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सत्यमेव जयते

भारत सरकार – रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ – 226011
Government of India - Ministry of Railways
Research, Designs & Standards Organization,
LUCKNOW - 226011

No. EL/11.5.5/2 Date: 15.12.2009

Chief Electrical Engineers,

- East Central Railway, Hazipur – 844 101 (Bihar)
- South East Central Railway, Bilaspur-495 004.
- West Central Railway, Opp. Indira Market, Jabalpur-482001
- Northern Railway, Baroda House, New Delhi-110 001.
- Central Railway, 2nd floor, Parcel Office Bldg., Mumbai CST-400 001
- South Central Railway, Rail Nilyam, Secunderabad – 500 071.
- Chittaranjan Locomotive Works, Chittaranjan-713 331 (WB)

MODIFICATION SHEET NO. RDSO/2009/EL/MS/0385 (Rev.0), Dated 15.12.2009

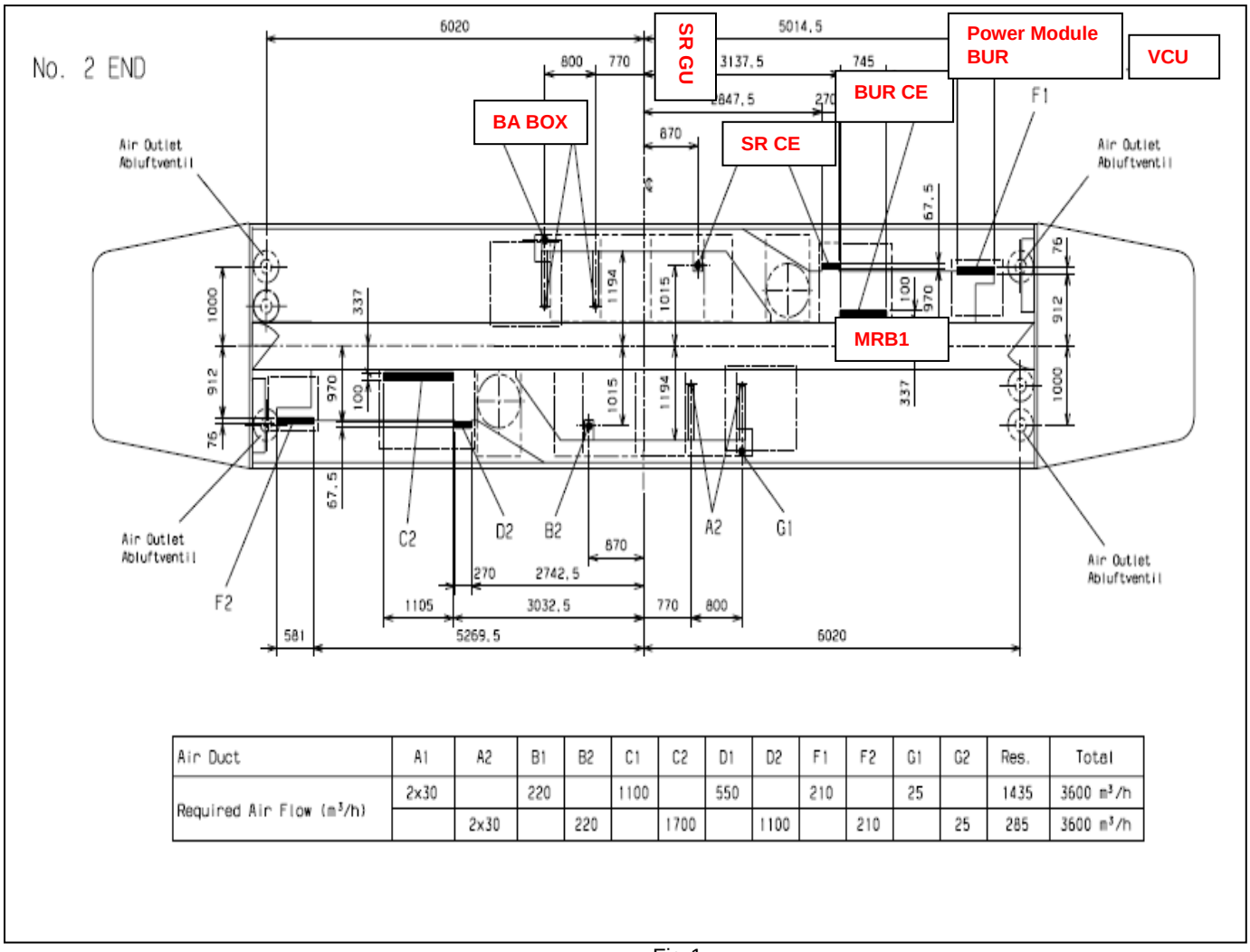
1.0 Title:

Partial blocking of opening duct of back side of auxiliary converter of three phase electric locomotives.

