First Issue	1.0	First Issued under new documentation system for ISO9001:2008.

2.0 PURPOSE

To standardize the inspection and maintenance schedules for heatless regenerative twin tower type compressed air dryer.

3.0 SCOPE OF APPLICATION

Application to all type of Electric locomotives by Electric Loco Sheds and POH workshops.

4.0 BRIEF HISTORY:

4.1 The desiccant based air dryers are being used for locomotives. In this dryer two desiccant towers are used. While one tower remains in drying mode, the second tower undergoes regeneration simultaneously. Part of dry air coming out from tower in-line goes for regeneration in second tower. Tower changeover takes place every 1/2 minutes by a sequence controller mounted in control panel. As the vapor-laden air flows through one tower, the moisture is adsorbed onto the desiccant. Meanwhile, in the other tower, "purge air" flows through, evaporates the water on the desiccant, and carries it out of the tower as vapor. After some time, desiccant is completely saturated and no longer capable to absorb moisture. Therefore, water absorbed is to be given away from its pores to by reactivation. This process is called regeneration. On the heatless air dryer, regeneration is done by drying it by air (regenerative air). For this a small quantity (10 to 20%) of the air dried by the desiccant is used. At present Air Dyer provided in electric locomotives is governed by RDSO's specification no. MP.0.01.00.06 (Rev.05) March-2011 and maintained as per maintenance instruction Report no. MP.MI-18 Rev.02, April-2008 with amendment no.1.

4.2 In the absence of standard maintenance schedule, each shed is following its own maintenance practice as per their experience. There is no system of testing of the air dryer to check its efficacy. Therefore, this SMI clearly defines the maintenance schedule works for each make of air dryer and also its testing. Periodicities of replacement of items have also been indicated make wise.

5.0 Maintenance Schedule of Air Dryer of M/s FTRTIL

Sl. no	TYPE	Activities	Maintenance Schedule					
			IA	IB	IC	Schedule 'A' after 18/24 months (AOH/TOH)	Schedule 'B' after 36/48 months (IOH)	POH
1	Humidity Indicator	1)Visually Inspect Humidity Indicators (ref. trouble shooting guide)	√	√	√	×	×	×
		2) Overhaul the equipment as recommended by OEM and Replace Humidity Indicator Kit	×	×	×	√	√	√
2	Purge Valve	1) Visually examine for loose fastenings, leaks or other damages/ Operate and / or Check part performance i.e. proper purging.	√	√	√	×	×	×
		2) Cleaning of Purge Valve and Replace parts if any damage	×	×	√	×	×	×
		3) Overhaul the equipment as recommended by OEM and Replace Purge Valve Kit	×	×	×	√	√	√
3	Drain Valve	1) Visually examine for loose fastenings, leaks or other damages/ Operate and / or Check part performance i.e. Check for Automatic Draining through double seated valve.	√	√	√	×	×	×
		2)Overhaul the equipment as recommended by OEM and Replace Drain Valve Kit	×	×	×	√	√	√
4	Pressure Switch	1) Visually examine for loose fastenings or damages/ Operate and / or Check part performance i.e. Functioning of pressure switch. Replace if found damage /non functioning	√	√	√	√	√	√

		1) Visually examine for loose fastenings, leaks or other damages.	√	√	√	×	×	×
5	Renew Regenerating Orifice kit	2) Overhaul the equipment as recommended by OEM and Replace Regenerating Orifice Kit.	×	×	×	√	√	√
6	Renew Pre-coalescing Element	1) Visually examine for loose fastenings, leaks or other damages. Check part performance.	√	√	√	×	×	×
		2) Overhaul the equipment as recommended by OEM and Replace Pre-coalescing Kit FTRTIL Part no. 790029165	×	×	×	√	√	√
7	Renew Final Filter Element	1) Visually examine for loose fastenings, leaks or other damages/ Operate and check performance.	√	√	√	×	×	×
		2)Replace Final Filter kit Part no. 790029125	×	×	√	×	×	×
		3) Overhaul the equipment as recommended by OEM and replace kit for final filter. FTIL Kit Part no. 790029125	×	×	×	√	√	√
8	Mufflers	1)Visually examine for loose fastenings and damages and check performance.	√	√	√	√	√	×
		2) Overhaul the equipment as recommended by OEM and replace Muffler if found damage.	×	×	×	√	√	√
9	Timer Circuit Board	1) Visually examine for loose fastenings, leaks or other damages/ Operate and / or Check part performance (Cycling time of each Tower). Replace if found damage /non performance	√	√	√	√	√	√
10	Desiccant Canister	1) Visually examine for loose fastenings, leaks or other damages/ Operate and / or Check part performance.	√	√	√	×	×	×

