



PRODUCT STANDARD
STEAM TURBINE ENGINEERING

ST 47030

PAGE 1 OF 3

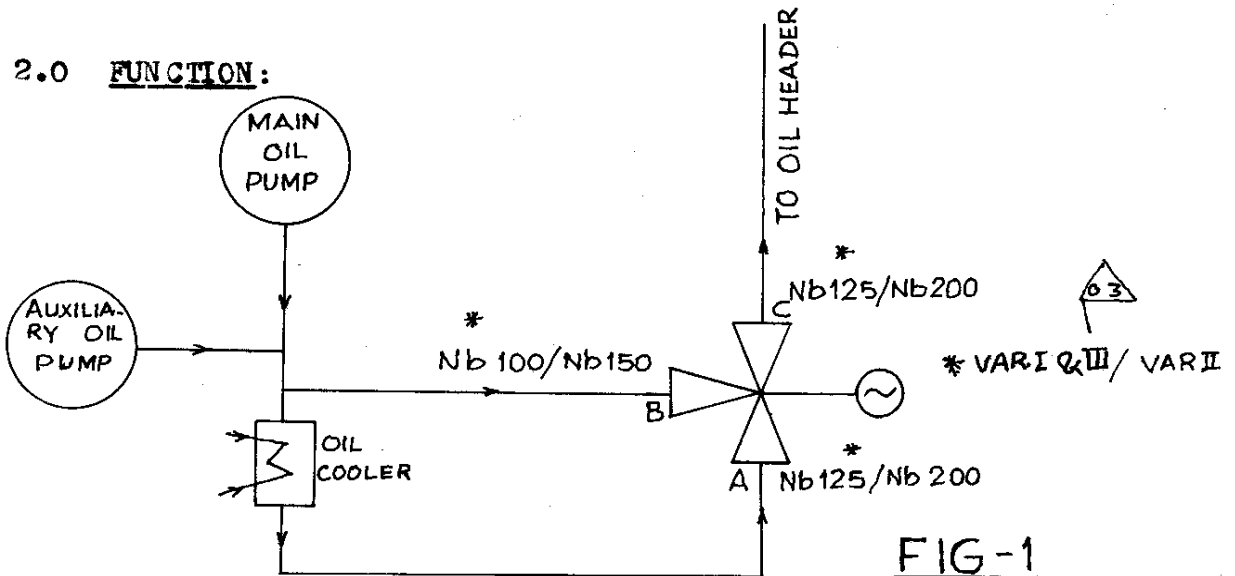
Own Experience

TECHNICAL SPECIFICATION OF THREE-WAY MIXING VALVE

1.0 **SCOPE** :- This specification covers design, manufacturing, assembly, testing, and supply of three way temperature control valve alongwith motorised actuator with identification numbers as tabulated below:

S.No.	Identification No	Size			Max ^m . working parameters		
		VAR. I	VAR. II	VAR. III	VAR. I	VAR. II	VAR. III ↓
1	MAV41AA001	125/ 125/ 100	200/ 200/ 150	125/ 125/ 100	12 Kg/cm ² 65°C	12 Kg/cm ² 65°C	12 Kg/cm ² 65°C

2.0 **FUNCTION**:



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SIGN & DATE	AGREED.			NAME	SIGN. & DATE
					DRAWN
	TSX	B.M. BANSAL	24.3.84	WORKED	A.K. JAIN 13.12.83
	QAX	H.C. UPADHYA	9.3.84	CHECKED	K.C. SACHAN 19.3.84
	DEPTT	NAME	SIGN. & DATE	SUPERVISED	S.S. KULKARNI 19.3.84

INVENTORY NO. P-5517	Revision : 04	Distribution	Qty.	Approved : <i>[Signature]</i>	ST
	Name / SIGN / Date			ENGG. DEV. MANAGER	8-20
	S.K. Gupta / <i>[Signature]</i> / 12.2.08			Prepared STE	Issued STE (TL) HARDWAR

Reaffirmed Feb, 2008



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SUPERSEDES
INVENTORY No.

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INVENTORY No.

Refer figure-1. The function of valve MAV41AA001 is to maintain a predetermined oil temperature in oil header for supply of oil (Turbine oil of grade/ISOVG 46) to turbine bearings. Depending upon set value and actual value of oil temperature in oil header the cold oil flow through inlet end A and hot oil flow through end B is controlled. The cold oil and hot oil is mixed up inside valve body and flows to oil header through discharge end C.