2.0 Object:

Railways have been reporting problem of dust accumulation inside the machine room chamber and on the electronic cards of three phase electric locomotives. This is a major problem, which affects reliability of electronic cards. The problem of dust accumulation is attributed to less pressurization in machine room and improper filtering of incoming air to machine room. In the existing system, the air delivery of the machine room blowers first passes through the heat sink of electronic cubicle of power converter, auxiliary converter, vehicle control unit; and WRE & GG modules of auxiliary converter and thereafter it goes to machine room compartment. There are four ventilators in WAP5 locomotive and six in WAG9/WAP7 locomotive for escaping out the machine room air.

RDSO conducted the measurement of air flow at the various locations of duct outlet in MRB-1 circuit (fig-1) by removing traction converter, auxiliary converter and vehicle control unit in one imported locomotive (loco no. 31015) at Electric Loco Shed, GMO and in one new loco at CLW. The measurements are summarized in table-1



Air Duct	A1	A2	B1	B2	C1	C2	D1	D2	F1	F2	G1	G2	Res.	Total
Required Air Flow (m^3/h)	2x30		220		1100		550		210		25		1435	3600 m^3/h
		2x30		220		1700		1100		210		25	285	3600 m^3/h

Fig-1

SN	Loco no.	MRB-1	SCMRB-1	Air flow in meter/second					
				BUR front duct				BUR back duct	
				L-1	L-2	R-1	R-2	L	R
01	31015 (Imported Loco)	SH	Landert	6.5	2.0	5.8	10	1.2	3.0
02	TPP-63 (CLW Loco)	SH	SH	5.1	0.1/2.0	5.8	2.4	4.5	10.8

Table-1

It can be seen from the above table that there is a variation in air velocity in CLW built locomotive as compared to imported locomotive.

One of the reason attributed for this in CLW built locomotive is " the duct opening of back side of auxiliary converter which was found to be blocked around 75% in imported loco where as in CLW built loco this was 100% open (fig-2 & 3)."

Blocked around 75% in imported locos

Fig-2: Imported loco

100% open in CLW built locos

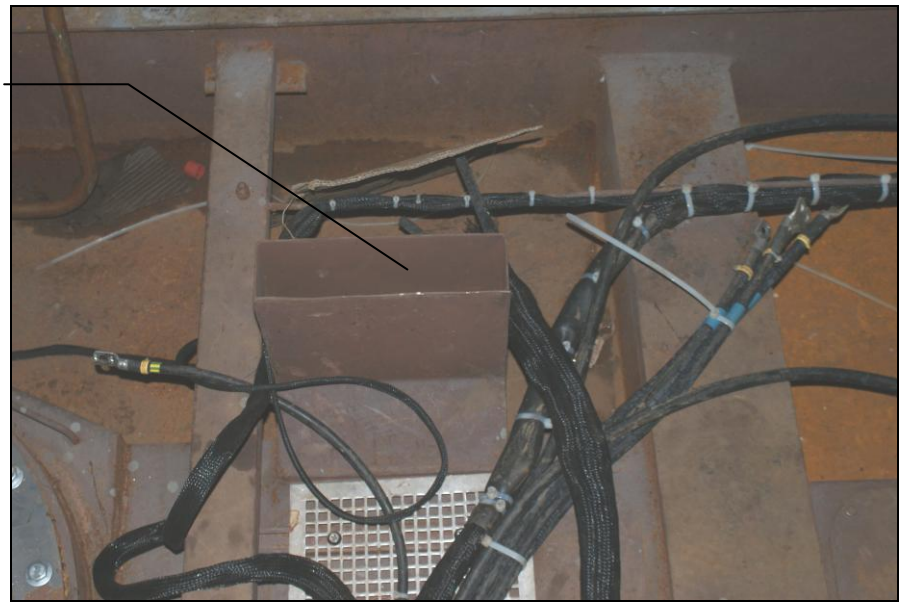


Fig-3: CLW loco

The modification shown in fig-2 was done by ABB vide modification release no. 431 rev A dated 26.11.2000 (copy enclosed) on all imported WAG9 and WAP5 loco to improve front side cooling of power modules of auxiliary converter. This modification has not been implemented by CLW in indigenously built three phase locomotives.