		2)Check the condition of Desiccant (replace if contaminated)	×	×	√	×	×	×
		3) Overhaul the equipment as recommended by OEM. Replace Desiccant Canister Kit	×	×	×	√	√	√
11	Inlet Check Valve	1) Visually examine for loose fastenings, leaks or other damages/ Operate and / or Check part performance.	√	√	√	×	×	×
		2) Overhaul the equipment as recommended by OEM and Replace Inlet check valve Kit	×	×	×	×	√	√
12	Outlet Check Valve	1) Visually examine for loose fastenings, leaks or other damages/ Operate and / or Check part performance.	√	√	√	×	×	×
		3) Overhaul the equipment as recommended by OEM and Replace Outlet check valve Kit and Solenoid Valve assembly kit	×	×	×	×	√	√
13	Compactor Assembly	1) Visually examine for loose fastenings, leaks or other damages/ Operate and / or Check part performance.	√	√	√	×	×	×
		3) Overhaul the equipment as recommended by OEM and Replace Compactor assembly Kit	×	×	×	×	√	√
14	Completely overhaul the Air Dryer (ref. Maintenance Manual and the major parts change details as follows)	1) Complete Dismantling and Overhaul the Air Dryer as recommended by OEM	×	×	×	×	√	√
		2) Replace all Rubber parts as recommended as per OEM	×	×	×	×	√	√

Note: For WAM4&WAP1 locos whose AOH carried out at the interval of 12months, Kit A & Kit B should be replaced at the interval of 2 years & 4 years respectively by synchronizing with suitable major schedule.

5.1 KIT– A to be renewed during AOH/TOH/IOH/POH for 3-phase locos after 18/24 months of service.

Sl. No.	Description of Spares	FTIL Part No.	D&M Part No.	Qty/ AD
1	Inlet man coalescer kit (AD)	790 0291 65	RK-AB787-W27B	1
2	Kit for Final Filter	790 0291 25	RK-AB787-W40	1
3	Regenerating orifice kit (AD)	790 0291 11	RK-AB787-W39	1
4	Humidity Indicator kit (AD)	790 0291 05	RK-AB787-187	2
5	Desiccant Canister Kit (AD)	790 0291 95	RK-AB787-W44	2
6	Drain Valve kit (AD)	790 0291 75	RK-AB787-W28	1
7	Purge Valve kit (AD)	790 0291 85	RK-AB787-W36	2

5.2 KIT– B to be renewed during AOH/TOH/IOH/POH for 3-phase locos after 36/48 months of service.

Sl. No.	Description of Spares	FTIL Part No.	D&M Part No.	Qty/AD
1	Inlet man coalescer kit (AD)	790 0291 65	RK-AB787-W27B	1
2	Kit for Final Filter	790 0291 25	RK-AB787-W40	1
3	Regenerating orifice kit (AD)	790 0291 11	RK-AB787-W39	1
4	Inlet Check Valve kit (AD)	790 0291 35	RK-AB787-W27A	2
5	Drain Valve kit (AD)	790 0291 75	RK-AB787-W28	1
6	Outlet Check Valve kit (AD)	790 0291 45	RK-AB787-W29	2
7	Purge Valve kit (AD)	790 0291 85	RK-AB787-W36	2
8	Solenoid assembly kit (AD)	790 0291 55	RK-AB787-W37	2
9	Compactor assembly kit (AD)	790 0292 05	RK-AB787-W41	2
10	O Ring (ID 1.359 x width - 0.139)	029 7190 00A	AB787-121	10
11	O Ring (ID 5.234 x width - 0.139)	029 7150 00A	AB787-125	4
12	O Ring (ID 1.734 x width - 0.139)	029 7130 00A	AB787-188	2
13	Electrical Box Gasket	029 7120 00	AB787-191	1
14	Tetra seal for Drain valve	029 7200 00	AB787-224	1
15	Gasket for Burndy Connector	029 7075 00	AB787-239	1
16	Humidity Indicator kit (AD)	790 0291 05	RK-AB787-187	2
17	Desiccant Canister Kit (AD)	790 0291 95	RK-AB787-W44	2

5.3 KIT– A to be renewed during AOH/TOH/IOH/POH for Conventional locos after 18/24 months of service.

S.N.	Description of Spares	FTIL Part No.	D&M Part No.	Qty /AD
1	Inlet man coalescer kit (AD)	790 0291 65	RK-AB787-W27B	1
2	Kit for Final Filter	790 0291 25	RK-AB787-W40	1
3	Regenerating orifice kit (AD)	790 0291 11	RK-AB787-W39	1
4	Humidity Indicator kit (AD)	790 0291 05	RK-AB787-187	2

