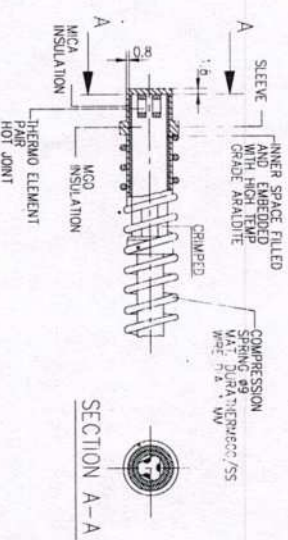
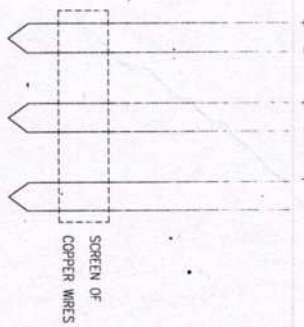


sva'xooQokir evaM gosaopnalya
 [sa p]aak' moom di qo' - solucano baari hawa [looBT/xisa
 loimato] ki sampika ho [saka p]axaa yaa Ap'axaa ko
 moom kya Bi trn p'axaga notim kyaoo baoo joo kimpal ko
 ki moom kyaoo baoo joo kimpal ko



SECTION A-A



1. BEFORE DISPATCH TO SITE THE TAG NOS SHOULD BE PUNCHED AT THE STEEL TAG PLATE AS PER SHIPPING LIST.

REFERENCE:- KUN 672.20

REFERENCE:- KUN 672.20

1. **THERMOELEMENT:** THREE PAIRS MADE FROM NICKEL-NI (NICKEL CHROMIUM NICKEL)-K-TYPE CABLE AS SHOWN IN DRAWING

2. CALIBRATION OF MOC-A MOCES : AS PER ISO - EC-584-PART-1- AND TOLERANCE CLASS 1.
3. THE JOINT SECTIONS SHALL BE ELECTRICALLY INSULATED FROM METALLIC SLEEVE BY MOC-A BETTER INSULATION. THE INSULATION RESISTANCE BETWEEN THE TWO THERMOCOUPLE PIPES AS BETWEEN EACH THERMOCOUPLE WIRE, AND METALLIC SLEEVE SHALL BE >10M Ω AT ROOM TEMP. (20°C) AT 500 VOLTS AND RELATIVE HUMIDITY 45 TO 75%.
4. THE THERMOCOUPLE SHALL BE USED FOR MEASUREMENT OF METAL TEMP. UP TO 200°C AND HENCE ALL MATERIALS USED SHALL BE SUITABLE FOR THAT TEMPERATURE.
5. MATERIAL OF STEEL, WIREPLATE & ROUNDED CAP, COIL DRAINAGE STEEL CO-58 PER IS-4855, NICKEL PLATED AND METAL CEMENTATE TO BE FURNISHED.
6. THE NIPPLE ALONE SHALL BE ABLE TO PRELIM MOVE OVER THE SPRING THE ROUNDED CAP SHALL BE ABLE TO OPERATE ON THE SPRING AND THE SPRING SHALL BE ABLE TO OPERATE ON THE ROUNDED CAP.
7. THE SPRING AND THIS SLEEVE SHALL BE INSULATED FROM EACH OTHER BY SPRINGING ON DEPTH OF 100, 200MM AND ABOVE . THE THERMOCOUPLE SHALL BE MOUNTED WITH SPRINGING TENSION EQUAL TO 15.20 AND 25mm RESPECTIVELY.
7. TESTING OF THERMOCOUPLE SHALL BE DONE AS PER IS-7258 AND 3 COPIES OF TEST CERTIFICATE SHALL BE FURNISHED BY SUPPLIER.
8. TWO COPIES OF CATALOGUE INDICATING FULL DIMENSIONAL AND TECH. DETAILS AND MATERIAL SPECIFICATION SHALL BE FURNISHED ALONGWITH QUOTATION BY BIDDER AND THREE COPIES OF SAME AFTER PLACEMENT OF PURCHASE ORDER.
9. BLACK STAINLESS STEEL PLATE SHALL BE FASTENED WITH THE THERMOCOUPLE.
10. THE INSULATION OF THE INDIVIDUAL CABLE SHALL BE OF DIFFERENT COLOUR IN ORDER TO DETERMINE THE SIX TERMINALS AS SHOWN UNDER.
11. DATA SHEET TO BE SUBMITTED FOR APPROVAL, WITH THE OFFER.
12. THE MEANING OF SYMBOL  WILL BE THAT "SPECIAL CARE IS TO BE TAKEN FOR THESE DIMENSIONS DURING MANUFACTURING".

