

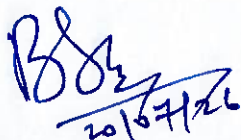
Additional Terms and Conditions for Bidders (including Pre-Qualification requirements)

Supply of "Self-priming mono block pump assembly with controller for KMMC".

PI No. - 140760031

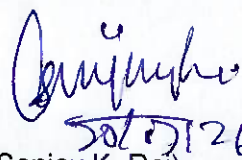
S. No	Description of requirement	Document to be attached
1	Bidder should submit a self-declaration stating that, "Offered item is same as per enquiry and there is no deviation".	Self-declaration on letterhead of firm.
2	In case Bidder is not be OEM but its Reseller then bidder to submit valid authorisation certificate from OEM with the bid.	Authorisation certificate
3	Contract shall be awarded to only such bidder who are approved for this item to RCF Spec No.EDTS-186, Rev-A , before bid opening date	Approval copy
4	Bidder should have supplied minimum one set. of same item (Self priming mono block pump assy) to any Public sector undertaking/ Central Gov. sector/Private sector/Indian Railways working for rolling stock application.	PO and Invoice copy

Prepared By



Brijendra S Mohanya
Sr. Mgr (CEE)

Approved By



(Sanjay K. Rai)
AGM (CEE)

Digitally signed by
MATHEWS P
Date: 2026.02.26
12:39:59 IST
Reason: IREPS
Document
Location: IREPS-CRIS

EDTS-186 Rev. 'A'

SPECIFICATION FOR SELF PRIMING MONOBLOCK PUMP ASSEMBLY WITH CONTROLLER FOR AC COACHES

1.0 SCOPE

This specification covers the design, manufacture and supply of complete set of pump equipment to be used on AC coaches for lifting water from main tanks mounted on the underframe to auxiliary tanks. The 'Water Raising 3 Phase Horizontal Centrifugal Self Priming Mono-set Pumps For Use In Coaches' shall conform to RDSO specification no. RDSO/PE/SPEC/AC/0022 (Rev.0) Amdt.1 and shall be procured from RDSO approved sources only.

The set of equipments shall comprise of the following:

- a) Water raising 3 phase horizontal centrifugal self priming mono-set pumps for use in coaches' to RDSO specification no. RDSO/PE/SPEC/AC/0022 (Rev.0) Amdt.1 with thermal switch as protection device embedded in the motor.
- b) Cradle arrangement with interconnecting stainless steel piping arrangement.
- c) Microprocessor based controller programmed for alternate loading of pumps during operation, isolation of faulty pump, overload protection , running time indication etc.

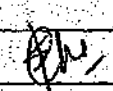
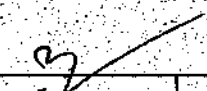
2.0 SERVICE CONDITIONS:

2.1 Environmental conditions:

Ambient	4°C to 55°C
Humidity	upto 100% saturation
Altitude	Max. 1000m above sea level

2.2 Working conditions:

Train speed	200 KMPH
Maximum vertical acceleration	1.0g.
Maximum lateral acceleration	0.5g.
Maximum longitudinal acceleration	3.0g.

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Frequency and amplitude:

Sinusoidal form of vibration, the frequency 'f' lies between 1 Hz and 50 Hz and their amplitude 'a' expressed in mm is given as a function 'f' by the equation.

$a = 25/f$ for the values of 'f' between 1 Hz and 10 Hz.

$a = 250/f^2$ for the values of 'f' between 10 Hz and 50 Hz.

3.0 REFERENCE SPECIFICATIONS:

RDSO/PE/SPEC/AC/0022 (REV.0)AMDT.1	Water raising 3-phase horizontal centrifugal self-priming mono-set pumps for use on coaches.
IEC 571-1980 (PART-1)	Rules for electronics used on rail vehicles
RDSO spec. no E16/01 (Rev.-A)	Reliability assurance specification.

4.0 SCOPE OF SUPPLY:

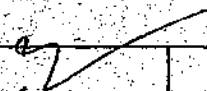
The following shall comprise the scope of supply:

1. Water raising 3 phase horizontal centrifugal self priming moonset pumps (2 nos) for use in coaches' to RDSO specification no. RDSO/PE/SPEC/AC/0022 (Rev.0) Amdt.1 with thermal switch as protection device embedded in the motor.
2. Complete assembly of pumps at S.No 1 above with cradle and associated plumbing accessories and hardware as per drg. No:CC71327 alt. 'nil'
3. Microprocessor based controller with overall dimensions as per drawing no. CC71328 alt. 'nil'

5.0 Technical Requirements:

5.1 Self-priming Mono set pump:

The technical requirements of 'prime mover i.e motor and self-priming pump shall be as per Cl. 6.0 to 6.4 of RDSO specification No. RDSO/PE/SPEC/AC/0022 (REV.0) with AMDT.1. However in addition a thermal switch shall be provided in the motor for overload protection and the terminal plate shall be as per details shown in RCF drawing no. CC71326 alt 'a'

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5.2 Controller unit:

The complete set of 2 nos. of self priming mono-set pumps shall operate through a microprocessor based controller. The controller shall be located in power panel of coaches. The technical requirements of the controller unit shall be as under:

- i) Input voltage : 110V DC (nominal)
85-135 V (variation)
- ii) Overall dimensions : H = 240 mm
W = 145 mm (W/O terminals)
D = 50 mm
- iii) Logic : Microcontroller based
 - a) The controller shall be preset to run one of the pumps for a period of 4 hours (adjustable) continuously and then automatically switch over to the other pump for same duration to enable equal loading of the pumps.
 - b) In the event of failure of any one of the pumps the controller shall switch over to the other pump automatically.
 - c) It shall also be possible to run the pumps in manual mode by selection through a rocker switch provided on the controller.
- iv) Indications : Running time of operating pump unit shall be displayed in digital mode on front panel
LED Indication (green) for each pump shall glow while in operation.
LED Indication (Red) for faulty equipment shall be provided for each pump.
- v) Switching outputs : 2 nos. isolated potential free contacts to trigger the power contactors provided in power panel.
- vi) Housing : The housing shall be aluminum die casted and shall be powder coated to white colour shade no. 023 of M/s Berger Paints/Nerolac after adequate surface treatment for anti rust and anti corrosion.
- vi) PCB : (PC3S4) of glass epoxy with anti fungal and anti corrosive treatment.

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- vii) Power contactors : 3 pole, 415 V AC, 16 A rating with coil voltage of 110 V AC to cat no. 3 TB41 of M/s Siemens or similar of reputed make shall be employed for changeover arrangement of pump equipment. The scheme shall be as shown in drawing no. CC71328 alt 'Nil'.
- viii) Cable terminations : Cage clamp type 'Wago' terminals suitable for 4.0 mm² cables shall be provided on the outer casing of the controller.

6.0 Protections :

- 6.1 Over current : Current-limiting features shall be provided to safeguard against failure of semiconductor devices under abnormal current conditions.
- 6.2 Input over Voltage : Over voltage protection shall be provided to limit the input voltage above 155 V DC.
- 6.3 Under Voltage : The equipment should function even below 85 V DC, No damage should occur to the equipment.
- 6.4 Reverse polarity : No damage shall occur to equipment under reverse polarity connection at input terminals.

7.0 Tests:

- 7.1 Water raising 3-phase horizontal centrifugal self-priming mono-set pumps for use on coaches shall be tested as per Cl. 8.0 & 9.0 of RDSO spec. No. RDSO/PE/SPEC/AC/0022 (REV.0) with AMDT.1

7.2 The tests on controller unit shall be conducted as follows:

7.2.1 Type tests:

All the type tests mentioned in table given below shall be carried out on a prototype unit at firm's premises at the manufacturer's cost. The firm manufacturing for first time shall get prototype approval from CEE/RCF.

7.2.2 Acceptance Test:

Acceptance test mentioned in table given below is to be carried out by an inspecting authority nominated by the purchaser at the works of the manufacturer, on the samples picked up by the inspecting authority.

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7.2.3 Routine tests:

Routine test mentioned in table given below shall be carried out on each unit by the manufacturer at his works to ensure compliance with the specification and the drawing.

7.2.4 List of tests to be performed is given below: -

S. NO	TEST DESCRIPTION	TYPE TEST	ACCEPTANCE TEST	ROUTINE TEST	CLAUSE NO.
1	Visual inspection and Performance test	✓	✓	✓	7.3
2	Insulation resistance	✓	✓	✓	7.4
4	Dielectric test	✓	✓	x	IEC571-21
6	Test for all protections	✓	✓	✓	6.0
7	Degree of protection test	✓	X	X	IP23

7.3 Visual inspection and performance test:

- Check for general workmanship, overall dimensions, mounting details, fabrication, finish as per approved drawings.
- The controller shall be tested for its performance to verify requirements mentioned at Cl.5.2 & Cl. 6.0 above

7.4 Insulation resistance:

Meggar the electronic circuits, with 1000 V meggar. Insulation resistances should be greater than the following minimum requirements

110 V circuit and earth: 20-M ohms.

Control and Electronics to earth: 10-M ohms.

8.0 Sampling and Rejection

- 8.1 Type and acceptance tests shall be carried on minimum of two units or maximum ten percent picked up at random from the lot offered for inspection. In case any of the samples fails to comply with the requirement of acceptance tests, the inspecting authority/officer may pick up double the number of samples and repeat all the tests. The lot shall be rejected if any fresh samples fail to meet the tests during the testing.

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8.2 Firm supplying the unit for the first time shall get prototype approval before commencing bulk production.

9.0 Testing facilities:

9.1 The venue for all the tests shall be the manufacturer's works, unless the purchaser indicates his preference for any other location for testing. When the testing is done at the firms works. The manufacturer shall provide personnel, units and other testing facilities for conducting the test free of charge. The manufacturer shall also supply a copy of the type and routine tests carried out by him on the motor to the inspecting officer nominated by the purchaser for his scrutiny approval.

10.0 Guarantee:

10.1 Each unit shall be guaranteed against manufacturing defects for its satisfactory performance for a period of 24 months from the date of commissioning or 30 months after the date of supply which ever is earlier. For any defects due to defective design, materials, manufacture and workmanship type defects, if any, will continue to attract warranty till they are satisfactorily overcome. The supplier shall give free, prompt and efficient after sales service in rectifying defects during warranty periods at Delhi, Bombay, Calcutta, Chennai, Suburban Regions and at RCF.

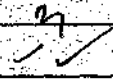
11.0 Installation and maintenance manual:

11.1 The tenderer shall give along with the tender technical details of the equipment offered including the constructional features, instructions for installation and maintenance manual.

12.0 Technical Particulars

12.1 The tenderer shall submit the details as per Annexure-A while quoting for offer.

12.2 The tenderer shall give along with the tender, technical details of the equipment offered including the constructional features, instructions for installation and maintenance manual.

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13.0 ISO Requirements:

13.1 The firm to be considered for manufacture and supply of 3-phase horizontal centrifugal self-priming mono-set pumps shall be ISO certified.