5	Desiccant Canister Kit (AD)	790 0292 45	RK-AB787-W44	2
6	Drain Valve kit (AD)	790 0291 75	RK-AB787-W28	1
7	Purge Valve kit (AD)	790 0291 85	RK-AB787-W36	2

5.4 KIT– B to be renewed during AOH/TOH/IOH/POH for Conventional locos after 36/48 months of service.

Sl. No.	Description of Spares	FTIL Part No.	D&M Part No.	Qty /AD
1	Inlet man coalescer kit (AD)	790 0291 65	RK-AB787-W27B	1
2	Kit for Final Filter	790 0291 25	RK-AB787-W40	1
3	Regenerating orifice kit (AD)	790 0291 11	RK-AB787-W39	1
4	Inlet Check Valve kit (AD)	790 0291 35	RK-AB787-W27A	2
5	Drain Valve kit (AD)	790 0291 75	RK-AB787-W28	1
6	Outlet Check Valve kit (AD)	790 0291 45	RK-AB787-W29	2
7	Purge Valve kit (AD)	790 0292 95	RK-AB787-W36	2
8	Solenoid assembly kit (AD)	790 0291 55	RK-AB787-W37	2
9	Compactor assembly kit (AD)	790 0292 05	RK-AB787-W41	2
10	O Ring (ID 5.234 x width - 0.139)	029 7150 00A	AB787-125	2
11	O Ring (ID 1.734 x width - 0.139)	029 7130 00A	AB787-188	2
12	Electrical Box Gasket	029 7120 00	AB787-191	1
13	Tetra seal for Drain valve & Purge Valve	029 7200 00	AB787-224	3
14	Gasket for Burndy Connector	029 7075 00	AB787-239	1
15	Humidity Indicator kit (AD)	790 0291 05	RK-AB787-187	2
16	Desiccant Canister Kit (AD)	790 0292 45	RK-AB787-W44	2
17	O Ring (ID 1.359 x width - 0.139)	029 7190 00A	AB787-121	8

6.0 Maintenance Schedule of Air Dryer Model LTZ015.2 of M/s KBIL

Sl. no	TYPE	Activities	Maintenance Schedule					
			IA	IB	IC	Schedule 'A' after 18/24 months (AOH/TOH)	Schedule 'B' after 36/48 months (IOH)	POH
1	Check Functioning of Dryer	When compressor is ON, Dryer should work. Verify Dryer's purge & tower changeover	✓	✓	✓	✓	✓	✓
2	Check Humidity status	Check the color of humidity indicator installed at the outlet port	✓	✓	✓	✓	✓	✓

		of air dryer. Blue is OK						
3	Check Tower changeover	Check lifting of indicator pin of respective tower. During the operation, alternatively INDICATOR PIN of respective tower should be up	✓	✓	✓	✓	✓	✓
4	Measure Cycle Time	By using Stop watch, record the time interval between two consecutive air releases from the drainage port of piston valve. # Time interval should be within 120+/- 5 seconds.	✓	✓	✓	✓	✓	✓
5	Verify Pressure Setting	Start from Zero pressure and note the pressure when changeover of towers occurs. Though air flows through dryer from starting but dryer does not change cycle unless pressure has reached ~ 4.7 kg/cm2	✓	✓	✓	✓	✓	✓
6	Drain moisture from Final/After Filter	Drain moisture collected (if any) at the bottom of Final/After Filter	✓	✓	✓	✓	✓	✓
7	Replace Final/After Filter Element	Dismantle Filter housing and replace the Element with new part.	✗	✗	✗	✓	✓	✓
8	Overhaul Air Dryer Unit	Dismantle Air Dryer along with Piston Valve and replace all Consumables parts, Rubber parts and Desiccant according to recommended IOH/POH kit. Follow Overhaul Instructions catalogue U-MA20.26-EN	✗	✗	✗	✗	✓	✓

6.1 KIT– A to be renewed during AOH/TOH/IOH/POH for electric locos after 18/24 months of service.

Sr. No.	Description	KBI Part No.	Qty (No.)
1	FINAL FILTER ELEMENT (Drg. No. I.4.3093)	I.3.3085/6	1
2	KNORR-K-RING	454953	2
3	O-RING	A40125/13	2
4	O-RING	A52320	1
5	O-RING	A91453	2
6	SCRAPER RING	A97200/5	2
7	O-RING	B44910	2
8	KNORR-K-RING	462422	2
9	SEALING RING	459633	1
10	O-RING	B55436	4
11	O-RING	C124266/1	4
12	HUMIDITY INDICATOR REPAIR KIT (06 items)	13685	1