STEAM TURBINE

[illegible]

THERMOCOUPLE
 DRA-300

KUT
 CARD
 CODE
 21336366010
 22

A2 500f.jp./A2 5ZE

21 20.2 7

svaʔvaɔiQakər evaM gaapnɔɪa
[sa pʰaaK maam di ga] – salucanaa Baart
havaɪ [lɔɔiʔt/kɪsɔ ɪlɔmaʔd kɪ sampiKa hɔ
[saka pʰɛyaxa yaa Apʰɛyaxa \$p maam
kɪsɔɪ Bəl trɪ pʰɛyaxa nahim ɪkyaa jaae
jaae kmpɪnɔt kɔ ɛt maam hɔɪnɔk haa .



- 1- THERMOCLEMENT : TWO PAIRS NCR-NI.
(ACCURACY CLASS 1 AS PER IEC 584 PART II)
- 2- HOT JUNCTION : UNGROUND
- 3- ELEMENT :- $\phi 6$, SPRING LOADED.
- 4- TERMINAL HEAD HINGED, SNAP CLOSURE / SLOT HEAD SCREW.
- 5- FOR OTHER DETAILS REF. TECH. SPEC:- ST-44008
- 6- DATA SHEET TO BE SUBMITTED FOR APPROVAL, WITH THE OFFER
- 7- BARE RESPONSE TIME : 10 SEC OR BETTER.

VAR NO.	DESCRIPTION OF THERMOCOUPLE	HOLDING PIPE LENGTH (IN)	MEASURING INSERT LENGTH (IN)	BHEL SPEC NO	BHEL CODE NO
00	THERMOCOUPLE TYPE-CJL=465	446	465	ST44008	W90313374015
01	THERMOCOUPLE TYPE-DL=465	386	465	ST44008	W90313374023
02	THERMOCOUPLE TYPE-DL=465	286	465	ST44008	W90313374031
03	THERMOCOUPLE TYPE-DL=560	386	560	ST44008	W90313374040

TYPE OF PRODUCT OR NAME OF

[illegible]

A3 scaffolding/A3 SIZE

01099099313

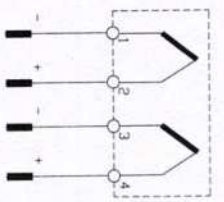
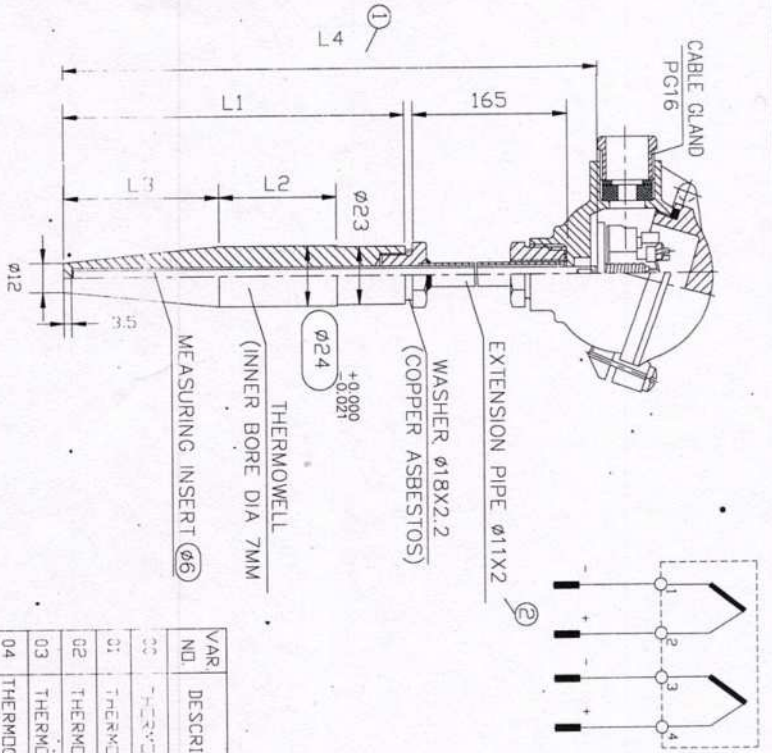
DOC REV NO.: 2