Thus in order to improve the front side cooling of power modules of auxiliary converter, the modification as per ABB vide modification release

no. 431 rev A dated 26.11.2000 (copy enclosed) is required to be done at the earliest.

3.0 Existing Arrangement:

The duct opening of back side of auxiliary converter is found 100% open in CLW built WAP-7 & WAG-9 locomotives.

4.0 Modified Arrangement:

Duct opening of back side of Auxiliary Converter has to be blocked 75% in place of 100% open with MS plate of 2 mm thickness of proper and required size.

5.0 Application to class of locomotives:

WAP-5, WAP-7, WAG-9, WAG-9H.

6.0 Material Required:

MS plate of 2 mm thickness of required size.

7.0 Material Rendered Surplus:

Nil.

8.0 Reference:

Nil

9.0 Modification Drawing:

Attached.

10.0 Agency of Implementation:

CLW and Loco Sheds holding WAP-5, WAP-7, Wag-9 & WAG-9H locomotives.

AGM 15/12/09
(Sandeep Srivastava)
for Director General/Elect.

Encl: As above.

Copy to:-

1. **Secretary (Electric Traction),** Railway Board, Rail Bhavan, New Delhi-110 001
2. **Sr. DEE (TRS), Electric Loco Sheds,**
   - Central Railway, Ajni (Nagpur)-440008.
   - South East Central Railway, BMY Complex, Bhilai, Durg-490 025.
   - Western Railway, Tughlakabad, New Delhi-110 044.
   - Northern Railway, Ghaziabad (UP)-201 001.
   - East Central Railway, Gomoh-828 401
   - South Central Railway, Lalaguda, Secunderabad – 500 017.

AGM 15/12/09
(Sandeep Srivastava)
for Director General/Elect.

Encl: As above

o/c

ADtranz	Daimler Chrysler Railsystems (Switzerland) Ltd.	Modification Release No.: 431 Rev.: A

Modification Release

Date: 26.11.2000

Issued by:	Project:	Order No.:
Harald Hack / BLSA	Indian Railways / IR-GP140	F361250

Subject:

Auxiliary converter air cooling

Concerned:		Implement on Loco-No.:	Account No.:
X	**WAP5**	30000 - 30010 (all fleet)	
X	**WAG9**	31000 - 31021 (all fleet)	

Problem description:

Air flow measurements on the locomotives have shown, that the cooling air flow through the heat exchangers on the auxiliary converter modules is not proper maintained.

Remedial Measures:

In order to increase the air speed through the heat exchangers, additional deflectors have to be installed on the auxiliary converter covers.

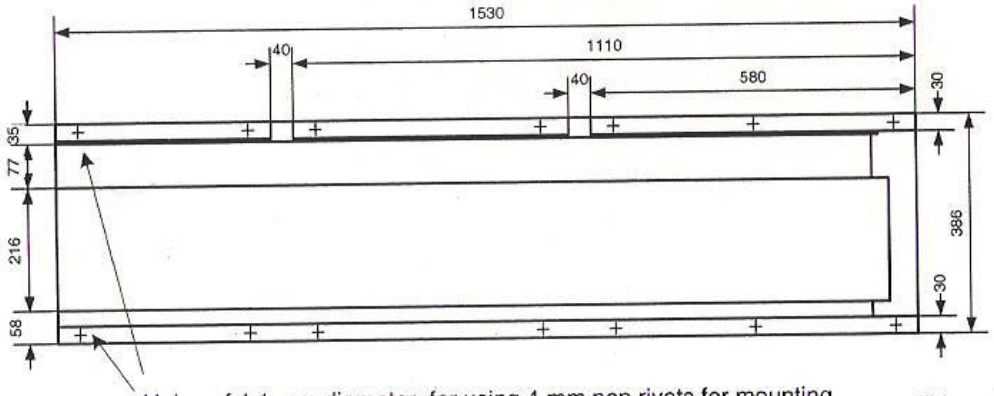
Documents concerned:

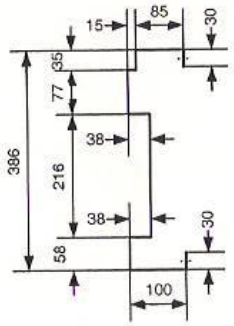
Type of document	Document No.	Revision	Title
drawing	MR431_01.vsd	-	BUR Air deflector electronics, type 1
drawing	MR431_02.vsd	-	BUR Air deflector electronics, type 2
drawing	MR431_03.vsd	-	Air deflector for auxiliary converter, type 3
drawing	MR431_04.vsd	-	Air deflector for auxiliary converter, type 4
drawing	MR431_05.vsd	-	BUR Air deflector electronics, types 1 & 2
drawing	MR431_05.vsd	-	BUR Air deflector arrangement
drawing	Defl_el.doc	-	BUR Air deflector (electronics), rear side of BUR Box

Distribution:

Company / Location	Responsible	Copies	Incl. Documents

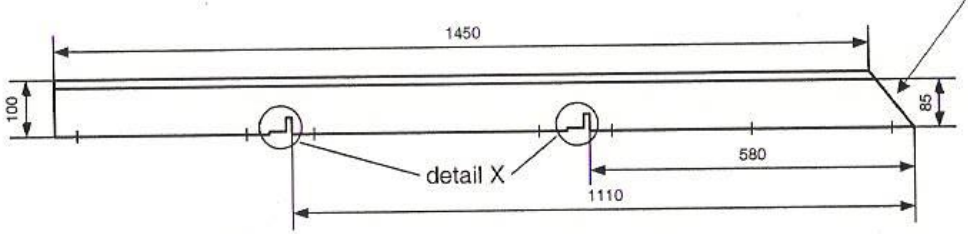
BUR Box 1
Air deflector, type 1



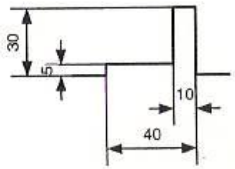


Holes of 4.1 mm diameter, for using 4 mm pop rivets for mounting

This end closed



"X"