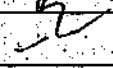
14.0 Enclosures:

- i) Annexure-A
- ii) Drg. No. CC71325 alt. 'a'
- iii) Drg. No. CC71326 alt. 'a'
- iv) Drg. No. CC71327 alt. 'a'
- v) Drg. No. CC71328 alt. 'a'

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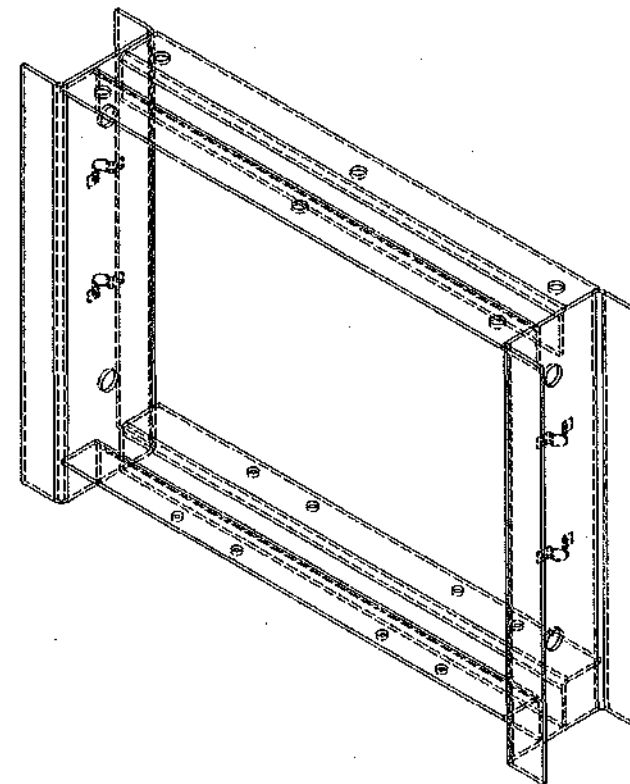
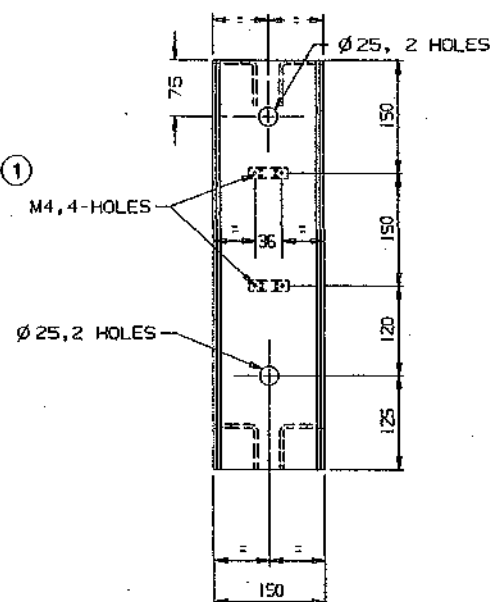
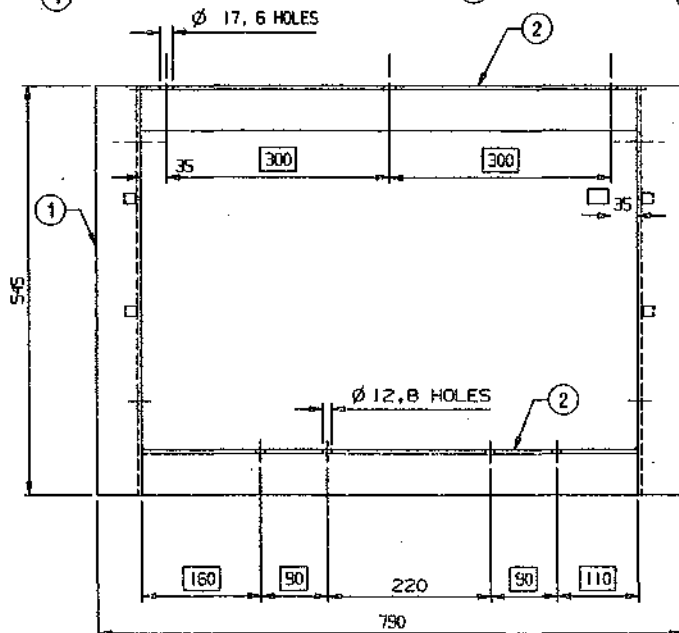
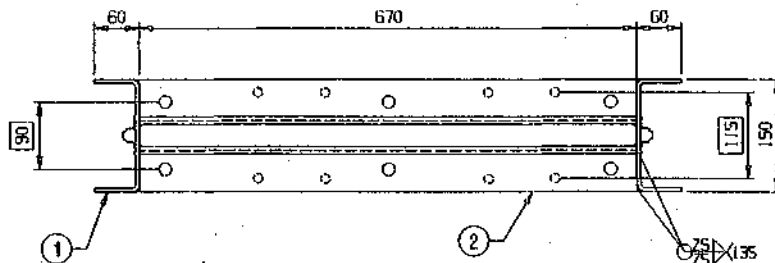
ANNEXURE-A**TECHNICAL DETAILS TO BE SUBMITTED BY THE FIRM/MANUFACTURER**

1. Manufacture name/trade mark of pump set.
2. Type of motor set.
3. Dimensions
4. Size of suction and delivery
5. Discharge Head suction & delivery.
6. Technical details of material used for pump construction:
 - a) Casing
 - b) Casing ring
 - c) Impeller
 - d) Impeller ring
 - e) Shaft
 - f) Shaft sleeve, if used
 - g) NRV
 - h) Fan
 - i) Fan cover
 - j) Brazing joints
7. Details of prime mover i.e Motor
 - a) Rated voltage with permissible tolerance
 - b) Rated current with permissible tolerance
 - c) Rated frequency with permissible tolerance
 - d) Winding connections
 - e) Rated rpm
 - f) Rated kW/HP
 - g) Efficiency
 - h) Class of insulation
 - i) Details of insulation material used
 - j) Details of winding wire
 - k) Direction of rotation
 - l) Rated water discharge/head
 - m) Degree of protection
 - n) Size, Type and make of bearings
 - o) Material used for terminal plate
 - p) Temperature
8. Any other details.
9. Clause by clause compliance to specification.

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ALT. NO.	ALT. DATE	ZONE	ALTERATIONS	AUTHORITY
1	26/08/2006	ALL	1. Ø 25, 2 HOLES PROVIDED IN ITEM-1.	DIC
		ALL	2. NOTE-3 ADDED.	NO.ED080014



3. THE PAINTING PROCEDURE SHALL BE AS FOLLOWS:-

- RUST CLEANING:- THE METAL SURFACE SHALL BE CLEANED MANUALLY BY WIRE BRUSH SO AS TO GET A SURFACE EQUAL TO ST-2 OF IS:10951(LATEST)
- CLEAN THE METAL SURFACE WITH PETROLEUM HYDROCARBON SOLVENT TO IS:1745(LATEST) TO MAKE IT FREE FROM OIL AND GREASE.
- APPLY ONE COAT OF HIGH BUILD EPOXY PAINT TO RDSO SPEC.NO. MAC/PCN/111/BB ON THE INTERIOR AND EXTERIOR OF THE CASTING, TO A DRY FILM THICKNESS OF 100-125µ.

2. DIM. MARKED THUS  ARE TO BE MAINTAINED STRICTLY.

1. ALL DIMENSIONS IN MM.

NOTE:-

DETAIL DRGS STARTING WITH "LI" ARE INTERNAL REFERENCE LISTS ONLY AND ARE NOT FOR ISSUE

ANY MANUAL ALTERATION SHALL AUTOMATICALLY RENDER THIS DRAWING INVALID.

FOR UNTOLERANCED DIMENSIONS REFER MDG0008 DATE OF FIRST ISSUE 26/09/2006

2	ANGLE 60X60X75 L-670	02	LICHNO	IRS: N-11-97	ITM-113
1	CHANNEL 60X150X60 L-545	02	LICHNO	IRS: N-11-97	ITM-39
WELD LENGTH	ITEM	DESCRIPTION & DIMENSIONS	GROUP	DETAIL DRG	REMARKS
NIL	M	ELECTRICAL			
WEIGHT	FILE	Z:\jasb\cc\cc71325a.prt			
NIL	KG				
S.AREA					
NIL	M ²				
LENGTH / DIA					
NIL	M				
WIDTH / THICK					
NIL	M				
HEIGHT					
NIL	M				