The parameters & oil quantity available at nozzles A and B is given below in tabulated form.

		NORMAL RUNNING				DURING/BARRING GEAR RUNNING			
		Condition-I		Condition-II		Condition-I		Condition-II	
		Nozz-le A	Nozz-le B	Nozz-le A	Nozz-le B	Nozz-le A	Nozz-le B	Nozz-le A	Nozz-le B
Inlet Pressure ata	VAR.I	4.5	5.2	5.2	4.9	2.88	3.88	3.88	3.08
	VAR.II	4.77	5.2	5.2	4.9	3.55	3.77	3.77	3.61
	VAR.III	4.54	6.56	6.56	6.4	3.84	5.18	5.18	5.0
Temp	°C	≤ 45	65	≤ 45	45	≤ 45	65	≤ 45	45
Quantity dm ³ / Sec.	VAR.I	25.7	0	0	25.7	19.4	0	0	19.4
	VAR.II	54.14	0	0	54.14	38.9	0	0	38.9
	VAR.III	33.33	0	0	33.33	27.4	0	0	27.4
Out let Pr. ata	VAR.I	2.5		2.5		2.0		2.0	
	VAR.II	2.5		2.5		2.0		2.0	
	VAR.III	3.54		3.54		3.18		3.18	
Temp.	°C	45		45		45		45	
Qty. dm ³ / sec.	VAR.I	25.7		25.7		19.4		19.4	
	VAR.II	54.14		54.14		38.9		38.9	
	VAR.III	33.33		33.33		27.4		27.4	

Revision: 04

15/5/84

P. 5517

SIGN & DATE	SIGN & DATE	SIGN & DATE	PRODUCT STANDARD		ST 47030
			STEAM TURBINE ENGINEERING		PAGE 3 OF 3
INVENTORY No. P. 5517	COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.	SUPERSEDES INVENTORY No.		3.0 MEDIUM OF FLOW: Servoprime 46 of IOC/medium turbine oil BS: 489.	
				4.0 CONSTRUCTION: Valve shall be of combined design.	
				① 5.0 Valve shall have a linear characteristics. supplier shall furnish flow Vs. lift curve for both ports.	
				6.0 RATING: Rating of the valve is to be decided by supplier according to working parameters mentioned in clause 1.0 & clause 2.0 of specification ST 47025.	
				7.0 MATERIAL BODY: to Carbon steel, material for internals to be selected by supplier and to be informed to purchaser for their comments, if any. Also refer clause 4.0 of ST 47025.	
				8.0 END CONNECTIONS: Flanged as per PN 16, DIN 2633.	
				9.0 For completion of this specification, read this specification alongwith general purchase specification of valves ST 47025.	
				10. Regarding actuators details, refer specification No. ST 47032. Actuator to be equipped with electronic position transmitter and other accessories as mentioned in ST 47032.	
				11. In continuation to clause 15.0 of specification ST 47025, the min. test requirement envisaged by BHEL are as follows:	
				11.1 Testing of Material: The material of components of valve such as body, bonnet, stem & fastners shall be tested as per relevant specification for its chemical composition & mechanical properties. For remaining components compliance certificate shall be furnished.	
				11.2 DPT on body, steam & seat and all welded joints.	
				11.3 Colour matching of valve seat & plug in case of metal to metal contact.	
				① 11.4 Functional test:- To check travel, opening closing time smooth operation with actuator & hand wheel, check for hysteresis, Cv test (type test)	
				11.5 Leak rate shall be as per class IV of ANSI/FCI-70.2	
				11.6 All welding to be carried out as per qualified procedures and welders in accordance with ASME Section-IX.	
				REVISION: 04	
				WORKED K SINGH <i>Whish</i> 28/7/95	
				CHECKED A B G <i>Abg</i> 28/7/95	