6.2 KIT– B to be renewed during AOH/TOH/IOH/POH for electric locos after 36/48 months of service.

Sr. No.	Description	KBI Part No.	Qty (Nos)
1	DESICCANT KIT (Consisting 5.57 Kg. Each packet)	503328	2
2	FINAL FILTER ELEMENT (Drg. No. I.4.3093)	I.3.3085/6	1
3	COMPRESSION SPRING	B80465	2
4	COMPRESSION SPRING	C59204	1
5	COMPRESSION SPRING	B35531	2
6	COMPRESSION SPRING	B82679	1
7	NUT	B95755/KI	2
8	WASHER	A33266	2
9	WASHER	B70469/1/KI	6
10	ROUND WIRE NETTING	B27807	3
11	SEALING RING	453783	2
12	SEALING RING	453790	1
13	SEALING RING	453807	2
14	SEALING RING	456999	2

15	O-RING	B24036	2
16	COMPRESSION SPRING	C65798	1
17	COMPRESSION SPRING	B85028	2
18	HEXAGON NUT	465160	3
19	O-RING	B21858	7
20	LOCKING RING	466059	8
21	HEXAGON NUT	468086	2
22	LOCKING RING	467642	2
23	O-RING	A40125/20	2
24	KNORR-K-RING	454953	2
25	RETAINING RING	467044	2
26	WASHER	450864	2
27	O-RING	A40125/13	2
28	O-RING	A52320	1
29	TOOTHED RING	A62331/2	3
30	O-RING	A91453	2
31	SCRAPER RING	A97200/5	2
32	O-RING	B44910	2
33	KNORR-K-RING	462422	2
34	SEALING RING	459633	1
35	O-RING	A79532	2
36	O-RING	B51209	2
37	VENTING VALVE	I46367	1
38	O-RING	A40791	2
39	O-RING	A64261	1
40	O-RING	A83273	1
41	O-RING	B24149	1
42	O-RING	B58177	2
43	GASKET	B70667	1
44	KNORR-K-RING	462615	1
45	WASHER	N3502222X / 466232	2
46	LOCKING RING	466884	4
47	WASHER	462326	3
48	HEXAGON NUT	464880	1
49	LOCKING RING	468204	3
50	WASHER	474785	1
51	SCRAPER RING	A97200/7	2
52	KNORR-K-RING	458906	2
53	RETAINING RING	464255	2
54	O-RING	B55436	4
55	O-RING	C124266/1	4
56	SEALING RING	466686	1
57	HUMIDITY INDICATOR REPAIR KIT (06 items)	13685	1

7.0 Maintenance Schedule of Air Dryer of M/s SIL make.

SN	Type	Activity		Maintenance Schedule					
				IA	IB	IC	Schedule 'A' after 18/24 months (AOH/TOH)	Schedule 'B' after 36/48 months (IOH)	POH
1	Check the color of humidity indicator	i)Blue color Dryer is performed ii) Lavender-Dryer is suspect iii) White - Possible dryer is not regenerating.	OK. Verify dryer is cycling. a) verify dryer is cycling. b) Desiccant Bag to be checked.	√ √ √ √	√ √ √ √	√ √ √ √	×	×	×
2	Check Electrical connection of Air Dryer and their tightness	Red wire for positive. Black wire for negative White wire for intermittent positive.	Electrical Power available Electrical Power available When compressor is loaded condition.	√ √ √	√ √ √	√ √ √	×	×	×
3	Check cyclic operation of Air Dryer	Cycling time for purging from regenerating tower	1 (One)minute drying & 1(One) minute regenerating	√	√	√	×	×	×
4	Check Memory feature	When compressor gets unloaded Purging of Air should stop and when compressor again gets loaded purging should continue		√	√	√	×	×	×

5	Check the Drain Valve on Coalescing Filter.	With the Dryer operating, the Drain Valve must expel a short burst of Air once a minute	Each Cycle	√	√	√	×	×	×
6	Replace the filter Coalescing	Parts to be renewed	List of item as per overhauling Kit 'A'	×	×	×	√	√	√
7	Overhaul the complete air Dryer and Change desiccant	Parts to be renewed	List of item as per overhauling Kit B	×	×	×	√	√	√

7.1 KIT– A to be renewed during AOH/TOH/IOH/POH after 18/24 months of service.

S. N.	Description of Spares	SIL Drg. No.	WABCO Pt No.	Qty Per Air Dryer (Nos)
1.	Filter Coalescing	09870601	653298	1
2	Nut 3/8" Hex Lock	71115603	569374	1
3	Washer 3/8" Lock Self-Sealing	09870701	6401300001	1
4	O Ring 4.237 ID	09872644	590013	1
5.	Kit Humidity Indicator Rebuild	09891301	304338	2
6	Repair Kit, Drain Valve	09891101	309112	1
7	Repair Kit, Purge Valve	09891201	309113	2