MOUNTING FRAME FOR PUMP

FOR SG AC COACHES

RAIL COACH FACTORY, KAPURTHALA

INDIAN RAILWAYS STANDARD

SCALE SSE/60

CHD

RAJR

REF.DWG.NO. NIL

PL NO. NIL

DRG.NO. CC71325

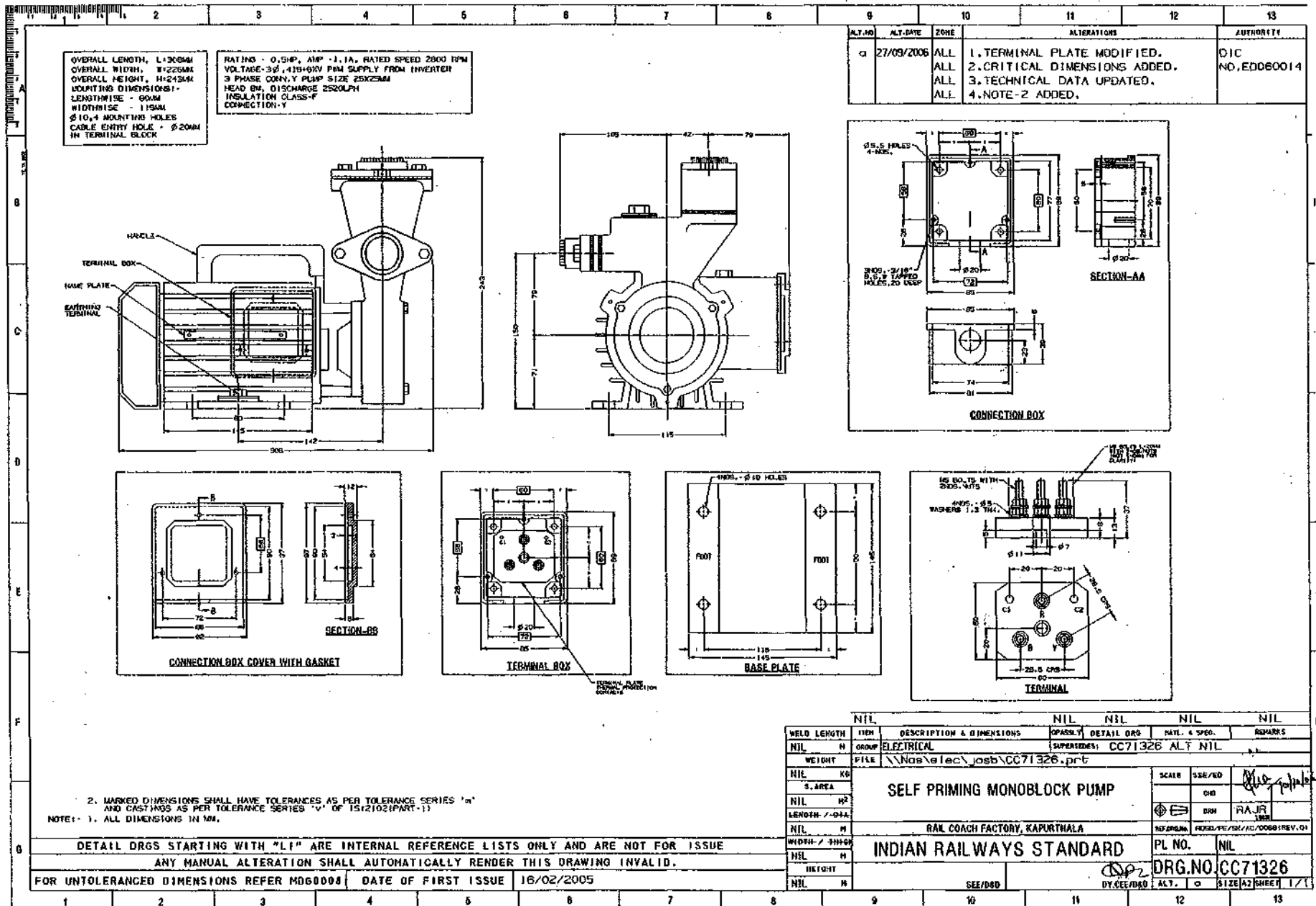
SEE/D&D

DY.CEE/D&D

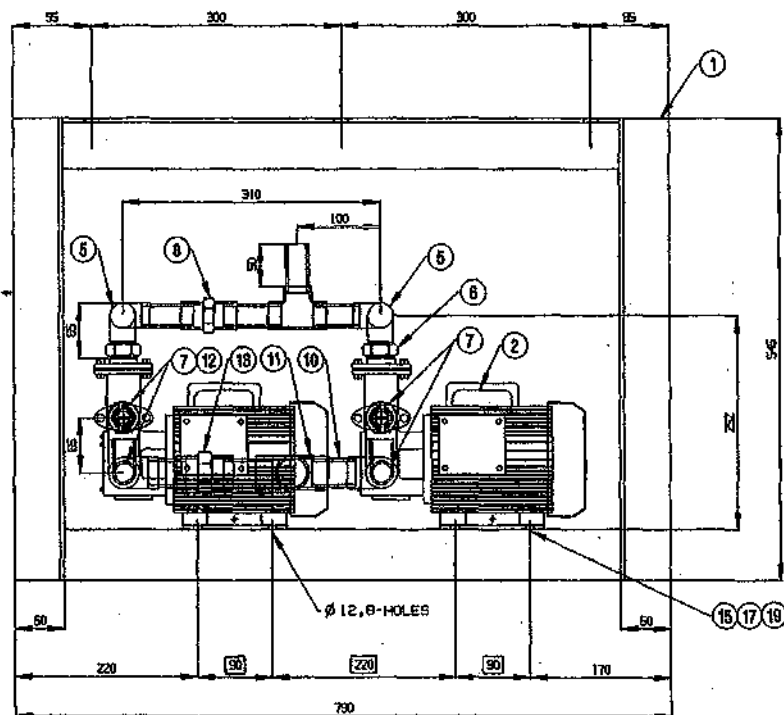
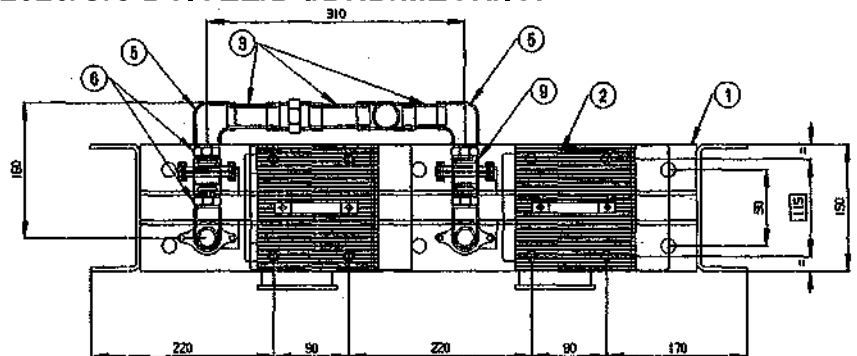
ALT. 1

SIZE A2 SHEET 1/1

4781381/2026/O/O DY.CEE/D-I/DND/MECH/ICF



4781381/2026/O/O DY.CEE/D-I/DND/MECH/ICF



NOTE: - 1. ALL DIMENSIONS IN MM.

2. ITEMS NO. 14, 16, 18 & 20 SHALL BE SUPPLIED LOOSE AND FITTED AT FURNISHING STAGE.

3. FOR LOCATION OF HOLES FOR SPLIT PIN REFER TO IS: 8549-1980, TAB-1.

*4. FROM M/S UNBRAKO, LPS, GKW AND TVS.

DETAIL DRGS STARTING WITH "LI" ARE INTERNAL REFERENCE LISTS ONLY AND ARE NOT FOR ISSUE

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FOR UNTOLERANCED DIMENSIONS REFER M000008

DATE OF FIRST ISSUE 30/05/2005

ALT. NO.	ALT. DATE	ZONE	ALTERATIONS	AUTHORITY
0	27/09/2005	ALL	1. MATERIAL OF HARDWARE CHANGED TO STAINLESS STEEL.	DIC NO. EDO60014
		ALL	2. ITEM-21 ADDED.	

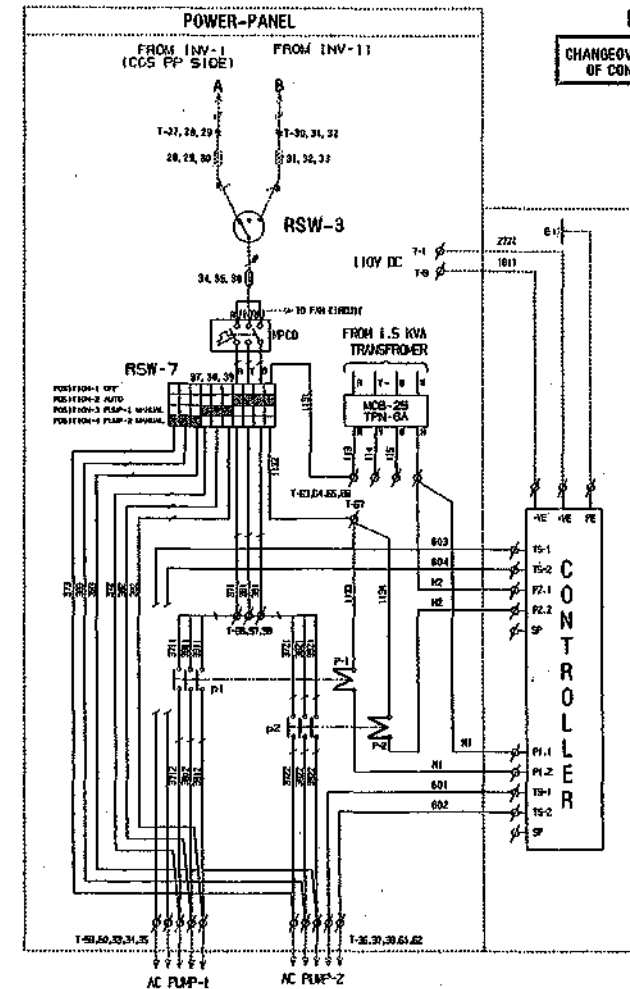
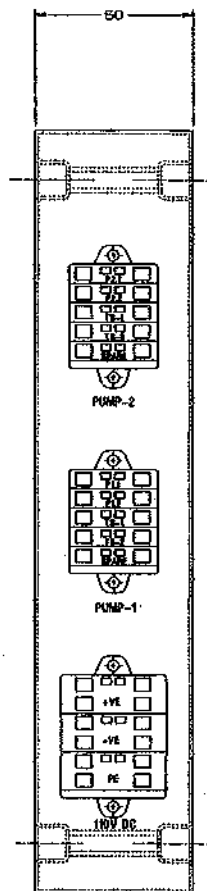
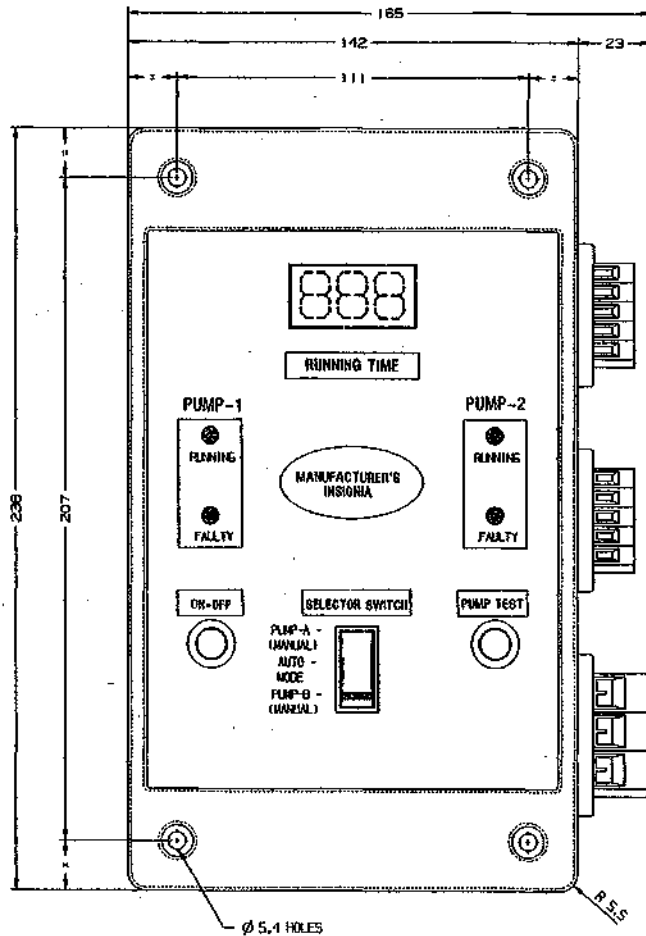
21	PLAIN WASHERS Ø 17	06	IS: 1363 (PT-14) -1984	STAINLESS STEEL	*
20	SPLIT PIN 3.2X32	06	IS: 549-1974	STAINLESS STEEL	*
19	SPRING WASHER Ø10	06	IS: 3063-1994	STAINLESS STEEL	*
18	SPRING WASHER Ø16	06	IS: 3063-1994	STAINLESS STEEL	*
17	HEXAGONAL NUT M10	06	IS: 1364 (PT. 3) -92,8	STAINLESS STEEL	*
16	HEXAGONAL NYLOC NUT M16	06	IS: 1364 (PT. 3) -92,8	STAINLESS STEEL	*
15	HEXAGONAL HEAD BOLT M10X50	06	IS: 1364 (PT. 1) -92,8,8,CE	STAINLESS STEEL	*
14	HEXAGONAL NYLOC HEAD BOLT M16X50	06	IS: 1364 (PT. 1) -92,8,5,6,CE	STAINLESS STEEL	*
13	SOCKET UNION DIA 25 BORE	01	IS: 1239 (PT. 2) 92 TAB-24	STAINLESS STEEL	NIL
12	ELBOW EQUAL 25 BORE	04	IS: 1239 (PT. 2) 92 TAB-8	STAINLESS STEEL	NIL
11	TEE EQUAL 25 BORE	01	IS: 1239 (PT. 2) 92 TAB-9	STAINLESS STEEL	NIL
10	PIPE 25 BORE	05	IS: 1239 (PT. 1) 90, TAB-3	STAINLESS STEEL	NIL
9	VERTICAL CHECK VALVE 20 BORE	02	IS: 778-84, CLASS-1	STAINLESS STEEL	NIL
8	SOCKET UNION DIA 20 BORE	01	IS: 1239 (PT. 2) 92 TAB-24	STAINLESS STEEL	NIL
7	HEXAGONAL NIPPLE 25 BORE	06	IS: 1239 (PT. 2) 92 TAB-28	STAINLESS STEEL	NIL
6	HEXAGONAL NIPPLE 20 BORE	06	IS: 1239 (PT. 2) 92 TAB-28	STAINLESS STEEL	NIL
5	ELBOW EQUAL 20 BORE	04	IS: 1239 (PT. 2) 92 TAB-8	STAINLESS STEEL	NIL
4	TEE EQUAL 20 BORE	01	IS: 1239 (PT. 2) 92 TAB-8	STAINLESS STEEL	NIL
3	PIPE 20 BORE	04	IS: 1239 (PT. 1) 90, TAB-3	STAINLESS STEEL	NIL
2	PUMP	02	CC71325	NIL	NIL
1	CRADLE	01	CC71325	NIL	NIL

WELD LENGTH	ITEM	DESCRIPTION & DIMENSIONS	APPLY	DETAIL DRG	MATL. & SPEC.	REMARKS
NIL	H	ELECTRICAL				
WEIGHT	FILE	\\Nas\elec\jash\cc\cc71327.prb				
NIL	X0	ARRANGEMENT OF SELF PRIMING				
NIL	S.AREA	MONO BLOCK PUMP IN SG AC COACH				
NIL	M ²	RAIL COACH FACTORY, KAPURTHALA				
LENGTH / DIA	N	INDIAN RAILWAYS STANDARD				
NIL	H	PL NO. NIL				
WIDTH / THICK	N	DRG. NO. CC71327				
NIL	H	SEE/D&D				
HEIGHT	N	DY.CEE/D&D				
NIL	H	ALT. 0				

2	3	4	5	6	7	8	9	10	11	12	13
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4781381/2026/O/α DY.CEE/D³/DND/MECH/ICF

ALT.NO	ALT.DT	ZONE	ALTERATIONS	AUTHORITY
α	28/09/2006	ALL	1. NOTE - 4 ADDED.	DIC NO.ED060014



RSW-7

CHANGEOVER SWITCH IN CASE OF CONTROLLER FAILURE

- THE DETAILS OF CONNECTION TO BE MARKED/SCREEN PRINTED ON CONTROLLER.
- REFER DPG, NO.ED060014 GENERAL SCHEMATIC DIAGRAM OF POWER GENERATION & DISTRIBUTION FOR SG/AC COACHES.
- FIXED DIMENSIONS SHALL BE STRICTLY ADHERED TO.
- ALL DIMENSIONS IN MM.