SUPERSEDES THE OLD SHEET
 UNDER
 * SAME NO. AS PER CHG. ADV.
 NO. STE-95-322 *Whish*

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक		HW 7450000 / ST 47032	
		PRODUCT STANDARD		पृष्ठ का	Page 1 of 11
समूची सूची संख्या को अधिकृतित करता है	SUPERSEDES INVENTORY NO.	<u>ELECTRIC ACTUATORS FOR VALVES</u>			
समूची सूची संख्या INVENTORY NO. P-5506	सहस्रत विभाग AGREED DEPTT.	1.0 <u>SCOPE:</u>			
		This specification covers the requirements of actuators for open-close type and regulating type valves, complete with electrical motor, torque switch, electronic position transmitter, local position indicator etc.			
स्वत्वाधिकार एवं गोपनीय	इस प्रस्ताव में दी गई सूचना भारत की इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।	2.0 <u>GENERAL</u>			
		2.1 The actuator shall generally comply with IS 9334 & shall be complete with motor, gear trains, hand wheel, signaling and switching unit, terminal boxes and all other necessary accessories.			
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.	हस्ताक्षर एवं दिनांक SIGN & DATE 20/12/08	2.2 The drive shall take into account the desired operating speed of the valve and the differential and static pressure applied on the valve as given in the relevant valve specification.			
		2.3 The normal torque rating of each drive unit shall have adequate margin and shall be at least equal to the theoretical brake torque, required to drive the equipment under full load, including all losses in speed reducers and power transmission even if the voltage is 90 % of the rated value under worst condition of pressure differential.			
हस्ताक्षर एवं दिनांक SIGN & DATE	हस्ताक्षर एवं दिनांक SIGN & DATE	2.4 The actuator assembly shall have metal gear trains and self locking gears shall be provided.			
		2.5 Greasing lubricating shall be possible without opening any assembly or part of it. The actuator shall be so designed that it can be mounted in any orientation without any lubricant leakage or other operational difficulties.			
हस्ताक्षर एवं दिनांक SIGN & DATE	हस्ताक्षर एवं दिनांक SIGN & DATE	2.6 A hand wheel shall be provided for mutual operation. Provision shall be made for manual engagement of the handwheel except when motor is energized, the hand wheel shall be automatically disengaged.			
		2.7 The actuator enclosure except the motor and the terminal boxes shall conform to IP-67.			
हस्ताक्षर एवं दिनांक SIGN & DATE	हस्ताक्षर एवं दिनांक SIGN & DATE	हस्ताक्षर एवं दिनांक SIGN & DATE	हस्ताक्षर एवं दिनांक SIGN & DATE	हस्ताक्षर एवं दिनांक SIGN & DATE	हस्ताक्षर एवं दिनांक SIGN & DATE
TSX	P. K. SINGH		अनुवादक TRANSLATED BY		
MEMBER PSC	SK SHARMA		निर्माणकर्ता WORKED BY	SURESH CHANDRA	
QAX	NK MANWANI		जांचकर्ता CHECKED BY	BS RANA	
सहस्रत विभाग AGREED DEPTT.	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	पर्यवेक्षककर्ता SUPERVISED BY	BS RANA	
SUPERSEDES THE OLD ST UNDER THE SAME NUMBER			स्वीकृति APPROVED :	KB BATRA	
REV.NO.	01		निर्माण PREPARED :	CIE	5.12
DI.	12.2.08		जारी ISSUED :	TSX	DATE : 5.1.84

सामग्री सूची संख्या को
अधिकारित करता है
SUPERSEDES
INVENTORY NO.

3.1 Standard :

The motor shall conform to IS: 325 and IS:4722., IS:2253, IS:4029 , IS: 3202 , or equivalent BS/DIN/IEC/VDE standard. The motor shall meet al Indian statutory requirements.

The bidder shall mention in their quotation the relevant standard.

3.2 Construction type :

Squirrel cage induction motor.

3.3 Rated voltage :

415v ac, 50 H , 3 phase, 3 Wire.

3.4 Permissible voltage and frequency variation :

415V + 10 % , 50Hz + 5%, combined voltage and frequency variation = +/- 10 % (absolute sum).

3.5 Type of duty:

In case of close/open services, motor shall be designed for the type of duty S2-15 minutes as per IEC 34-1.

In case of regulating services, motor shall be designed for the type of duty.

a) S4/S5-25 % .DC-1200 C/hr for < 3.0 KW
b) S4/S5-25 % .DC-600 C/hr for > 3.0 KW as per IEC 34-1.

3.6 Ambient condition :

The motor shall be suitable for continuous environmental temperature ranging from -20 to +70 °C .Operating climate is tropical and humid . Maximum humidity is near to 100 % but not occurring simultaneously with maximum temperature.

3.7 Insulation :

Class B non hygroscopic insulation with two additional dips in epoxy varnish .