7.2 KIT– B to be renewed during AOH/TOH/IOH/POH after 36/48 months of service.

SN.	Description of Spares	SIL Drg. No.	WABCO Pt No.	Qty Per Air Dryer (Nos)
1.	Filter Coalescing	09870601	653298	1
2.	Nut 3/8" Hex Lock	71115603	569374	1
3.	Washer 3/8" Lock Self-Sealing	09870701	6401300001	1
4.	O Ring 4.237 ID	09872644	590013	1
5.	Kit Humidity Indicator Rebuild	09891301	304338	2
6.	O Ring 2" OD	09872641	536582	4
7.	O Ring ½" OD	09872642	524612	8
8.	Check Valve Seal	09876501	653292	4

9.	O Ring 1.739 ID	09872643	593569	4
10.	Gasket Flange 1"	09872741	93986	6
11.	Gasket Flange 3/8"	09872742	93839	3
12.	O Ring 4.487 ID	09872645	593572	2
13.	O Ring 6" OD	09872646	304493	4
14.	Desiccant Element	09890901	653510	2
15.	Valve Solenoid 110V DC	09883502	653828	2
16.	Repair Kit, Drain Valve	09891101	309112	1
17.	Repair Kit, Purge Valve	09891201	309113	2
18.	Piston	09873801	653295	4
19.	Spring Return	09874901	653606	2

8.0 Maintenance Schedule of Air Dryer of M/s Prag polymers.

SN	Type	Activities	Maintenance Schedule					
			IA	IB	IC	Schedule 'A' after 18/24 months (AOH/TOH)	Schedule 'B' after 36/48 months (IOH)	POH
1	Check electrical connections and their tightness		✓	✓	✓	✓	✓	✓
2	Operational check of the dryer with compressor loaded and unloaded • Purge valves must expel air every minute. • Drain valve must expel collected impurities every min. • Cyclic operation of the unit must be OK	Attend/ replace the component(s) behaving erratic	✓	✓	✓	✓	✓	✓
3	Check Auto drain of MR-1 & MR-2	It should function properly	✓	✓	✓	✓	✓	✓
4	Shut off cock of After/Final filter	Open to drain moisture collected in the bowl	✓	✓	✓	✓	✓	✓
	Check color of humidity	If found	✓	✓	✓	✓	✓	✓

5	indicator, which indicates: **Blue**- Dryer performing satisfactorily **Pink/Lavender**- Dryer is suspect **White**- Dryer not performing	'Pink', run the unit to see whether after some time the color should change to blue. Verify if dryer is cycling. If cycling operation is ok, check condition of Coalescer filter element. If contaminated with oil, replace element and also replace Humidity Indicator						
6	Charge the system from '0' pressure and check the pressure setting	Cut In- 7 Kg/sq.cm Cut out- 6 Kg/sq.cm	X	X	✓	✓	✓	✓
7	Air dryer assembly	Clean dirt and dust	✓	✓	✓	✓	✓	✓
8	Mufflers of Purge valves and Drain valve	Remove and clean Mufflers	X	X	X	✓	✓	✓
9	Pipe connections	Check pipe connections for their tightness	X	X	X	✓	✓	✓
10	Drain and purge valves	Dismantle, Clean and re-assemble	X	X	X	✓	✓	✓
11	Coalescer filter and After/Final Elements	Replace element with gasket.	X	X	X	✓	✓	✓
12	Overhaul the complete Dryer unit.	Replace all parts as mentioned in kit A & B	X	X	X	X	✓	✓

8.1 KIT– A to be renewed during AOH/TOH/IOH/POH after 18/24 months of service.

SN	Description	Part no.		Qty
		New	Old	
	Coalescer Filter Element Kit			
1	Coalescer Filter Element	4106120	AD.1.06.12	01
2	'O' Ring	4107050	AD.1.07.05	02
3	Gasket	4107030	AD.1.07.03	01
4	Gasket	4106160	AD.1.06.16	02
	After Filter/MR Element Kit (Optional)			
5	After Filter Element	4115010	AD.1.15.01	01
6	'O' Ring	4110020	AD.1.10.02	01
7	Gasket	4107030	AD.1.07.03	01