NOTE-

CABLE SIZE	2.5 SQMM	1.5 SQMM	ELASTOMERIC CABLES E1-VOL(P-S)REV-11
SYMBOL			

DETAIL DROGS STARTING WITH "LI" ARE INTERNAL REFERENCE LISTS ONLY AND ARE NOT FOR ISSUE

ANY MANUAL ALTERATION SHALL AUTOMATICALLY RENDER THIS DRAWING INVALID.

FOR UNTOLERANCED DIMENSIONS REFER MDG0008 DATE OF FIRST ISSUE 16/12/2004

WELD LENGTH	ITEM	DESCRIPTION & DIMENSIONS	OPASSLY	DETAIL DRO	MATL. & SPEC.	REMARKS
NIL	H	GROUP ELECTRICAL	SUPERSEDES:	CC71328	ALT NIL	
WEIGHT	FILE	\\Nas\elec\jash\cc71328.prt				
NIL	KG	PUMP CONTROLLER FOR				
S. AREA		SG-AC COACHES				
NIL	M ²	RAIL COACH FACTORY, KAPURTHALA				
LENGTH	-P1A	INDIAN RAILWAYS STANDARD				
NIL	M	PL NO. NIL				
WIDTH / THICK		DRG.NO. CC71328				
NIL	M	SEE/D&D				
HEIGHT		DY.CEE/D&D ALT. α SIZE A2 SHEET 1/1				
NIL	M					

Amendment-1

AMENDMENT NO.-1 TO SPEC. NO. EDTS186 REV. 'A'

This amendment is issued to specification no. EDTS186 Rev 'A' for Self Priming Mono-block assembly with controller for AC coaches to make its universal operation both on AC & DC supply. The following clauses are amended:

Clause 5.2 (i) may be read as:

Input voltage: 110V AC/DC
85-135 V (variation)

Clause 6.2 (i) may be read as:

Input over voltage: Over voltage protection shall be provided to limit the input voltage above 155 V AC/DC.

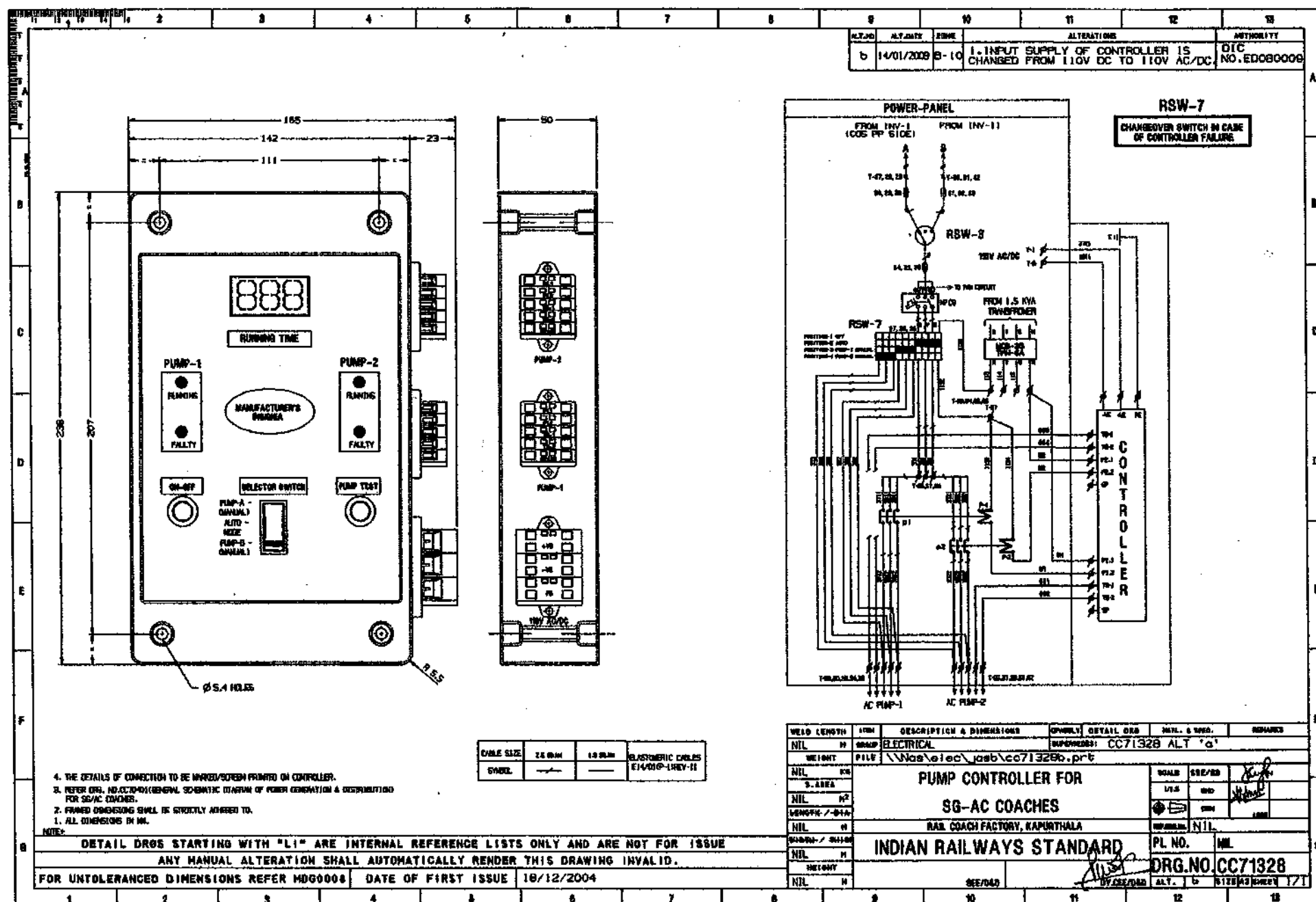
Clause 6.3 (i) may be read as:

Under voltage: The equipment should function even below 85 V AC/DC, no damage should occur to the equipment.

Clause 14.0 (v) may be read as:

Drawing no. CC71328 alt 'b'

EDTS186 Rev 'A'	1	14.01.2009			1 of 1
Spec. no.	Amndt.	Date	SSE/CAD-III	DY.CEE/D &D	Page



Rail Coach Factory, Kapurthala

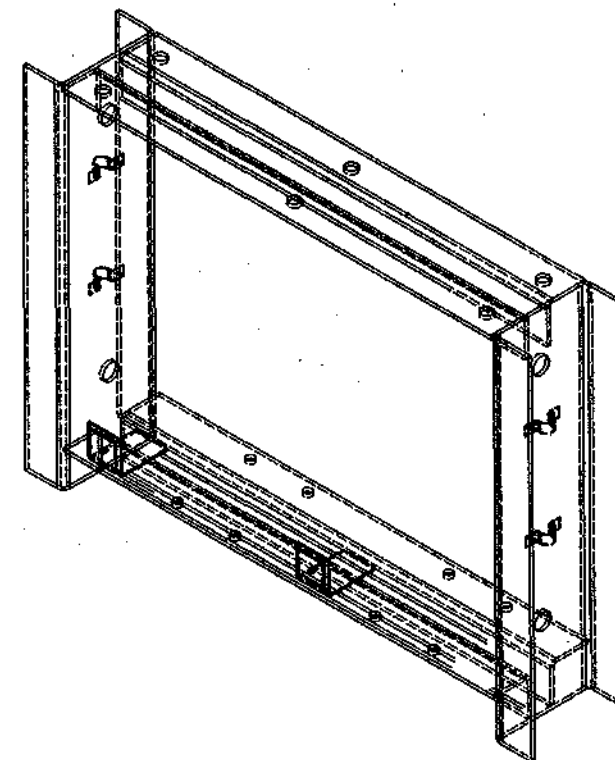
Ammendment-2 to spec. no. EDTS186 Rev.-A, AM-1

This amendment (i.e. AM-2) is issued to specification no. EDTS186 Rev-A, AM-1 for supply of Self priming Monoblock pump assembly with controller for AC coaches to incorporate the earthing lugs in reference drawings for earthing of the pump equipments.

To incorporate the above, the following reference drawings detail mentioned in specification shall be read as under:-

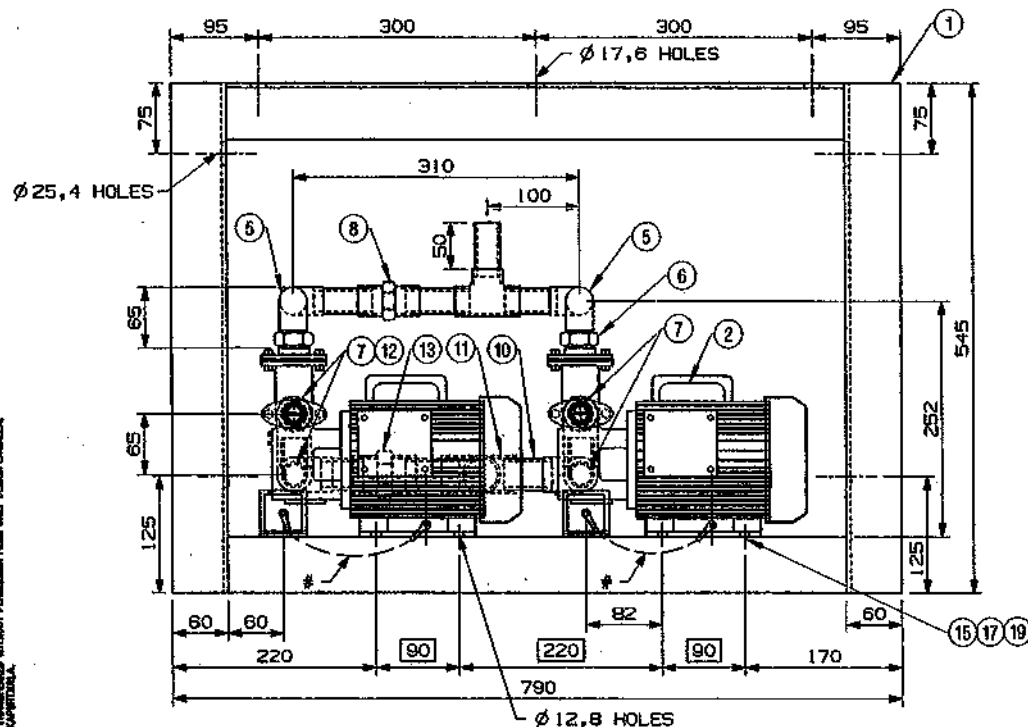
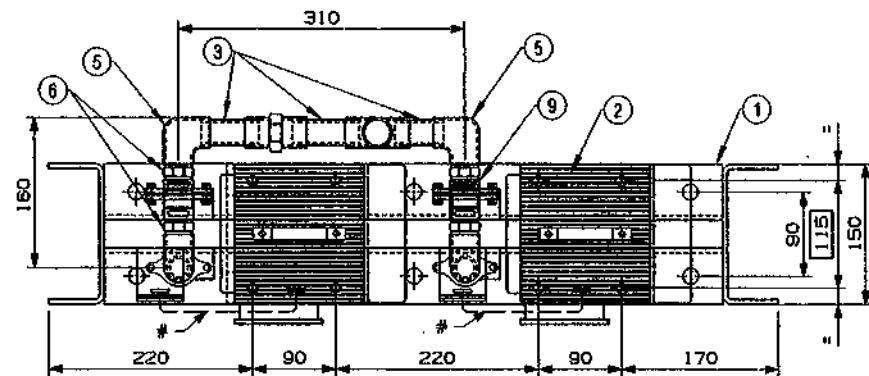
Sno.	Existing drg. description	Revised drg. description	Existing drg. no.	Revised Drg. no
1.	Mounting frame for Pump for SG AC coaches.	Mounting frame for Self priming Monoblock Pump.	CC71325 Alt. 'a'	CC71325 Alt. 'b'
2.	Arrangement of Self priming mono block pump in SG AC coaches.	Arrangement of Self priming mono block pump.	CC71327 Alt. 'a'	CC71327 Alt. 'b'

EDTS186, Rev.-A, AM-1	2	10.09.13				
Spec. no.	AMDT.	Date	SSE/CAD	AEE/D&D	DYCEE/D&D	Pg 1 of 1



3	EARTHING LUG		02	ICF/SK-7-1-S12,COL.V	NIL	NIL		
2	ANGLE 60X60X75 L-670		02	LICH-01	IRS: M-41-97	ITEM-113		
1	CHANNEL 60X150X6 L-545		02	LICH-01	IRS: M-41-97	ITEM-39		
WELD LENGTH	ITEM	DESCRIPTION & DIMENSIONS		QUANTITY	DETAIL DWS	MATL. & SPEC.		
NIL	M	ELECTRICAL		REMARKS: CC71325 ALT 3				
WEIGHT	FILE	\\Hs022\elec\rash\cc71325b.prt (3D)						
NIL	KG	MOUNTING FRAME FOR SELF PRIMING MONO BLOCK PUMP				SCALE	SWE/ED	
S.AREA							CHD	
NIL	M ²						DRN	
LENGTH / -D-44		RAIL COACH FACTORY, KAPURTHALA						
NIL	M	रेल कोच फैक्टरी कपूरथला				REF.DRAW.	NIL	
WIDTH / -D-44		IRS				PL NO.	NIL	
NIL	M					DRG.NO	CC71325	
HEIGHT		 10.4.93				ALT.	b	SIZE A2 SHEET 1/
NIL	M	AFF/DSD		BY.CEE/DSD				

475 1381/2026/0/04 DY.CEE/D-4/DND/MECH/ICF



THIS DRAWING IS THE INTELLECTUAL PROPERTY OF RAIL COACH FACTORY, KAPURTHALA. THIS DRAWING SHALL NOT BE REPRODUCED, ALTERED, USED FOR REPRODUCTION OR ANY OTHER PURPOSE WITHOUT PERMISSION FROM RAIL COACH FACTORY, KAPURTHALA.