3.8 Temperature sensors :


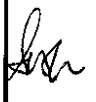
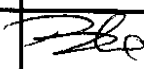
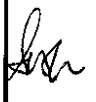
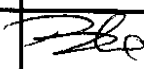
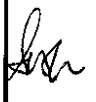
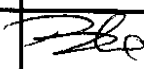
Motors for regulating valve drives shall have three Thermostats for winding temperature, per phase ,wired up to the terminals.




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स्वत्वधिकार एवं गोपनीय
 इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल लिमिटेड की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।

हस्ताक्षर एवं दिनांक
SIGN & DATE
20/11/08

सामग्री सूची संख्या INVENTORY NO. P-5506	REV. NO. 01		निर्माणकर्ता WORKED BY SC	 62.08	
			जांचकर्ता CHECKED BY BSR	 62.08	

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक PRODUCT STANDARD	HW 7450000 / ST 47032								
सामग्री सूची संख्या को अधिष्ठापित किया है SUPERSEDES INVENTORY NO.	<p>3.9 <u>Enclosure :</u></p> <p>Motor shall be totally enclosed fan cooled type. The type of protection shall be IP -67.</p> <p>3.10 <u>Finish :</u></p> <p>The motor external parts shall be finished and painted to produce a neat and durable surface which would prevent rusting and corrosion . The equipment shall be thoroughly degreased, all rust, sharp edges and scale removed and treated with one coat of primer and finished with two coats of paint, paint shade shall be intimated later by BHEL. The motor and cooling fan shall be painted with corrosion proof paint.</p> <p>3.11 <u>Bearings :</u></p> <p>The motor shall be double shielded ,grease prelubricated, regreasable , anti friction bearings, having a minimum service life of 100,000 hrs.</p> <p>3.12 <u>Terminals :</u></p> <p>The terminals shall be brought out to a terminal box complete with cable glands. protection class shall be as per IP-67. An extra blind gasket of neoprene/rubber shall be provided with each cable glands to stop any possible entry of dust etc. Connection diagram shall be printed at inner side of the cover.</p> <p>3.13 <u>Grounding :</u></p> <p>Suitable arrangement shall be provided for ear thing the motor at two separate and distinct connection points. Design of ear thing conductor shall be as per IS: 4722.</p> <p>3.14 <u>Name plate :</u></p> <p>The motor shall have a name plate indicating maker's name, type number, rated voltage, nominal current , speed and other salient information.</p>										
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स्वाधिकाार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रारम्भ एवं प्रसारण अन्य कर्मियों को तब तक प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।											
दिनांक एवं हस्ताक्षर SIGN & DATE 20/11/08											
सामग्री सूची संख्या INVENTORY NO. P-5506	REV. NO. 01		<table border="1"> <tr> <td>निर्माणकर्ता WORKED BY</td> <td>SC</td> <td></td> <td>6.2.08</td> </tr> <tr> <td>जांचकर्ता CHECKED BY</td> <td>BSR</td> <td></td> <td>6.2.08</td> </tr> </table>	निर्माणकर्ता WORKED BY	SC		6.2.08	जांचकर्ता CHECKED BY	BSR		6.2.08
निर्माणकर्ता WORKED BY	SC		6.2.08								
जांचकर्ता CHECKED BY	BSR		6.2.08								