8.2 KIT– B to be renewed during AOH/TOH/IOH/POH after 36/48 months of service.

SN	Description	Part no.		Qty
		New	Old	
	Coalescer Filter Element Kit			
1	Coalescer Filter Element	4106120	AD.1.06.12	01
2	'O' Ring	4107050	AD.1.07.05	02
3	Gasket	4107030	AD.1.07.03	01
4	Gasket	4106160	AD.1.06.16	02
	Desiccant Canister Assembly Kit			
5	Desiccant	4113070	Activated Alumina	AD2=08Kg. AD3=06Kg. AD4/5=04Kg
6	'O' Ring	4113040	AD.1.13.04	02
7	Sleeve (Desiccant)	4113060	AD.1.13.06	02
8	Retaining Ring A	4113031	AD.1.13.03A	04
9	Retaining Ring B	4113032	AD.1.13.03B	04
	Purge Valve Assembly Kit			
10	'O' Ring	4109060	AD.1.09.06	02
11	'O' Ring	4109090	AD.1.09.09	02
12	Cup Washer	4109080	AD.1.09.08	02
13	Seat	4109130	AD.1.09.13	02
14	Lock Nut	4109111	AD.1.09.11A	02
15	Spring	4109070	AD.1.09.07	02
	Drain Valve Assembly Kit			
16	'O' Ring	4108030	AD.1.08.03	01
17	'O' Ring	4109060	AD.1.09.06	01
18	Cup Washer	4108040	AD.1.08.04	01
19	Seat	4108110	AD.1.08.11	02
20	Spring	4108060	AD.1.08.06	01
	Outlet Check Valve Assembly Kit			

21	'O' Ring	4104050	AD.1.04.05	02
22	'O' Ring	4110090	AD.1.10.09	02
23	'O' Ring	4104100	AD.1.04.10	03
24	Cup Washer	4109080	AD.1.09.08	02
25	Seat	4106080	AD.1.06.08	02
	Inlet Check Valve Assembly Kit			
26	'O' Ring	4104050	AD.1.04.05	02
27	'O' Ring	4106090	AD.1.06.09	02
28	'O' Ring	4104100	AD.1.04.10	03
29	Cup Washer	4109080	AD.1.09.08	02
30	Seat	4106080	AD.1.06.08	02
	Compactor Assembly Kit			
31	'O' Ring	4109090	AD.1.09.09	02
32	'O' Ring	4110070	AD.1.10.07	02
33	'O' Ring	4110090	AD.1.10.09	02
34	Cup Washer	4109080	AD.1.09.08	02
	Timer Unit Assembly Kit			
35	Gasket	4104250	AD.1.04.25	01
36	Gasket	4104200	AD.1.04.20	01
37	Seal	4104142	AD.1.04.14B	02
38	Gasket	4107030	AD.1.07.03	04
	Tower Assembly Kit			
39	'O' Ring	4110020	AD.1.10.02	04
40	'O' Ring	4104100	AD.1.04.10	02
	After Filter/MR Assembly Kit (Optional)			
41	After Filter Element	4115010	AD.1.15.01	01
42	'O' Ring	4110020	AD.1.10.02	01
43	Gasket	4107030	AD.1.07.03	01
44	'O' Ring	4104100	AD.1.04.10	02

9.0 Maintenance Schedule of Air Dryer of M/s Trident

SN	Maintenance Activity	IA	IB	IC	Schedule 'A' after 18/24 months (AOH/TOH)	Schedule 'B' after 36/48 months (IOH)	POH
1	Open drain cock of final filter to drain off any accumulated water content	√	√	√	√	√	×
2	Check the color of humidity indicator	√	√	√	√	√	×
3	Check auto drain of main reservoir No.1 & main reservoir No.2	√	√	√	√	√	×
4	Check electrical connection of air dryer and their tightness.	√	√	√	√	√	×
5	Check cyclic operation of air dryer.	√	√	√	√	√	√
6	Check Memory Feature	√	√	√	√	√	√
7	Examine the drain valve on the sump of pre coalescer	√	√	√	√	√	√

8	Charge the system from zero pressure and check the dryer does not cycle immediately. Note the pressure when the dryer starts cycling.	×	×	√	√	√	√
9	Replace consumables as per respective manufacturer's recommended replacement **kit-A**	×	×	×	√	√	√
10	Clean external muffler connected with purge valves.	×	×	×	√	√	√
11	Check condition of each pipe assembly and their tightness.	×	×	×	√	√	√
12	Overhaul the complete air dryer and change desiccant.	×	×	×	×	√	√
13	Test each air dryer before putting it back in to service. Schematic diagram of test bench is given in Annexure-I List of tests to be conducted and record to be maintained is given in Annexure-II	×	×	×	×	√	√
14	Replace consumables as per respective manufacturer's recommended replacement **kit-B**	×	×	×	×	√	√