#5. EATHING OF PUMP EQUIPMENTS SHOWN FOR REFERENCE ONLY & NOT IN FIRM'S SCOPE OF SUPPLY.

*#4. FROM M/S UNBRAKO, LPS, GKW AND TVS.

3. FOR LOCATION OF HOLES FOR SPLIT PIN TO IS: 9549-1980, TAB-1.

2. ITEM-14, 15, 18 & 20 SHALL BE SUPPLIED LOOSE AND FITTED AT FURNISHING STAGE.

NOTE: 1. ALL DIMENSIONS IN MM.

DETAIL DRGS STARTING WITH "LI" ARE INTERNAL REFERENCE LISTS ONLY AND ARE NOT FOR ISSUE

ANY MANUAL ALTERATION SHALL AUTOMATICALLY RENDER THIS DRAWING INVALID.

FOR UNTOLERANCED DIMENSIONS REFER MDG0008

DATE OF FIRST ISSUE 30/05/2005

ALT. NO.	ALT. DATE	ZONE	ALTERATIONS	AUTHORITY
6	10/09/2013	ALL	1. DESCRIPTION OF DRAWING UPDATED. 2. NOTE-5. ADDED.	DIC NO. ED130007

21	PLAIN WASHERS Ø 17	06	IS: 1363 (PT-14) -1984	STAINLESS STEEL	*
20	SPLIT PIN 3.2X32	06	IS: 549-1974	STAINLESS STEEL	*
19	SPRING WASHER B10	08	IS: 3063-1984	STAINLESS STEEL	*
18	SPRING WASHER B16	06	IS: 3063-1984	STAINLESS STEEL	*
17	HEXAGONAL NUT M10	08	IS: 1364 (PT.3) -92.8	STAINLESS STEEL	*
16	HEXAGONAL NYLOC NUT M16	06	IS: 1364 (PT.3) -92.8	STAINLESS STEEL	*
15	HEXAGONAL HEAD BOLT M10X50	08	IS: 1364 (PT.1) -92.8, 8, CE	STAINLESS STEEL	*
14	HEXAGONAL NYLOC HEAD BOLT M16X50	06	IS: 1364 (PT.1) -92.8, 5, 6, CE	STAINLESS STEEL	*
13	SOCKET UNION DIA 25 BORE	01	IS: 1239 (PT.2) 192 TAB-24	STAINLESS STEEL	NIL
12	ELBOW EQUAL 25 BORE	04	IS: 1239 (PT.2) 192 TAB-8	STAINLESS STEEL	NIL
11	TEE EQUAL 25 BORE	01	IS: 1239 (PT.2) 192 TAB-8	STAINLESS STEEL	NIL
10	PIPE 25 BORE	05	IS: 1239 (PT.1) 90, TAB-3	STAINLESS STEEL	NIL
9	VERTICAL CHECK VALVE 20 BORE	02	IS: 770-84, CLASS-1	STAINLESS STEEL	NIL
8	SOCKET UNION DIA 20 BORE	01	IS: 1239 (PT.2) 192 TAB-24	STAINLESS STEEL	NIL
7	HEXAGONAL NIPPLE 25 BORE	06	IS: 1239 (PT.2) 192 TAB-28	STAINLESS STEEL	NIL
6	HEXAGONAL NIPPLE 20 BORE	06	IS: 1239 (PT.2) 192 TAB-28	STAINLESS STEEL	NIL
5	ELBOW EQUAL 20 BORE	04	IS: 1239 (PT.2) 192 TAB-8	STAINLESS STEEL	NIL
4	TEE EQUAL 20 BORE	01	IS: 1239 (PT.2) 192 TAB-8	STAINLESS STEEL	NIL
3	PIPE 20 BORE	04	IS: 1239 (PT.1) 90, TAB-3	STAINLESS STEEL	NIL
2	PUMP	02	CC71326	NIL	NIL
1	CRADLE	01	CC71325	NIL	NIL

WELD LENGTH	1704	DESCRIPTION & DIMENSIONS	OPAGELY	DETAIL DRG	MATL. & SPS.	REMARKS
NIL	M	ELECTRICAL	SUPERSEDES:	cc71327	ALT a	
WEIGHT	FILE	\\Hs022\elec\mash\cc71327b.prt (20)				
NIL	KG	ARRANGEMENT OF SELF PRIMING				
S. AREA	M ²	MONO BLOCK PUMP				
NIL	M	RAIL COACH FACTORY, KAPURTHALA				
LENGTH / DIA	M	रेलकोच फैक्टरी कपूरथला				
NIL	M	IRS				
WIDTH / THICK	M	PL NO. NIL				
NIL	M	DRG.NO. CC71327				
HEIGHT	M	AER/D&D				
NIL	M	DY.CEE/D&D				

2	3	4	5	6	7	8	9	10	11	12	13
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Rail Coach Factory, Kapurthala

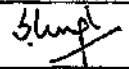
COR.-1 to spec. no. EDTS186 Rev.-A, AM-1&2

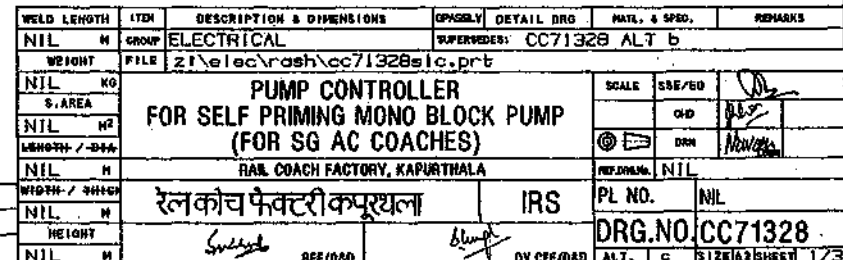
This Corrigendum (i.e. Cor.-1) is being issued to specification no. EDTS186 Rev-A, AM-1 & AM-2 for supply of Self priming Monoblock pump assembly with controller for AC coaches to incorporate the Part nos. of 'WAGO' terminals & modification of the drawings as per under given details:

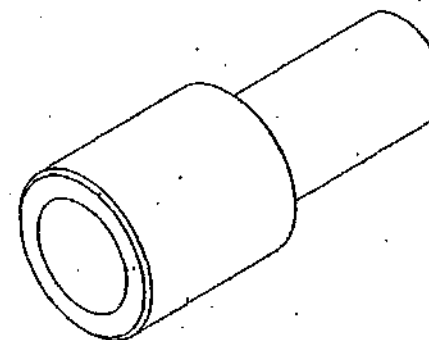
A): All type WAGO terminals suitable for 4sqmm e-beam cable mentioned at Cl. 5.2 (VIII) shall be to part nos 262-105 (03nos.)

B): The following reference drawings detail mentioned in specification shall be read as under:-

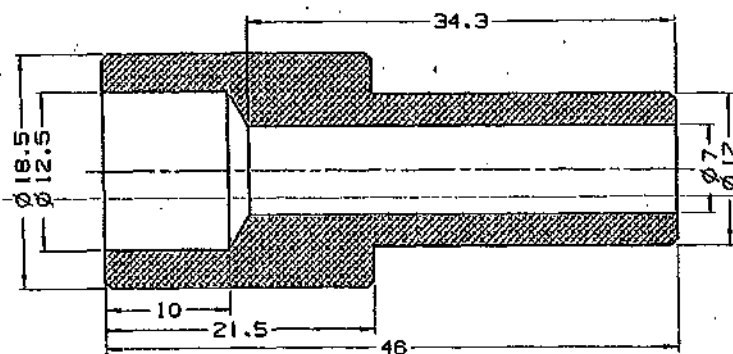
Sno.	Drg. description	Existing drg. no.	Revised Drg. no
1.	Mounting frame for Self priming Monoblock Pump.	CC71325 Alt. 'b'	CC71325 Alt. 'c'
2.	Pump Controller for mono block pump.	CC71328 Alt. 'b'	CC71328 Alt. 'c'

EDTS186, Rev.-A, AM-1 & AM-2	1	28.10.15				
Spec. no.	Cor.	Date	SSE/CAD	SEE/D&D	DYCEE/D&D	Pg 1 of 1





ISO - VIEW



SECTION B-B

NOTE: 1. ALL DIMENSIONS IN MM.

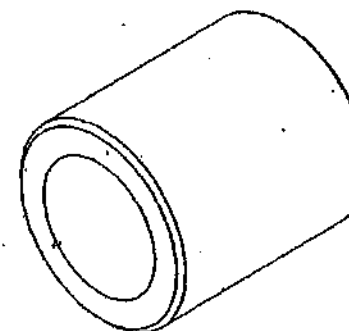
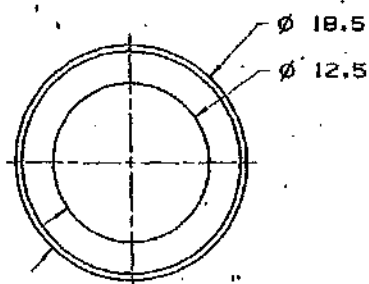
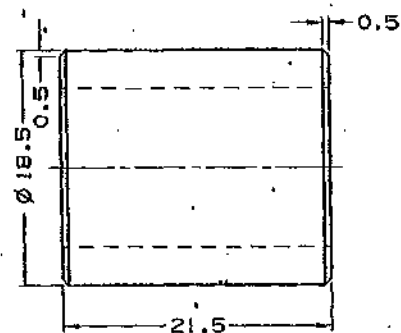
DETAIL DRQS STARTING WITH "LI" ARE INTERNAL REFERENCE LISTS ONLY AND ARE NOT FOR ISSUE.

THIS IS A COMPUTER GENERATED DRAWING. ANY MANUAL ALTERATION SHALL AUTOMATICALLY RENDER IT INVALID.