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक PRODUCT STANDARD	HW 7450000 / ST 47032 पृष्ठ का Page 4 of 11		
सामग्री सूची संख्या को अधिकारित करता है SUPERSEDES INVENTORY NO	<p>3.15 <u>Starting condition :</u></p> <p>a) The motor shall be capable to start at rated voltage + 10% even at full load without any operational problem, over stressing , overheating etc.</p> <p>b) Starting current shall be less than 6 times the rated current .</p> <p>c) The locked rotor withstand time under hot condition at rated voltage shall be at least 2-5 seconds more than the starting time .</p> <p>d) The motor shall be suitable for DOL starting even at 0% of the rated voltage.</p> <p>3.16 <u>Running conditions :</u></p> <p>a) The motor shall be capable to run at full load at 80% of rated voltage for at least 5 minutes and at 70% of rated voltage for at least 1 second.</p> <p>b) The motor shall be capable to withstand voltage and torque stresses developed due to the difference between the motor residual voltage and incoming supply voltage equal to 150% of rated voltage during automatic changeover of supply busses.</p> <p>c) Combined critical speed of motor and driven equipment shall not be equal to the motor speed at voltages from 80% to 120% of rated voltage.</p>				
COPYRIGHT AND CONFIDENTIAL. The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly, in any way detrimental to the interest of the company	<p>4.0 <u>SIGNALLING & SWITCHING UNIT :</u></p> <p>4.1 Close torque switches shall provide total 2NO + 2NC contacts, with either two 1NO + 1NC switches or one 2NO + 2NC switch.</p> <p>4.2 Open torque switches shall provide total ,2NO + 2NC contacts, with either two 1NO + 1NC switches or one 2NO + 2NC switch.</p> <p>4.3 Any torque switch once operated shall not reset by itself until the valve stem travels backward. The torque switches shall have accuracy of +3% of the set value.</p> <p>4.4 Limit switches shall provide total 8NO + 8NC contact with either four 2NO+ 2NC or eight 1NO + 1NC switches. All limit switches will be adjustable throughout full close to full open position.</p>				
स्वत्वाधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रस्ताव एवं आस्वादा का या किसी भी तरह प्रयोग, जो कि कंपनी के हित में है, निकालकर हो न किया जाए ।					
दिनांक एवं हस्ताक्षर SIGN & DATE 7/02/08					
सामग्री सूची संख्या INVENTORY NO P-5506	REV. NO. 01		निर्मापककर्ता WORKED BY SC		6.2.08
			जांचकर्ता CHECKED BY BSR		6.2.08

उत्पाद मानक

HW 7450000 /
ST 47032



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दिनांक एवं हस्ताक्षर
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SUPERSEDES
INVENTORY NO.

सामग्री सूची संख्या को
अधिकारित करना है

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स्वत्वाधिकार एवं गोपनीय

इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इस्का प्रयुक्त एवं अपर्याप्त रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।

हस्ताक्षर एवं दिनांक
SIGN & DATE

22/01/08

सामग्री सूची संख्या
INVENTORY NO.

P-5508

REV. NO.
01

निर्माणकर्ता
WORKED BY

SC

Push

6.2.08

जांचकर्ता
CHECKED BY

BSR

Be

6.2.08

- 4.5 All switches shall be actuated by cam or disc roller counter mechanism. Mechanical life expectancy of the switches shall be at least 10 million switching cycles. Switching capacity of all switches shall be at least 5A at 240 V AC and 0.5 A at 220 V DC. All switches shall be snap action micro switch type. Limit switches and actuating mechanism shall be rust proof suitable for humid atmosphere and shall not cause any trouble during operation. Limit switch compartment shall be with IP66 enclosure and spacious enough for easy setting.
- 4.6 One local position indicator shall be provided.
- 4.7 For following valve tag nos., if they are included in the enquiry , Electronic Position Transmitter is to be offered. Tag nos. MAL11AA011, MAL12AA011, MAV41AA001 and MAX41AA041.
- EPT type : 2-wire , non- contact
Transmitter power supply = 24 V DC
Output signal = 4-20 mA DC
Load = 600 ohms at 24V DC
Accuracy = <1%
- 4.8 For clarity ,wiring diagram of the switching and signaling unit is shown in sheet 11.
- 4.9 The switching and signaling unit must be suitable for continuous environmental temperature ranging from -20 of to 70 °C.
- 4.10 All terminals shall be brought out to a terminal box of protection class IP-67. The suitable cable glands shall be fitted to the terminal box. Double compression type cable gland shall be provided.
- 4.11 All control wiring shall be done with 1100V grade HR PVC or TEFLON Insulated wire.

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उत्पाद मानक

HW 7450000 / ST 47032

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पृष्ठ का
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दिनांक एवं हस्ताक्षर
SIGN & DATE

सामग्री सूची संख्या को
अधिकृतित करना है
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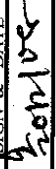