9.1 KIT– A to be renewed during AOH/TOH/IOH/POH for 3-phase locos after 18/24 months of service.

S.N	Item	Part no	Qty
1	Filter Element	AD433	1
2	Filter Top Cup	CD668	1
3	Filter Bottom Cup	CD669	1
4	Spare Kit Filter Bottom	AS443	1
5	Spare Kit Valve Double Poppet	AS444	1
6	Filter Element M250Y	AC077	1

9.2 KIT– B to be renewed during AOH/TOH/IOH/POH for 3-phase locos after 36/48 months of service.

S.N	Item	Part no	Qty
1	Filter Element	AD433	1
2	Filter Top Cup	CD668	1
3	Filter Bottom Cup	CD669	1
4	Spare Kit Filter Bottom	AS443	1
5	Spare Kit Valve Double Poppet	AS444	1
6	Filter Element M250Y	AC077	1
7	Spare Kit Valve Shuttle	AS445	1

8	Spare Kit Valve Purge	AS446	2
9	Bag Cartridge desiccant	CD671	2
10	Spring Compactor	CD673	2
11	Spare Kit Seals Tower	AS447	1
12	Sub Assy Humidity Indicator	AD925	2
13	Gasket Pad Amisco Solenoid Valve	AS079A	2
14	Seal Kit Controller Box	AS709	1

9.3 KIT– A to be renewed during AOH/TOH/IOH/POH for conventional locos after 18/24 months of service.

S.N	Item	Part no	Qty
1	Filter Element	AD433	1
2	Filter Top Cup	CD668	1
3	Filter Bottom Cup	CD669	1
4	Spare Kit Filter Bottom	AS443	1
5	Spare Kit Valve Double Poppet	AS444	1
6	Filter Element M250Y	AC077	1

9.4 KIT– B to be renewed during AOH/TOH/IOH/POH for Conventional locos after 36/48 months of service.

S.N	Item	Part no	Qty
1	Filter Element	AD433	1
2	Filter Top Cup	CD668	1
3	Filter Bottom Cup	CD669	1
4	Spare Kit Filter Bottom	AS443	1
5	Spare Kit Valve Double Poppet	AS444	1
6	Filter Element M250Y	AC077	1
7	Spare Kit Valve Shuttle	AS706	1
8	Spare Kit Valve Purge	AS446	2
9	Bag Cartridge desiccant	CD671	2
10	Spring Compactor	CD673	2
11	Spare Kit Seals Tower	AS447	1
12	Sub Assy Humidity Indicator	AD925	2
13	Gasket Pad Amisco Solenoid Valve	AS079A	2
14	Seal Kit Controller Box	AS709	1

10.0 METHOD & PERIODICITY OF MEASUREMENT OF DEW POINT:

To conduct dew point depression at various compressor capacities as per RDSO specification no.MP.0.01.00.06 (Rev.05) March-2011.

10.1 Test Procedure:

Compressed air is allowed to pass through the dryer. Set the system pressure 10 Kg/sq.cm for locomotives. Using flow controller required flow is adjusted. Flow is measured using flow meter. Dew point meter with dew point sensor are fitted before and after the dryer to measure dew point at inlet and outlet of the dryer. Using heater, required inlet temperature of airflow is maintained. Dew point readings are taken when inlet pressure reaches 10 Kg/sq.cm for locomotives during the flow. Dew point depression across the dryer is calculated. Dew point depression = Inlet dew point – Outlet dew point. The above procedure is repeated for various flows. Dew point reading is taken from particular setting of flow and temperature.

Let the unit run for 30 minutes for stabilization of the dew point. Note the air inlet temperature and the dew point temperature at the temperature gauge and calculate the dew point depression as under :-

Dew Point Depression = $T_1 - T_2$

Where T_1 = Inlet Dew point Temperature, T_2 = Outlet Dew point Temperature

This check shall be made at designed and maximum airflow capacities of Air dryer as per specified value.