FOR UNTOLERANCED DIMENSIONS REFER MDG0008	DATE OF FIRST ISSUE	04/11/2015
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ALT. NO.	ALT. DATE	ZONE	ALTERATIONS	AUTHORITY
NIL	NIL	NIL	NIL	NIL

I		AL. SPACER		04	NIL	IS:738-1984	NIL
WEED LENGTH	ITEM	DESCRIPTION & DIMENSIONS		ASSEMB	DETAIL Dwg	MATL. & SFD.	REMARKS
NIL	M	ELECTRICAL		SUPERSEDED: NIL			
WEIGHT	FILE	Z:\e\ec\rash\cc\13282c.prt					
NIL	K9	AL. SPACER FOR PUMP CONTROLLER				SCALE	SSR/NO
S.AREA							
NIL	M2						SHD
LENGTH / DIA							DRY
NIL	M	RAIL COACH FACTORY, KAMURTHALA				2D / 3D / 2D	NIL
WIDTH / THICK		रेल कोच फैक्टरी कपुरथला				IRS	PL NO. NIL
NIL	M						
HEIGHT		Luhm				ORG.NO.	CC71328
NIL	M						
		SEE/DAD	Sngt		BY CRE/DAD	ALT. INT	SIZE 230 HGT 230



ISO - VIEW

ALT. NO.	ALT. DATE	ZONE	ALTERATIONS	AUTHORITY
NIL	NIL	NIL	NIL	NIL

NOTE: 1. ALL DIMENSIONS IN MM.

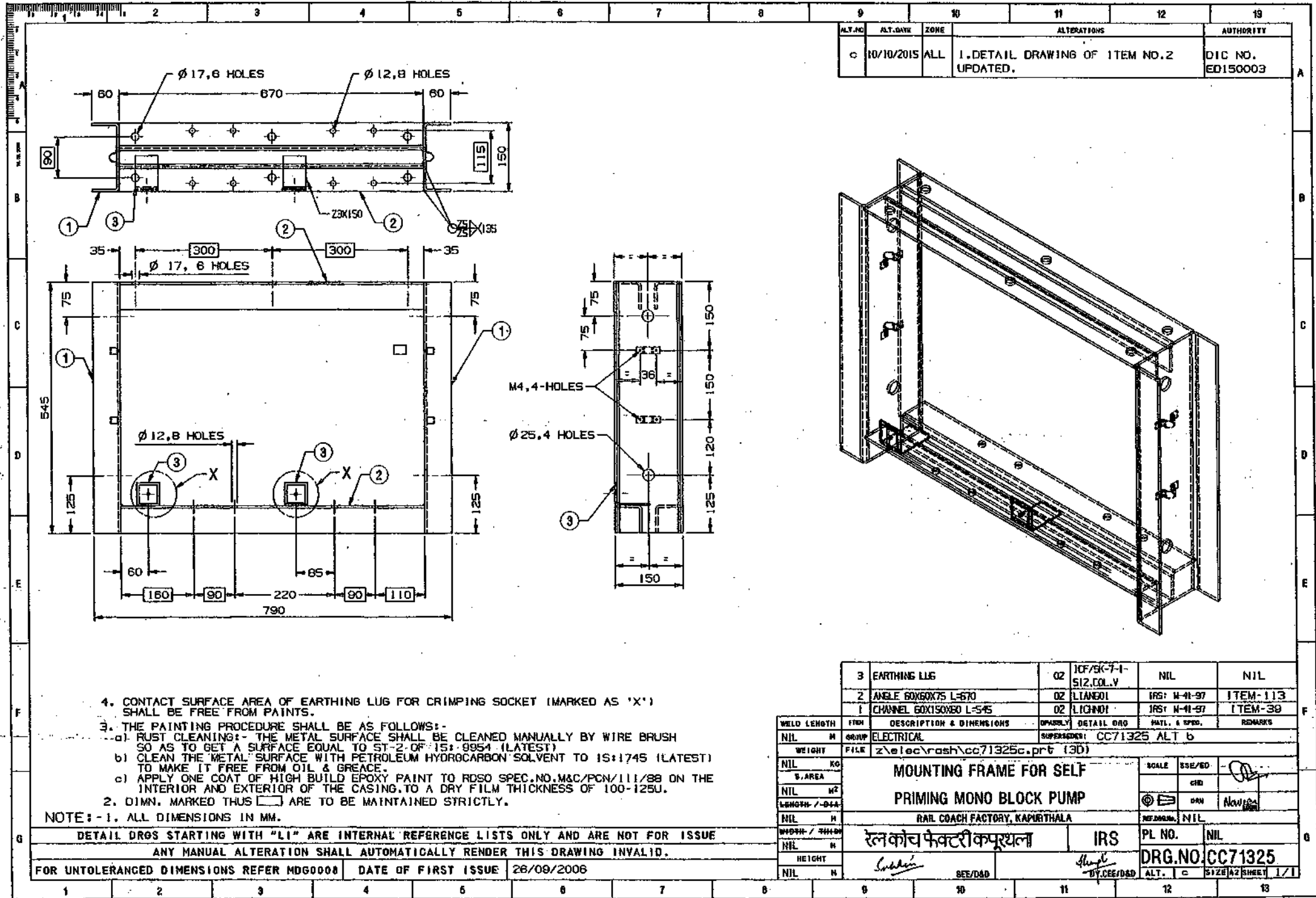
DETAIL DRS STARTING WITH "LI" ARE INTERNAL REFERENCE LISTS ONLY AND ARE NOT FOR ISSUE.

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FOR UNTOLERANCED DIMENSIONS REFER MDG0008 DATE OF FIRST ISSUE 04/11/2015

1	RUBBER GASKET	04	NIL	NEOPRENE RUBBER	NIL
WELD LENGTH	ITEM	DESCRIPTION & DIMENSIONS	SPARELY	DETAIL DRS	REMARKS
NIL	M	ELECTRICAL			
WEIGHT	FILE	Z:\elec\rash\cc71328s3.prt			
NIL	X0	RUBBER PACKING FOR PUMP CONTROLLER			
S. AREA			SCALE	SSB/RO	
NIL	N3			CHD	
LENGTH / DIA				DNH	
NIL	H	RAJ COACH FACTORY, KAPURTHALA			
WIDTH / THICK				REF. NO.	NIL
NIL	H	रेलकोच फैक्टरी कपूरथला	IRS	PL NO.	NIL
HEIGHT				DRG. NO.	CC71328
NIL	H			ALT. INIL	SHEET 1/3

4781381/2026/O/O DY.CEE/D-I/DND/MECH/ICF

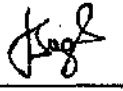
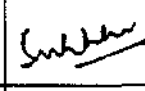


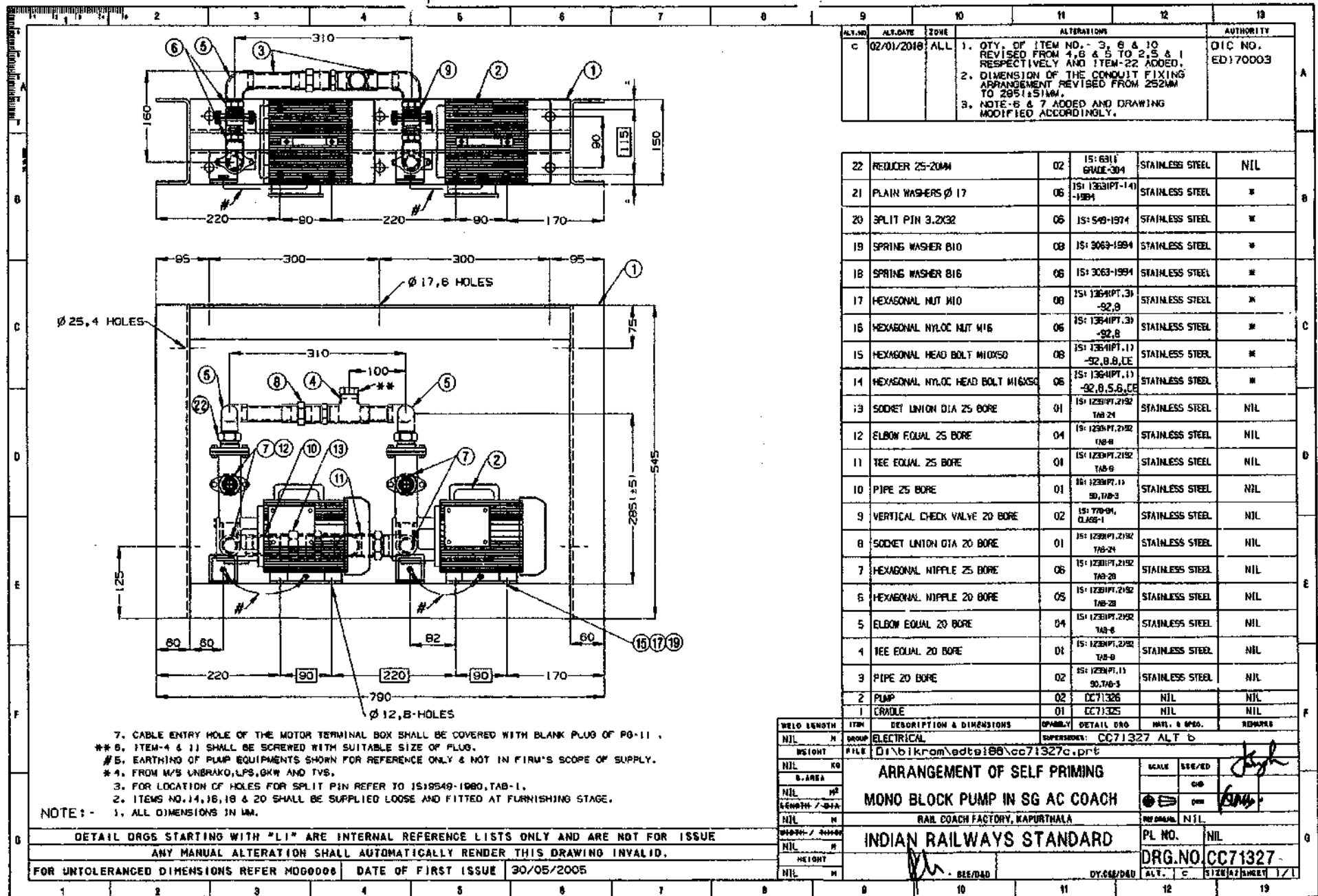
Corr.-2

This corrigendum is issued to EDT5-186, Rev.-'a', Am.-1 & 2, Corr-1 of "Self Priming Monoblock Pump Assembly with controller for AC Coaches" to modify the dimensions of the conduit fixing arrangement and quantity of the items in the bill of material of drawing no. CC71327 Alt-'b'.

To incorporate the above, the following reference drawing detail mentioned in specification shall be read as under:-

S.No.	Description	Existing drg.no.	Revised drg.no.
1	Arrangement of Self priming Monoblock pumps.	CC71327,Alt-'b'	CC71327,Alt-'c'

EDTS-186 Rev. 'A', Am.-1&2, Corr.-1	2	03.01.2018				1 OF 1
Spec. no.	Corr.	DATE	SSE/CAD	SEE/D	DY.CEE/D&D	PAGE



Annexure-1 to RCF Specification no. EDTS-186, Rev-A, Am-2, Corr-2

This annexure is issued to specification no. EDTS-186, Rev-A, Am-2, Corr-2 in order to incorporate IRIS conditions in the specifications. The Following clauses are added:-

A. First Article/Prototype Inspection:-

1. First Article inspection (FAI) will be done in case of first time manufacture and approved by CEDE/RCF before bulk supplies.
2. External Provider shall carryout FAI at their premises as per ISO/TS 22163:2017 requirements and submits the report along with the documents to RCF, Kapurthala prior to FAI by the purchaser. The following documents shall be submitted:-
 - i) FAI report
 - ii) QAP (Quality Assurance Plan)
 - iii) Details of special processes and their compliance.
3. Special Processes are as under:-
 - i) Casting and Moulding
 - ii) Powder Coating/Painting
 - iii) Welding
4. On completion of First Article Inspection in-house by the firm and submission of documents to RCF, the representative of the purchaser shall be nominated to carry out FAI along with the validation of the above special processes at firm's premises.
5. Validation of outsourced special processes shall also be carried out as per requirement of the ISO/TS 22163:2017.
6. Audit inspection shall be done during regular production in the firm for certify quality of Self Priming Monoblock Pump Assembly with controller for AC coaches.
7. Firm has to fulfil all the requirements as mentioned in the IRIS standard ISO/TS 22163:2017.

B. RAMS (Reliability, Availability, Maintainability and Safety):-**1. Reliability targets:-**

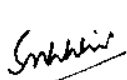
The achieved level of reliability shall ensure MDBF of 2,00,000 kms or more after initial reliability growth period of one years. The following fleet average levels of MDBF shall be achieved after the mentioned period of time:

- MDBF > 80,000 kms after 06 months.
- MDBF > 2,00,000 kms after 12 months.