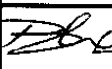
दिनांक
SIGN & DATE


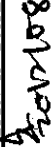






- 4.12 Internal wiring diagram shall be printed at the inner side of the cover.
- 4.13 The terminals shall be screw/screw type channel(rail) mounted lined up on terminals, each terminal a single piece mould
- 4.14 The terminals shall be of minimum 1100V grade.
- 4.15 All terminals shall be suitable for wire of any size between 0.5 sq.mm and 2.5 sq. mm.
- 4.16 1 no. 9 pin plug & socket connector to suit 4 pair x0.5 mm² screened instrumentation cable (16 mm OD), suitably mounted in the terminal box. The signals covered shall be open/close commands, and open/close feedback and disturbance signals.
- 4.17 Additionally 1 no. 9 pin plug & socket connector to suit 4 pair x0.5 mm² individual and overall shielding instrumentation cable (16 mm OD), suitably mounted in the terminal box for 4-20 mA position transmitter.
- 4.18 In cases where the position transmitter is not existing, the corresponding terminal stations will be left unused.
- 5.0 TEST & INSPECTION :
- 5.1 All routine and type test shall be carried out on the motor as per IS:325 IS:4722 or equivalent BS/DIN/IFC/VDE standards. The bidder shall mention in their offer the relevant standard.
- 5.2 Actuator shall be tested in accordance with IS:9334.
- 5.3 Full assembly i.e. the valve along with actuator and motor shall be tested for proper functioning vis-à-vis the relevant clauses of this specification
- 5.4 If desired by BHEL ,the supplier shall provide BHEL inspector or BHEL's authorized representative all facilities to witness the tests.

सामग्री सूची संख्या
INVENTORY NO.
P-5506

REV. NO.
01

निर्माणकर्ता WORKED BY	SC	<i>[Signature]</i>	6.2.08
जांचकर्ता CHECKED BY	BSR	<i>[Signature]</i>	6.2.08

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक PRODUCT STANDARD	HW 7450000 / ST 47032 पृष्ठ का Page 7 of 11		
सामग्री सूची संख्या को अधिकारिता करता है SUPERSEDES INVENTORY NO.	<p>5.5 Calibration/accuracy check of position transmitter shall be done on Routine basis wherever position transmitter is provided.</p> <p>5.6 Type test shall be carried out on degree of protection of actuator and reports of type tests shall be those conducted within last five years.</p> <p>5.7 Setting of torque & limit switches along with HV & IR test on 01 electrical part of switch on routine basis.</p>				
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical. Limited It must not be used directly or indirectly in any way detrimental to the interest of the company.	<p>6.0 <u>TEST AND GUARANTEE CERTIFICATE</u></p> <p>6.1 Results of all tests enumerated in 5.1 & 5.2 above shall be compiled in TC.</p> <p>6.2 Supplier shall furnish the following. Characteristics Curves along with test certificates as routine basis for BHEL /Owner' approval.</p> <p>a. Speed V/S Torque characteristics of the motor at 90%,100% & 110% of rated voltage.</p> <p>b. Thermal withstand characteristics in both hot and cold condition at 90%,100% and 110% voltage.</p> <p>c. Performance characteristics.</p> <p>6.3 Results of routine & type test carried out on all motors & actuator in accordance with the standard indicated in this specification shall be furnished in six copies for BHEL/owner's approval only on acceptance from BHEL/owner motor actuator can be dispatched.</p> <p>6.4 One copy each of complete documentation and test certificate along with each valve actuator assembly.</p>				
स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रयोग एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में लाभकारी हो न किया जाए ।					
हस्ताक्षर एवं दिनांक SIGN & DATE 					
सामग्री सूची संख्या INVENTORY NO. P-5506	REV. NO. 01		निर्माणकर्ता WORKED BY SC		6.2.08
			जांचकर्ता CHECKED BY BSR		6.2.08

15-10-08 SIGN & DATE		उत्पाद मानक PRODUCT STANDARD	HW 7450000 / ST 47032 पृष्ठ का Page 8 of 11								
SUPERSEDES INVENTORY NO.	7.0 DOCUMENTS AND OTHER INFORMATION 7.1 Any deviation in the offered product from any clause/sub clause above must be clearly mentioned by the bidder in their quotation. 7.2 Two copies of complete technical literature and dimensional drawings will be furnished along with the quotation. 7.3 Three copies of the technical data sheet as per Annexure 'A' must be furnished along with offer. 7.4 Six copies of technical literature , dimensioned drg. ,wiring diagram and data sheets for BHEL's approval. 7.5 Six copies of operation & maintenance manual for the actuator including Electronic position transmitter. 7.6 CROSS REFERRED STANDARD: IS:325, IS:4722,IS:2253,IS:4029,IS:3202,IEC:34-1 and IS:9334										
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स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत की इलेक्ट्रिकल्स की संपत्ति है, इसका प्रयोग एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।											
15-10-08 SIGN & DATE 											
INVENTORY NO. P-5506	REV. NO. 01		<table border="1"> <tr> <td>निर्माणकर्ता WORKED BY</td> <td>SC</td> <td></td> <td>6.2.08</td> </tr> <tr> <td>जांचकर्ता CHECKED BY</td> <td>BSR</td> <td></td> <td>6.2.08</td> </tr> </table>	निर्माणकर्ता WORKED BY	SC		6.2.08	जांचकर्ता CHECKED BY	BSR		6.2.08
निर्माणकर्ता WORKED BY	SC		6.2.08								
जांचकर्ता CHECKED BY	BSR		6.2.08								