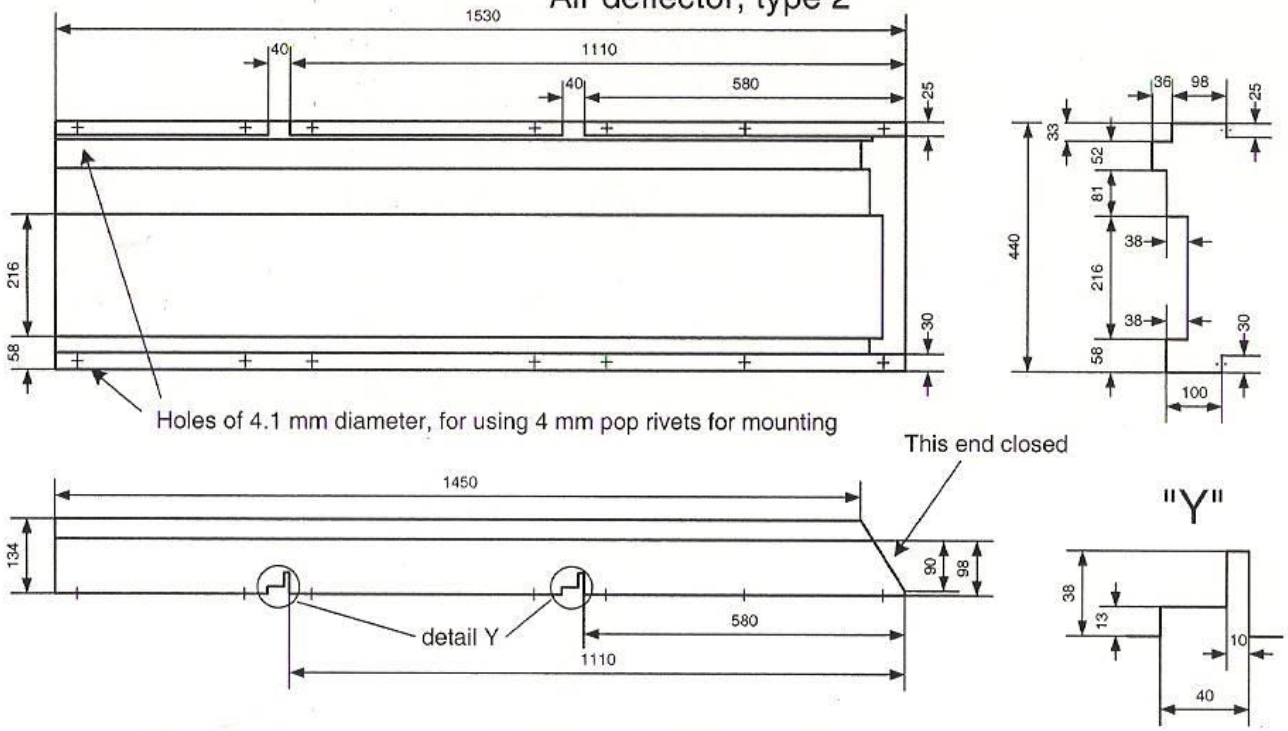


All dimensions in mm

Material: Aluminium 1.5 mm

TITEL :	BUR Air deflector electronics						
FIRMENNAME :	ADtranz / H.Hack			AUTOR:		ADtranz / H.Hack	
DATUM :	11-29-00	UHRZEIT :	14:15	BLT	1	von 1	BLTS
DATEINAME :	Mr431_01.vsd						
ZEICHNUNGSMAßSTAB :	10 cm:100 cm						

BUR Box 2
Air deflector, type 2

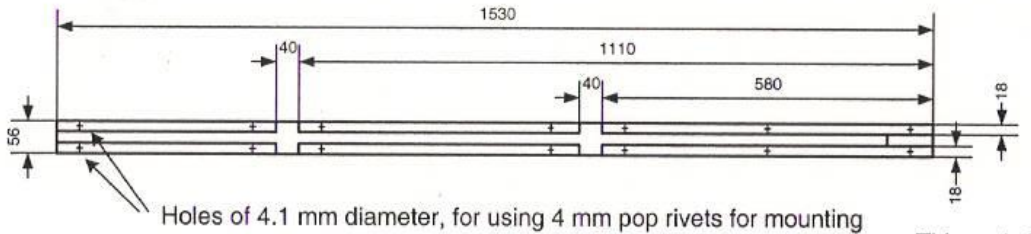


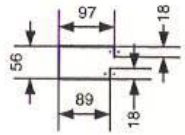
All dimensions in mm

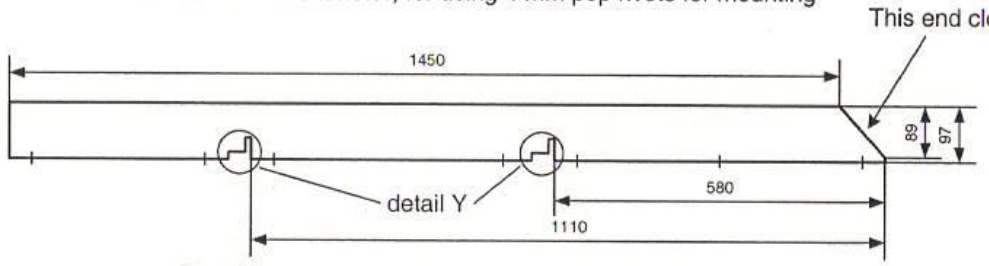
Material: Aluminium 1.5 mm

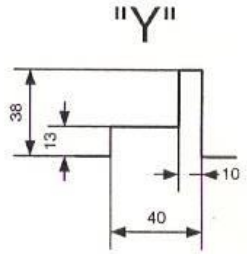
TITEL :	BUR Air deflector electronics							
FIRMENNAME :	ADtranz / H.Hack			AUTOR:	ADtranz / H.Hack			
DATUM :	11-29-00	UHRZEIT :	13:50	BLT	1	von	1	BLTS
DATEINAME :	Mr431_02.vsd							
ZEICHNUNGSMAßSTAB :	10 cm:100 cm							