For this purpose, any equipment shall be counted as available for calculations only after a stabilization period of 6 months after putting the train into revenue service.

2. Availability Requirements:-

The availability of the coach calculated on quarterly basis and considering unscheduled repairs for the equipment should not be less than 96%.

EDTS-186, Rev-A, Am-2, Corr-2	1	04.02.2020				1 of 2
Specification No.	Annexure	Date	SSE/CAD	SEE/D	Dy.CEE/D&D	Page No.

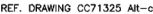
3. Maintainability:

The maintenance program prepared by EPPPS shall have the following objectives:-

- a) Enhancement of Rolling stock availability
- b) Minimisation of maintenance costs
- c) Minimisation of coach downtime/MTTR (meantime to restore serviceability)

EPPPS shall submit the basic maintenance schedules for the equipment. The minimum interval between overhauls at workshop be as per the maintenance manual/Schedule for LHB coaches issued by CAMTECH.

EDTS-186, Rev-A, Am-2, Corr-2	1	04.02.2020				2 of 2
Specification No.	Annexure	Date	SSE/CAD	SEE/D	Dy.CEE/D&D	Page No.



Page 1 of 13	Effective from 10.4.2002	SPECIFICATION NO: RDSO/PE/SPEC/AC/0022 - (Rev. O) -2002
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RESEARCH DESIGN STANDARDS ORGANISATION

MINISTRY OF RAILWAYS

POWER SUPPLY AND EMU DIRECTORATE

1.0 TITLE

**SPECIFICATION FOR WATER RAISING 3-PHASE HORIZONTAL CENTRIFUGAL
SELF-PRIMING MONOSET PUMPS FOR USE ON COACHES.**

S. N.	Date of amendment	Revision	Page No.	Reasons for Amendment
1.	Nil	0	Nil	Nil

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NO.....
 COPY HOLDER *For File* 7.1.9.
 ISSUE/CHANGE/REVISIONITY.
 SIGN.....
 DESIGN *IDSE-9*

Approved by

EDPS

Calvin
9/4/2002

Page 2 of 13	Effective from 10.4.2002	SPECIFICATION NO: RDSO/PE/SPEC/AC/0022 - (Rev. O) -2002
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SPECIFICATION NO: RDSO/PE/SPEC//AC/0022 - (Rev. O) –2001

For

**WATER RAISING 3-PHASE HORIZONTAL CENTRIFUGAL SELF PRIMING
MONOSET PUMPS FOR USE ON COACHES**

1.0 SCOPE

This specification covers the requirements for design, development, manufacture and supply of 3- phase horizontal centrifugal self-priming monoset pumps to be used on Indian Railway coaching stock for lifting water from under frame mounted main tank to auxiliary tank located at the ceiling of the coaches. This 3- phase horizontal centrifugal self-priming monoset pump is referred as the equipment in the specification.

2.0 STANDARD REFERRED/APPLICABLE

IS: 325	Three-phase induction motors.
IS: 4691	Degree of protection provided by enclosure for rotating electric machine.
IS: 4889	The methods of determining efficiency of rotating electrical machines.
IS: 5120	Technical requirements for rotodynamic special purpose pumps.
IS: 9542 ✓	Horizontal centrifugal mono-set pumps.
IS: 8418	Horizontal centrifugal self-priming pumps.
IS: 8789	Values of performance characteristics for three-phase induction motor.
IS: 13730 – 13	Dual coated enamelled round copper wires with temperature Class: 200.

Note: The latest version (revision/Amendment) of specification will be applicable whenever referred.

3.0 WORKING CONDITIONS

3.1 Environmental conditions:

Maximum ambient air temperature : 55° C

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Minimum ambient air temperature	:	4 ° C
Max. Relative humidity	:	100 %
Atmosphere	:	Extremely dusty and desert weather and desert terrain in certain areas. The dust contents in air may reach as high values as 1.6 mg/m cub. It also contains the fog, cast iron dust of brake block shoe, flying ballast etc.
Rainfall	:	Very heavy in certain areas.
Coastal area	:	The equipment shall be designed to work in corrosive atmosphere.

The maximum value of the condition in the coastal area will be as under:

Max. pH value	:	8.5
Sulphate	:	7 mg/liter
Max. Concentration of Chlorine	:	6 mg/liter
Max. Conductivity	:	130 micro sec./cm
Annual rainfall	:	Ranging between 1750 to 6250 mm
Altitudes	:	Not exceeding 1200 m

3.1.1 The equipment shall be suitable for rugged service normally to be met within Railway Rolling Stock, where coaches are expected to run up to a maximum speed of 200 km/h in varying climatic conditions existing through out India as defined above.

3.1.2 The supplier shall be fully responsible for ensuring that all component forming part of the supply is entirely fit for purpose and no part of this specification shall in any way remove or reduce this obligation in this respect.

3.1.3 The supplier shall provide "In the field service support during the guarantee period".

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4.0 SERVICE CONDITIONS

The equipment shall be sturdy and suitable for working under the following service conditions normally to be met with in Railway rolling stock, under varying climatic conditions prevailing through out India during whole year as defined in Clause 3.0.

Altitude	:	Max 1200 meter above mean sea level
Train Speed	:	200 Kmph (Max)
Vibration	:	The equipment and its protection & mounting arrangements shall be designed to withstand satisfactorily with the vibration and shocks encountered in service as specified below.

- | | | | |
|----|-----------------------------------|---|-------|
| a) | Maximum vertical acceleration | : | 3.0 g |
| b) | Maximum lateral acceleration | : | 3.0 g |
| c) | Maximum longitudinal acceleration | : | 3.0 g |

('g' being the value of acceleration due to gravity)

The vibration and shocks encountered in service shall be of sinusoidal form and their amplitude & frequency shall be as under:

$a = 25 / f$: for value of 'f' from 1 to 10 Hz &

$a = 2500 / f^2$: for value 'f' exceeding 10 Hz and up to 50 Hz.

5.0 CHARACTERISTICS OF COLD, CLEAR, FRESH WATER

The characteristics of cold, clear and fresh water, which has to be pumped, are specified as under:

a)	Turbidity	50 ppm (silica scale) max.
b)	Chlorides	500 ppm max.
c)	Total solids	3000 ppm max.
d)	pH value	6.5 to 8.5
e)	Temperature	40° C
f)	Specific gravity	1.004 Max

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6.0 TECHNICAL REQUIREMENTS

The dimensions of self-priming pump shall generally conform to RCF drawing no. CC 73005 alt-'a' and should be totally enclosed with fan cooled 3 phase squirrel cage induction motor.

6.1 Material of Construction

Though a number of materials of construction are available to meet the needs for Pump handling clear, cold, fresh water but IS: 9542 can be referred for the guideline regarding few typical materials to be used for these type of pumps. Gaskets, Seals and Packing shall conform to IS: 5120.

6.2 Requirements for prime mover i.e. motor

Motor shall meet the following requirements: -

- i) **Type of enclosure & degree of protection:** Squirrel cage induction motor shall be Totally Enclosed Fan Cooled (TEFC) type and shall have IP55 Protection conforming to IS 4691.
- ii) **Rated voltage:** 415 V, 3- phase, 50 Hz Sinu soidal and PWM supply having 15% ripple content. The equipment however should be capable to work from $415 \pm 6\%$ V, 3 phase, 50Hz $\pm 3\%$ PWM supply converted from 110 V dc by static inverter.
- iii) **Rated Output:** 0.5 HP / 0.37 KW at 415 V, 50 Hz and 0.8 p.f.
- iv) **Duty:** Continuous (S_1 duty as per IS: 325)
- v) **Minimum efficiency :** 60%
- vi) **Insulation class and temperature rise:** Insulation used in winding shall be of class "F". However temperature rise shall not exceed 70 °C to have sufficient margin to take care of hot spot and working with PWM supply etc.
- vii) **Speed:** synchronous speed 3000 RPM
- viii) Motor Casing shall be provided with two independent earthing terminals suitable for M6 screws for earthing with coach body.
- ix) The values of performance characteristics of motor used shall conform to IS: 8789.

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6.3 Requirement for self-priming pump

The self-priming pump shall meet the following requirements:

- i) Type : Self Priming Pump to IS: 8418
- ii) Total head : 8 meters (Suction 3 m, discharge 5m)
- iii) Discharge : 0.7 liters/second (2520 liters/hrs).
- iv) Suction & delivery : 25mm (1" BSP) /25 mm (1" BSP)
- v) The material of the pump : As per IS: 9542

6.4 Other requirements

- i) The terminal connections for supply shall be brought out in a terminal box on the motor. Terminals shall be clearly marked RYB (embossed) on the terminal plates to obtain correct direction of rotation. Adequate creepage and clearance should be provided between the terminals. The terminal box should also have protection level of IP-55 as per IS: 4691. Terminal plate should be made of epoxy reinforced glass conforming to BS - 3815 and should be anti- moisture absorbent and free from porosity.
- ii) Size of the cable entry hole shall be 20 mm.
- iii) Silver brazed joints / fused for connecting terminals leads and winding wires shall only be used. Soldered joints are not acceptable.
- iv) The minimum L 10 life of bearings shall be 1,00,000 Hrs. Only sealed low function RZ type bearing of SKF/FAG makes shall be used.
- v) Winding wire: Enamelled round copper wire conforming to IS: 13730 Part-13 of 1993. The wires shall have the base coat of Polyesterimide enamel MT 533.39A and top coat with Polyamideimide known as Allotherm 602.35A of Schenectady Beck India Ltd. Enamelled copper wire is also known as Dual Coated enamelled winding wire and falls in the category of temperature Class-200.
- vi) Impregnating resin: Dobeckan FT 2005/500 of M/s Schenectady Beck India Ltd. It is one component solventless "UP" impregnating resin of temp. index 200 deg. C. RE-009 of M/s Rotomac Electricals is a equivalent resin.

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Alternatively, use Elmotharm H71A of Schenectady Beck India Ltd. It is a Polyesterimide based impregnating varnish of temperature index 180deg.c.

- vii) The equipment shall be treated suitably for rust removal and coated with anti-rust primer and finished with two coats of battleship Grey paint.
- viii) The self-priming pump must be adequately designed to sustain varying loading conditions prevalent on IR.
 - a) Pump may have to work for more than 72 hours continuously.
 - b) Even under dry conditions (i.e. No water in main tank) the monoblock should be able to work satisfactorily for 8 hrs. Without any damage to sealing, bearing and impeller etc.
- ix) The direction of rotation of pump is designated clockwise or anti-clockwise as observed when looking at the pump shaft from the driving end. The direction rotation with the supply RYB phases sequence connected to the corresponding terminals marked on the terminal box shall be permanently marked clearly on the motor body either by incorporating an arrow on the casing or fixed by a separate metal plate arrow secured to the pump.
- x) **The nameplates shall contain following**
 - a) Manufacturer name/trade mark, type, serial no. and year of manufacturing
 - b) Rated voltage, current and frequency with permissible tolerance
 - c) Winding connections
 - d) Rated rpm
 - e) Rated kW / HP
 - f) Class of insulation
 - g) Direction of rotation
 - h) Rated water discharge/head.
 - i) Degree of protection.
- xi) Units terminology and classification relating to pumps for clear, cold, fresh water shall be as specified in IS: 5120 'Technical requirements for rotodynamic special purpose pumps (First Revision)'.

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Suction Limitations

- xii) Suction limitations affecting the performance of pumps for water are the same as those specified in 9 of IS: 5120.
- xiii) The effect of total suction lift on performance of pumps for water is the same as those specified in 10.5 of IS: 5120.
- xiv) Suction lift is to be reduced for higher altitudes at the rate of 1.15 m for every 1000 m above mean sea level. The correction for temperature should be obtained from steam tables.

Casing

- xv) The casing should be of such a construction as to be capable of withstanding a hydrostatic test pressure of 1.5 times the maximum discharge pressure.

Impeller

- xvi) The impeller shall be properly balanced against manufacturing defects along with any other unmachined rotating parts on proper balancing equipment.