10.2 Dew Point Depression:

As per technical circular no. RDSO/2011/EL/TC/0108, Rev.'0', Dated 07.03.2011, due point depression shall be as under:

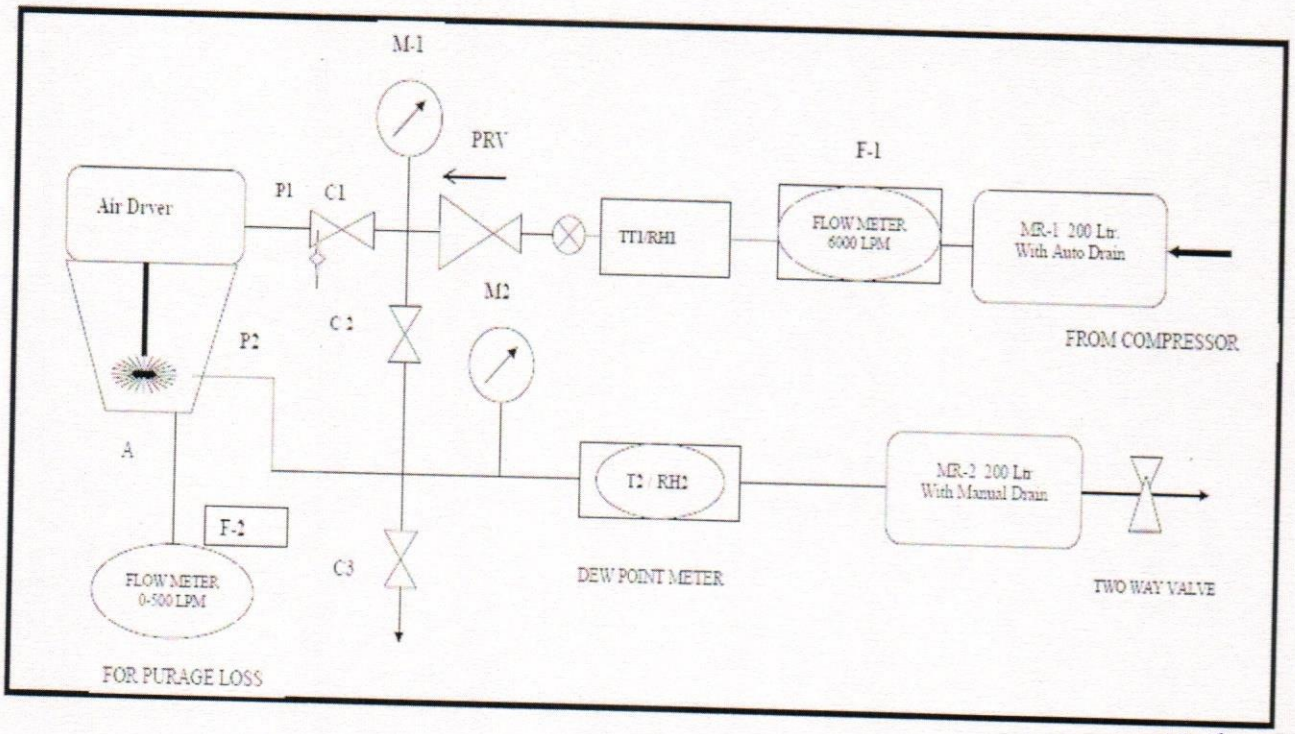
(i) For new or overhauled (new desiccant) Air dryer it should be ≥ 30^0 C.
(ii) For Air Dryers already in service (more than 1 year) it should be ≥ 15^0C.

10.3 Periodicity of measurement of dew point.

Dew point measurement should be carried out as per the schematic diagram shown in Annexure-1 during schedule of 36/48 months & POH. Observation during testing of air dryer should be recorded as per format given in Annexure II.

****

Annexure-I



AIR DRYER TEST RIG PIPING DIAGRAM

Annexure-II

TESTING REPORT FOR AIR DRYER

Air Dryer S. No.:

Make :

Design Air Flow rate: 2000LPM for freight electric locomotive
1500LPM for passenger electric locomotive

Inlet Air pressure: 10 Kg/cm^2 for all type locomotives.

SN	Description	Standard	Observation
1	**Leakage test** Soap test exterior surface of the air dryer, purge valve and all tube connections.	No Leakage	
2	Drying and regenerative cycle time.	120±5 seconds (For KBIL Make) 68±5 seconds (For Trident make) 60±5 seconds (For other make)	
3	Pressure setting at the start of cycling operation of air dryer.	4.6±0.5 Kg/cm^2 for KBIL 7±0.5 Kg/cm^2 for rest all make	
4	Pressure drop across the unit	Not more than 3% of working pressure	
5	Cyclic operation of air dryer at voltage range 85-130V DC	Drying and regenerative time should be: 120±5 seconds (For KBIL Make) 60±5 seconds (For other make)	
6	Dew point depression (Inlet air dryer temperature—outlet dew point temperature)	• For new or overhauled (new desiccant) Air dryer it should be minimum 30^0 C. • For Air Dryers already in service (more than 1 year) it should be minimum 15^{0}C.	
7	Purge losses (Purge loss measured by flow meter in LPM ×100/Design flow in LPM)	Maximum 20% at design capacity.	