BUR Box 1 & 2
Air deflector, type 3







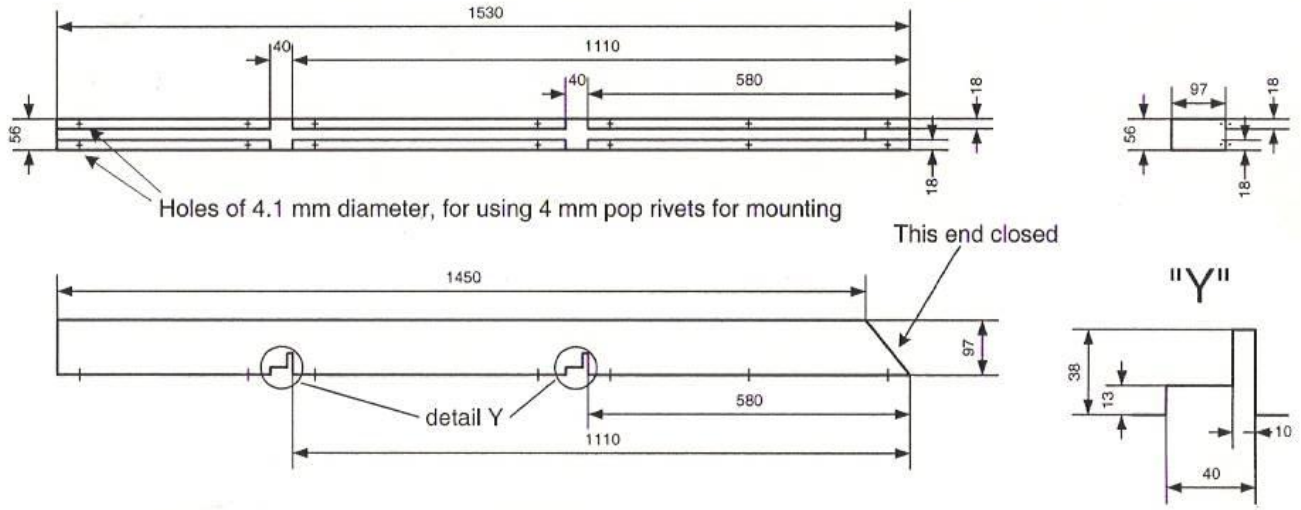


All dimensions in mm

Material: Aluminium 1.5 mm

TITEL :	Indian Railways, Air deflectors for auxiliary converter, module side							
FIRMENNAME :	ADtranz / H.Hack			AUTOR:		ADtranz / H.Hack		
DATUM :	11-29-00	UHRZEIT :	13:51	BLT	1	von	1	BLTS
DATEINAME :	Mr431_03.vsd							
ZEICHNUNGSMAßSTAB :	40 cm:100 cm							