Shaft

- (xvii) The shaft shall be of stainless steel AISI-410 or as per IS 6603 having sufficient size as to be capable of transmitting the required power over the entire range.

7.0 INSPECTION AND TESTING

Separate type, routine and acceptance for pump units will be conducted.

Type test will be conducted by RDSO on one unit to verify that product meets the design and performance requirement of the specification at the firm's premises. The manufacturer should arrange all the necessary arrangement for the testing. Some or all type test may be repeated after a period of two years to confirm the quality of the product to meet the specified requirement.

In addition the manufacturer shall also repeat the type test to be witnessed by RDSO either totally or in part in following cases without any additional cost

- Modification of equipment likely to affect its function
- Failure or variations established during type test

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- Resumption of production after an interruption of more than two years
- At the time of indigenisation, if the firm is having TOT with foreign collaborators in consultation with purchaser

The routine tests are to be carried out by manufacturer on each unit to verify that properties of the product corresponding to those measured during type test. Acceptance test shall be conducted on the lot offered after successful clearance of type test.

8.0 TESTS

The test for squirrel cage induction motor and pump will be carried out generally as per IS: 325 and Clause 10 of IS : 8418 respectively except the following:-

a) Type Tests

- i. The test for open circuit ratio for wound rotor as per Cl. 23.3 and test on insulation system as per Cl.27 are to be excluded for type test.
- ii. IP 55 protection test as per IS: 4691 shall be carried out on prototype unit and one unit in each of the lot offered for inspection subsequently.
- iii. Pumps shall be tested as per Clause 10 of IS : 8418. While carrying out the standard performance test as per IS:5120-1968 the relevant clauses of the specification will be followed as per the capacity of the pump.
- iv. In addition to above Dry run test as per Clause 9.0 of the specification, shall also be conducted.

b) Acceptance Test

Acceptance test shall be carried out on 10% of the lot offered or minimum two numbers as per Clause 22.3.2 of IS: 325 except open circuit voltage ratio of stator and windings and high voltage test indicated in para f and g of the Clause 22.3.2.

c) Routine Test

Routine test shall be carried out as per Clause 22.3.2 of IS : 325 except open circuit voltage ratio indicated in para f of Clause 22.3.2.

Note:-

The optional tests shall be got conducted from Government approved test house as mutually agreed by Inspecting Authority.

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9.0 DRY RUN TEST

The mono-set pump should be able to work satisfactorily under dry conditions (i.e. No water in the main tank) for 8 hours and the motor should be capable of performing satisfactorily even after this test of 8 hrs. The observation on completion of test shall be made to identify for any damage caused to sealing, bearing and impeller after dry run.

10.0 SAMPLES AND REJECTION

The acceptance tests shall be carried out on minimum of two units or maximum ten percent picked up at random from the lot offered for inspection. Type tests shall also be conducted on one machine to prove design efficacy. In case any sample fails to comply with the requirement of acceptance test, the inspecting authority / officer may pick up double the number of samples and repeat all the tests. The lot shall be rejected if any fresh samples fail to meet the requirements during the re-testing.

Firm supplying the unit for the first time shall get prototype approval before commencing bulk production and supply.

11.0 TESTING FACILITIES

All the tests shall be carried out at manufacture's premises, unless the purchaser indicates his preference for testing elsewhere. When the testing is done at the firms' premises, the manufacturer shall provide all support and testing facilities for conducting the test free of charge. The manufacturer shall also supply a copy of the type and routine tests carried out by him on the motor to the inspecting officer nominated by the purchaser for his scrutiny and approval.

12.0 GUARANTEE

Each unit shall be guaranteed against manufacturing defects for its satisfactory performance for a period of 18 months from the date of commissioning or 24 months from the date of supply whichever ever is earlier for any defects due to defective design, materials, manufacture and workmanship. Type defects, if any, will continue to attract warranty till they are satisfactorily overcome. The supplier shall provide free, prompt and efficient after sales service in rectifying defects during warranty.

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13.0 TECHNICAL PARTICULARS

- i) The tenderer shall submit the details as per **Annexure – A** while submitting his offer.
- ii) The tenderer shall submit clause by clause comments for compliance/non-compliance of each clause of specification.
- iii) The tenderer shall give along with the tender, technical details of the equipment offered including the constructional features, instructions for installation and maintenance manual.

Note: In absence of above details, offers will be treated as incomplete and rejected).

14.0 ISO Requirement

The firm to be considered for manufacture and supply of
3 – phase horizontal centrifugal self-priming mono-set pumps shall be ISO Certified.

15.0 Enclosures

- i. Annexure 'A' – Technical parameters of 3 - phase horizontal centrifugal self-priming mono-set pumps
- ii. RCF Drg. No. CC 73005 Alt. a

mounting dimensions & overall dimensions are to be followed.

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Annexure -A

**TECHNICAL DETAILS TO BE SUBMITTED BY THE
FIRM/MANUFACTURER**

1. Manufacturer name/trade mark of pump-set
2. Type of pump-set
3. Dimension
4. Size of suction and delivery
5. Discharge Head suction & delivery
6. Technical details of material used for pump construction
 - a) Casing
 - b) Casing ring
 - c) Impeller
 - d) Impeller ring
 - e) Shaft
 - f) Shaft sleeve, if used
 - g) NRV
 - h) Fan
 - i) Fan Cover
 - j) Brazing joints
7. Details of prime mover i.e. Motor
 - a) Rated voltage with permissible tolerance
 - b) Rated current with permissible tolerance
 - c) Rated frequency with permissible tolerance
 - d) Winding connections
 - e) Rated rpm
 - f) Rated kW / HP
 - g) Efficiency
 - h) Class of insulation
 - i) Detail of insulating material used
 - j) Details of winding wire
 - k) Direction of rotation
 - l) Rated water discharge/head.
 - m) Degree of protection
 - n) Size, type, and make of bearings
 - o) Material used for terminal plate
 - p) Temperature rise
8. any other details
9. Clause by clause compliance to specification

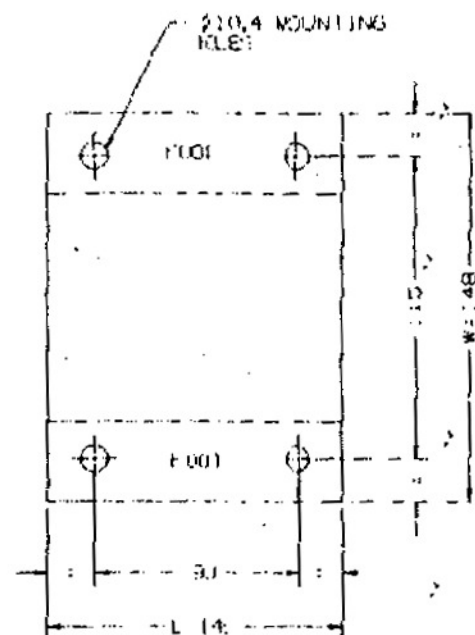
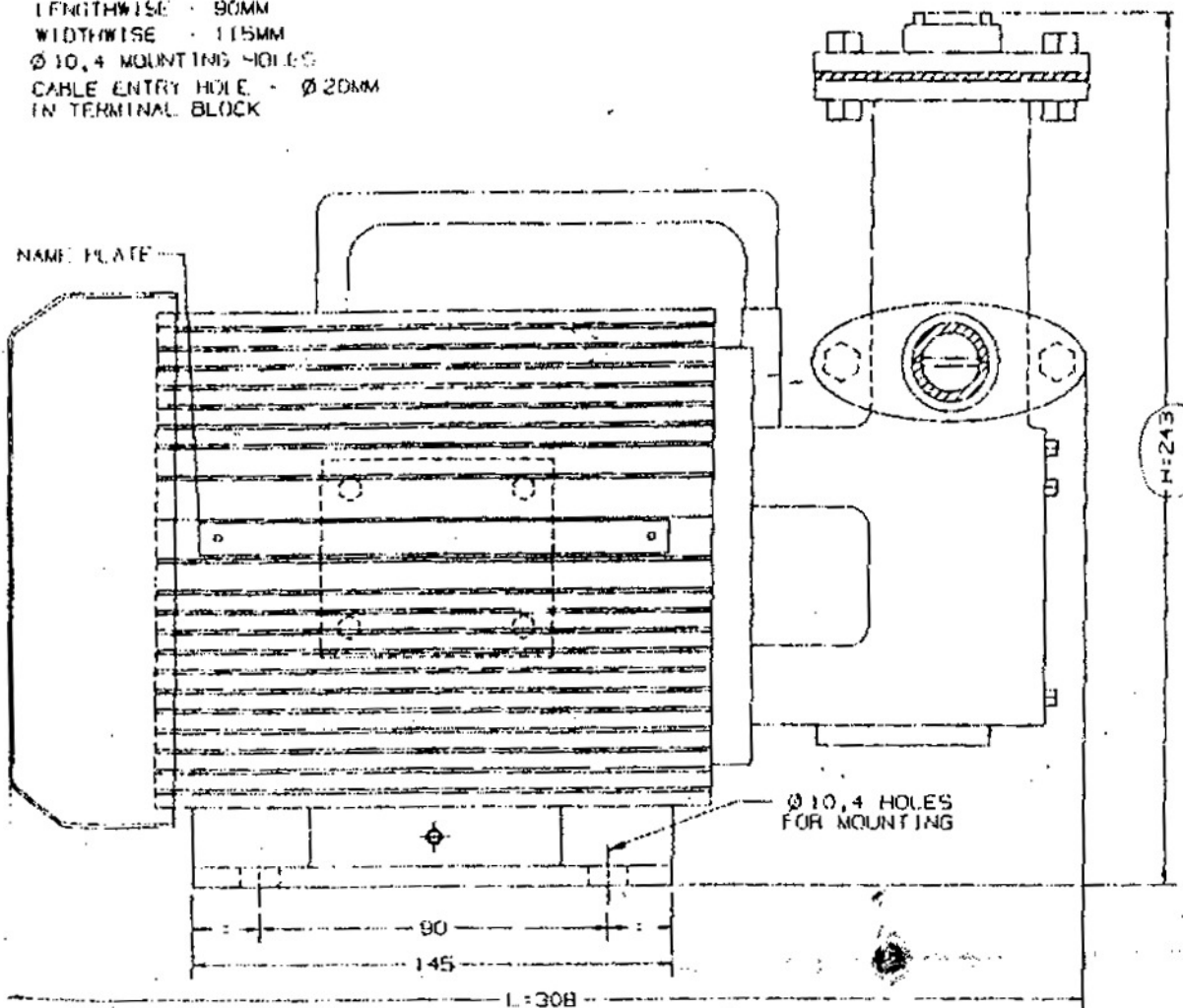
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ADE-9	13
Unit Supervisor	14
ADE/Doc	15

RATING : 0.5HP, AMP : 1.2A, RATED SPEED 2800 RPM
VOLTAGE : 3Ø, 415±5%V PWM SUPPLY FROM INVERTER
3 PHASE CONNLY PUMP SIZE 25X25MM
HEAD BM. DISCHARGE 42LPM

CL. NO.	CL. DATE	ZONE	FUNCTIONS	AUTHORITY
1.			DIMENSION 2700 AL TRFD 10 2000.	DIMENSION CHANGED DUE TO CDS-24 CHANGED 1000 OF CORR 1 OF THE 31ST NO ELEM. 73B.
2.			DIMENSION 2700 AL TRFD 10 2200.	
3.			DIMENSION 2700 AL TRFD 10 2400.	
4.			DIMENSION 1200 AL TRFD 10 1000.	
5.			DIMENSION 1200 AL TRFD 10 1400.	
6.			HEAD-330 AL TRFD 10 00.	



FILE	SELF PRIMING MONOLOCK PUMP	FILE	FILE	FILE
ITEM	DESCRIPTION & DIMENSIONS	PRICE/ACTUAL WGT	WTR. SPEC.	REMARKS
INSP	ELECTRICAL	QTY	673005	all in 1
FILE	/users/telecom/nmt/cr/355a.PRI			
SELF PRIMING MONOLOCK PUMP		FILE	FILE	FILE
MONOLOCK PUMP		FILE	FILE	FILE