उत्पाद मानक

HW 7450000 / ST 47032



PRODUCT STANDARD ANNEXURE 'A'

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हस्ताक्षर एवं तिथि
SIGN & DATE

सुपरसेड्स
INVENTORY NO.

सामग्री सूची संख्या को
अधिकृतित करता है

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स्वत्वाधिकार एवं गोपनीय

इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रयोग एवं आरव्यक्त रूप से किसी भी तरह प्रयोग, जो कि कंपनी को हित में हानिकारक हो न किया जाए।

हस्ताक्षर एवं तिथि
SIGN & DATE

20/11/08

PROJECT NAME :
CUSTOMER DRG. NO.
DATA SHEET OF ELECTRICAL ACTUATORS FOR THERMAL SETS APPLICATION:

1. TYPE OF DUTY :
2. Manufacturer of actuator :
3. Complete type no. :
4. Protection class of actuator :
5. Protection class of terminal box :
6. Adjustable tripping torque :
7. Max. torque in opening direction (without torque switch) (Nm) :
8. Shaft speed :
9. Shaft revolution per full stroke ;
10. No. of torque switches and no. of contacts in each switch :
11. No. of limit switches and no. of contacts in each switch :
12. Contact rating of the torque and limit switches at 240 V AC & 220 V DC :
13. Position transmitter included or not :
 - a) TYPE 2 Wire , non contact type:
 - b) input of position transmitter :
 - c) output of position transmitter :
 - d) Maximum permissible load :
 - e) Accuracy of position transmitter:

सामग्री सूची संख्या
INVENTORY NO.

P-5508

REV. NO.
01

निर्माणकर्ता
WORKED BY

SC

Signature


6.2.08

जांचकर्ता
CHECKED BY

BSR

Signature

6.2.08

निर्माण एवं रजिस्ट्रेशन SIGN & DATE		उत्पाद मानक PRODUCT STANDARD	HW 7450000 / ST 47032 पृष्ठ का Page 10 of 11			
निर्माण एवं रजिस्ट्रेशन SUPERSEDES INVENTORY NO.	<p>14. <u>Operating time (Open/Close time):</u></p> <p>i) Starting current (415V AC) :</p> <p>j) Nom. output torque (Nm) :</p> <p>k) Starting torque (Nm) :</p> <p>15. <u>MOTOR :</u></p> <p>a) Maker's name :</p> <p>b) Complete type no. :</p> <p>c) Protection class :</p> <p>d) Rated voltage :</p> <p>e) Rated power (KW) :</p> <p>f) Nom. current (415V AC) :</p> <p>g) Efficiency :</p> <p>h) Power factor :</p> <p>i) Starting current (415V AC) :</p> <p>j) Nom. output torque (Nm) :</p> <p>k) Starting torque (Nm) :</p> <p>l) Type of enclosure :</p> <p>m) No of Thermostats provided :</p> <p>n) Ambient temp. range :</p> <p>o) Temp. rise :</p> <p>p) OLR value :</p> <p>q) Space heater power supply :</p> <p>16: Wiring diagram no. of actuators indicating terminal box nos.:</p>					
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निर्माण एवं रजिस्ट्रेशन SIGN & DATE <i>22/10/08</i>						
निर्माण एवं रजिस्ट्रेशन INVENTORY NO. <i>P-5506</i>	REV. NO. 01		निर्माणकर्ता WORKED BY SC	<i>[Signature]</i>	6.2.08	
			जांचकर्ता CHECKED BY BSR	<i>[Signature]</i>	6.2.08	

