

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक		HW 7450000 / ST 47032	
		PRODUCT STANDARD		पृष्ठ का	Page 1 of 11
समग्री सूची संख्या को अधिकृतित करता है	SUPERSEDES INVENTORY NO.	<u>ELECTRIC ACTUATORS FOR VALVES</u>			
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.	1.0 SCOPE: 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.				
	2.0 GENERAL 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. 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. 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. 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.				
स्वत्वाधिकार एवं गोपनीय	इस प्रस्ताव में दी गई सूचना भारत हेवी 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।				
हस्ताक्षर एवं दिनांक SIGN & DATE	20/12/08				
समग्री सूची संख्या INVENTORY NO.	P-5506				
हस्ताक्षर एवं दिनांक SIGN & DATE	20/12/08	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE
		TSX	P. K. SINGH	अनुवादक TRANSLATED BY	
		MEMBER PSC	SK SHARMA	निर्माणकर्ता WORKED BY	SURESH CHANDRA
		QAX	NK MANWANI	जांचकर्ता CHECKED BY	BS RANA
		सहमत विभाग AGREED DEPTT.	नाम NAME	पर्यवेक्षककर्ता SUPERVISED BY	BS RANA
SUPERSEDES THE OLD ST UNDER THE SAME NUMBER				स्वीकृति APPROVED :	KB BATRA
REV.NO.	01			निर्माण PREPARED :	CIE
DI.	12.2.08			जारी ISSUED :	TSX
				दिनांक DATE :	5.1.84

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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 :


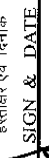
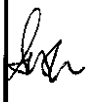
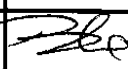
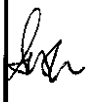
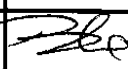
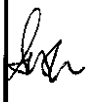
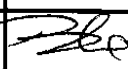
Motors for regulating valve drives shall have three Thermostats for winding temperature, per phase ,wired up to the terminals.




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 इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल लि. 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		6.2.08
			जांचकर्ता CHECKED BY BSR		6.2.08

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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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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
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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 लि. की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से 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		निर्माणकर्ता WORKED BY SC		6.2.08
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उत्पाद मानक

HW 7450000 /
ST 47032



PRODUCT STANDARD

पृष्ठ का
Page 5 of 11

दिनांक एवं हस्ताक्षर
SIGN & DATE

SUPERSEDES
INVENTORY NO.

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हस्ताक्षर एवं दिनांक
SIGN & DATE

22/01/08

- 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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सामग्री सूची संख्या
INVENTORY NO.

P-5508

REV. NO.
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उत्पाद मानक

HW 7450000 / ST 47032

पृष्ठ का
Page 6 of 11

PRODUCT STANDARD

दिनांक एवं हस्ताक्षर
SIGN & DATE

सामग्री सूची संख्या को
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INVENTORY NO.

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हस्ताक्षर एवं 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.
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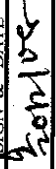

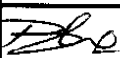

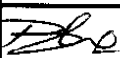

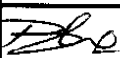
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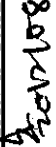


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दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक PRODUCT STANDARD	HW 7450000 / ST 47032 पृष्ठ का Page 7 of 11								
सामग्री सूची संख्या को अधिकृत करता है SUPERSEDES INVENTORY NO.	<p>5.5 Calibration/accuracy check of position transmitter shall be done 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 electrical part of switch on routine basis. 01</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>										
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हस्ताक्षर एवं दिनांक SIGN & DATE 											
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
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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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15-10-08 SIGN & DATE 					
INVENTORY NO. P-5506	REV. NO. 01		निर्माणकर्ता WORKED BY SC		6.2.08
			जांचकर्ता CHECKED BY BSR		6.2.08

उत्पाद मानक

HW 7450000 /
ST 47032



PRODUCT STANDARD
ANNEXURE 'A'

पृष्ठ का
Page 9 of 11

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
अनुवाद रूप से किसी भी तरह प्रयोग, जो कि कंपनी को हित में हानिकारक हो न किया जाए।