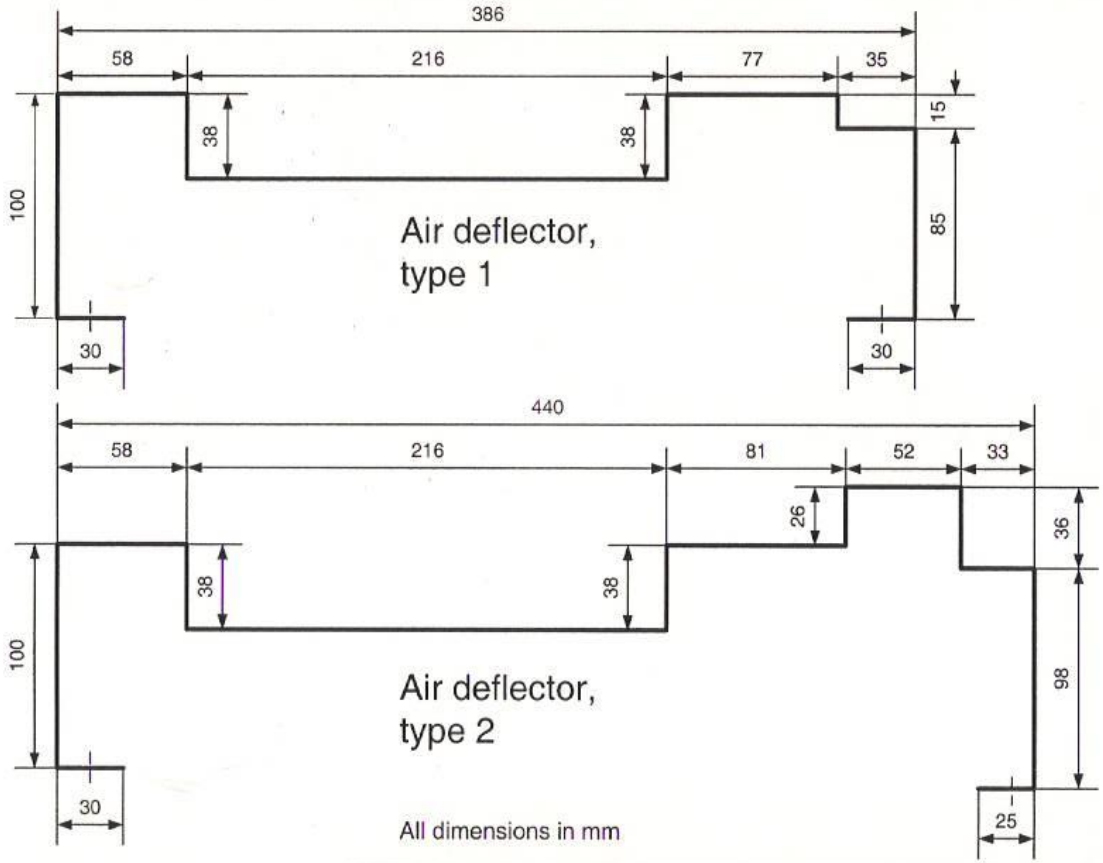
BUR Box 2
Air deflector, type 4



All dimensions in mm

Material: Aluminium 1.5 mm

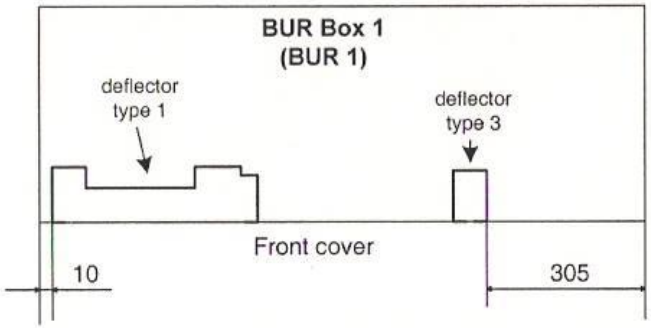
TITEL :	Indian Railways, Air deflectors for auxiliary converter, module side							
FIRMENNAME :	ADtranz / H.Hack			AUTOR:		ADtranz / H.Hack		
DATUM :	11-29-00	UHRZEIT :	13:53	BLT	1	von	1	BLTS
DATEINAME :	Mr431_04.vsd							
ZEICHNUNGSMAßSTAB :	40 cm:100 cm							

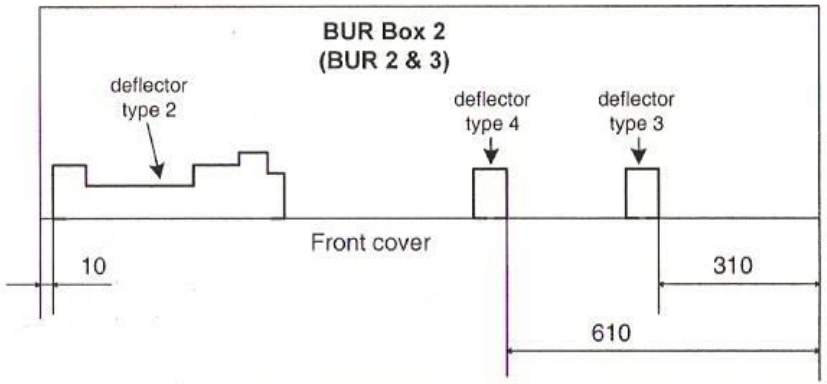


view A
(seen from the top of the converter)
M1:2.5

TITEL :	BUR Air deflector electronics							
FIRMENNAME :	ADtranz / H.Hack			AUTOR:		ADtranz / H.Hack		
DATUM :	11-29-00	UHRZEIT :	11:56	BLT	1	von	1	BLTS
DATEINAME :	MR431_05.vsd							
ZEICHNUNGSMAßSTAB :	40 cm:100 cm							