15/10/08 EX-101



उत्पाद मानक

HW 745000 /
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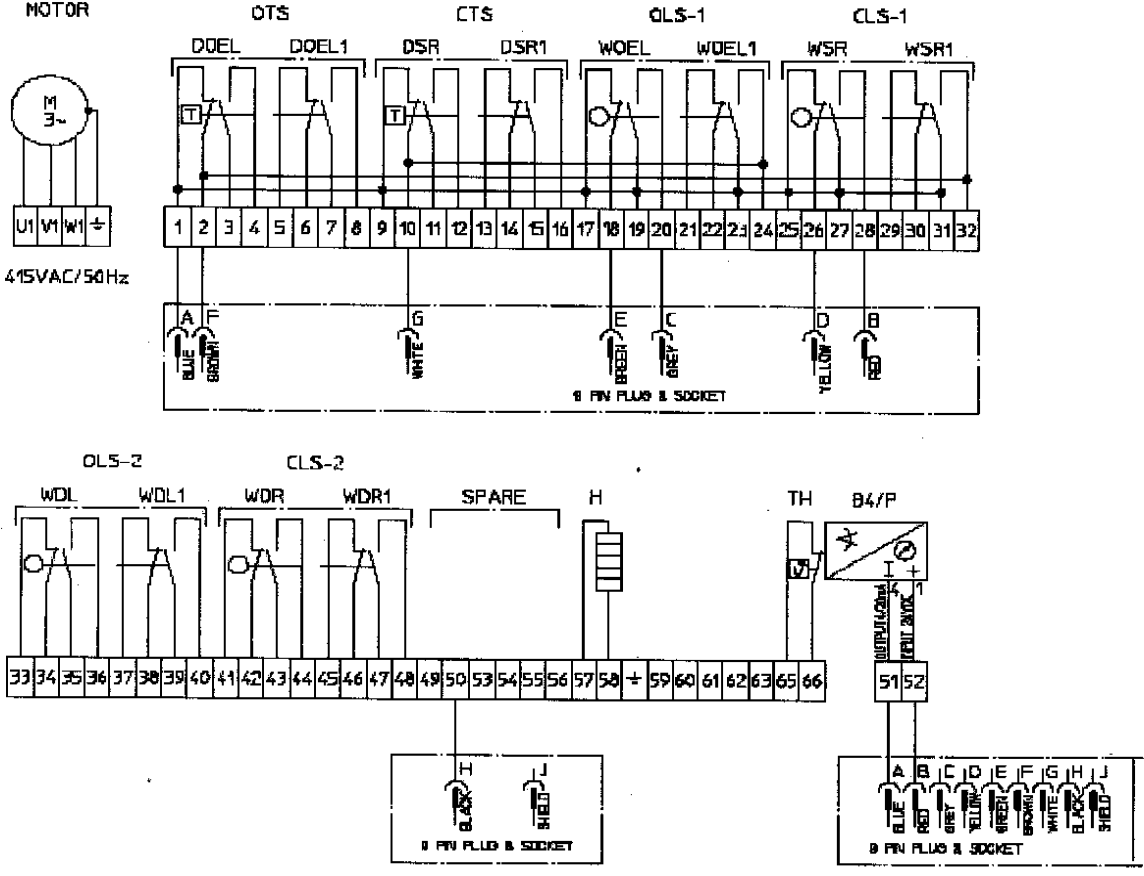
PRODUCT STANDARD

SUPERSEDES
INVENTORY NO.

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स्वाधिकार एवं गोपनीय
इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है प्रकृत प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी प्रकार प्रयोग, जो कि कंपनी के हित में अधिकतम हो, न किया जाए।

विकास एवं प्रयोग



Important Note:
Only for PELV-System permissible
PELV = Protective Extra Low-Voltage
refer to norm: EN 50178 and IEC 60204-1.

- LEGEND:**
- OTS -TORQUE SWITCH FOR C.C.W. ROTATION (OPEN)
 - CTS -TORQUE SWITCH FOR C.W. ROTATION (CLOSE)
 - OLS-1 -LIMIT SWITCHES FOR POSITION OPEN
 - OLS-2 -LIMIT SWITCHES FOR POSITION OPEN
 - CLS-1 -LIMIT SWITCHES FOR POSITION CLOSE
 - CLS-2 -LIMIT SWITCHES FOR POSITION CLOSE
 - H -HEATER (240VAC/50Hz)
 - TH -THERMOSTAT
 - B4 IWG/P - ELECTRONIC POSITION TRANSMITTER

Terminal plan shows the actuator in intermediate position, switches are not actuated.

संख्या सूची संख्या

REV. NO.
01

निर्माणकर्ता WORKED BY	SC	<i>Am</i>	6.2.08
जांचकर्ता CHECKED BY	BSR	<i>Bso</i>	6.2.08