हस्ताक्षर एवं तिथि
SIGN & DATE

20/10/08

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		
निर्माण एवं रजिस्ट्रेशन INVENTORY NO.	<p style="text-align: right;">पृष्ठ का Page 10 of 11</p> <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. 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

15/10/08 EX-101



उत्पाद मानक

HW 745000 /
ST 47032

पृष्ठ का
Page 11 of 11

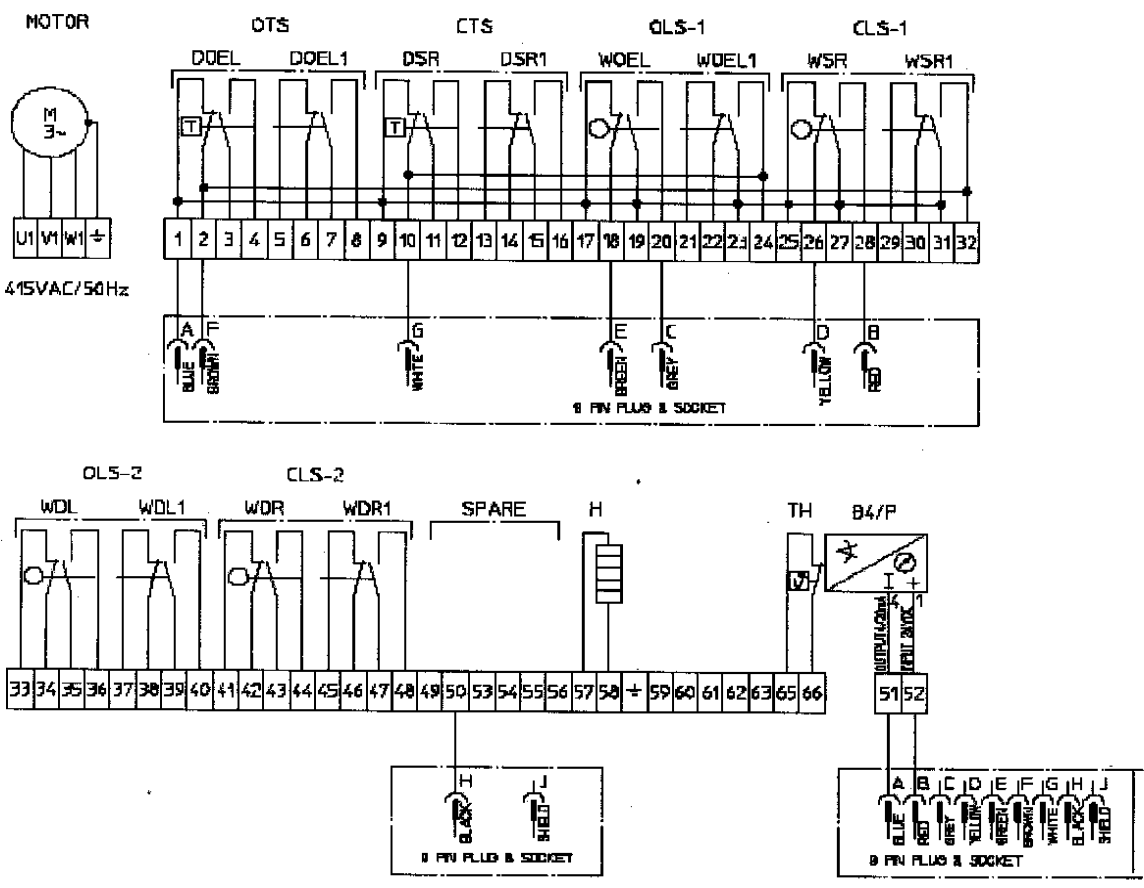
PRODUCT STANDARD

SUPERSEDES
INVENTORY NO.

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इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी प्रकार प्रयोग, जो कि कंपनी के हित में अधिकतम होना चाहिए।

REVISIONS एवं 15/10/08



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
P-5528

REV. NO.
01

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