Arrangement of air deflectors in both BUR Boxes

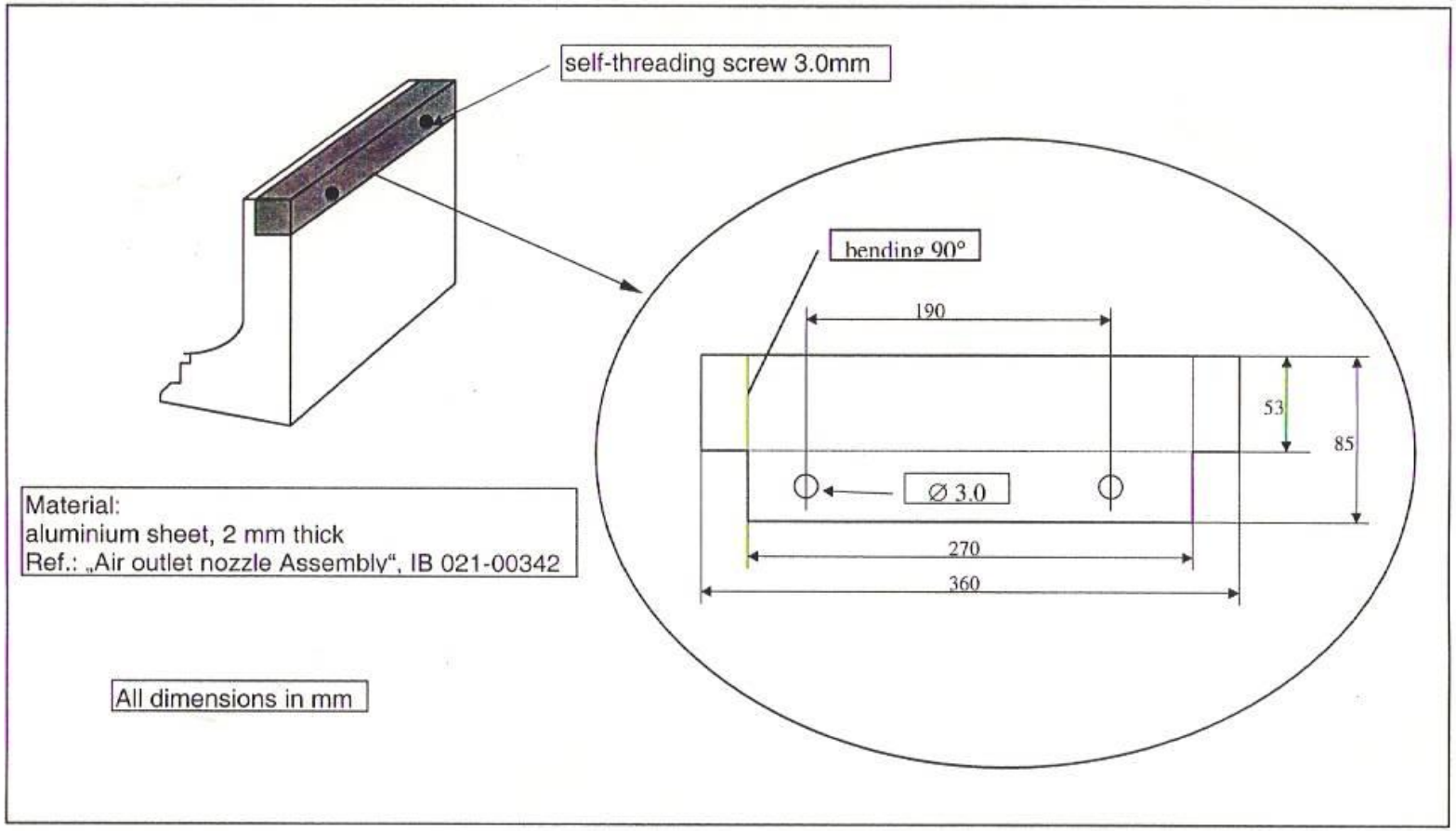




(seen from the top of the auxiliary converter)

All dimensions in mm

TITEL :	BUR Air deflector arrangement								
FIRMENNAME :	ADtranz			AUTOR:	ADtranz / H.Hack				
DATUM :	11-29-00	UHRZEIT :	11:16	BLT	1	von	1	BLTS	
DATEINAME :	Mr431_06.vsd								
ZEICHNUNGSMAßSTAB :	40 cm:100 cm								


self-threading screw 3.0mm
bending 90°
190
53
85
Ø 3.0
270
360
Material:
aluminium sheet, 2 mm thick
Ref.: „Air outlet nozzle Assembly", IB 021-00342
All dimensions in mm