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- 1- THERMOELEMENT : TWO PAIRS IN CR NI.
(ACCURACY CLASS-1 AS PER IEC 584 PART-11)
- 2- HOT JUNCTION : UNGROUND
- 3- ELEMENT : 6, SPRING LOADED.
- 4- TERMINAL HEAD HINGED, SNAP CLOSURE / SLOT HEAD SCREW.
- 5- FOR OTHER DETAILS REF. TECH. SPEC.- ST-44006
- 6- DATA SHEET TO BE SUBMITTED FOR APPROVAL, WITH THE OFFER.
- 7- BARE RESPONSE TIME : 10 SEC OR BETTER.

NOTE:-
THE MEANING OF SYMBOL  WILL BE THAT 'SPECIAL CARE IS TO BE TAKEN FOR THESE DIMENSIONS DURING MANUFACTURING'.

VAR NO.	DESCRIPTION AND THERMOWELL MATERIAL	L1	L2	L3	MEAS. INSERT LENGTH	THERMOWELL MATERIAL	BHEL SPEC. NO.	BHEL CODE NO.
00	THERMOWELL .D4-100CrMo910	140	50	65	375	F22	ST44006	W90313360405
01	THERMOWELL .D4-100CrMo910	200	50	125	375	F22	ST44006	W90313360405
02	THERMOWELL .D4-100CrMo910	200	50	125	375	F22	ST44006	W90313360405
03	THERMOWELL .D4-100CrMo910	200	110	65	375	F22	ST44006	W90313360405
04	THERMOWELL .D4-100CrMo910	200	110	65	375	F22	ST44006	W90313360405

saMa8a-1 Aibokp
saM#yaa
REFERENCE DRG. NO.

hstaxar AaOr ikaMaK/SIGN &
DATE

Asa'yo iwarmaAaom ka vago-
GRADE OF UNTOLERANCED DIMENSION
masdinaMga ? eed230208 emu
MACHINING - AA0230208 m
voolidMaga ? eed21104 ki Eonoi ba
WELDING-CLASS 'B' OF AA0621104
gaoSa kiMaga ? eed21101 ki soorNai

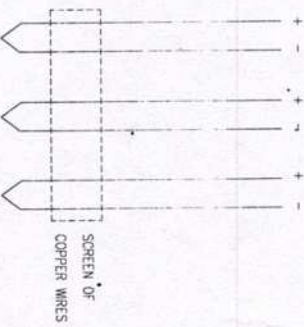
saMa8a-1 Aibokp
saM#yaa
REFERENCE DRG. NO.

hstaxar AaOr ikaMaK/SIGN &
DATE

Asa'yo iwarmaAaom ka vago-
GRADE OF UNTOLERANCED DIMENSION
masdinaMga ? eed230208 emu
MACHINING - AA0230208 m
voolidMaga ? eed21104 ki Eonoi ba
WELDING-CLASS 'B' OF AA0621104
gaoSa kiMaga ? eed21101 ki soorNai

saMa8a-1 Aibokp
saM#yaa
REFERENCE DRG. NO.

(C) hit meM haimar nap .



SECTION A-A

NOTE :-

1. BEFORE DISPATCH TO SITE THE TAG NOS SHOULD BE PUNCHED AT THE STEEL TAG PLATE AS PER SHIPPING LIST.

1-PAR	2-PAR	3-PAR	STANDARD ELEMENT
YELLOW + RED	YELLOW/BROWN + RED/BROWN	YELLOW/BLACK + RED/BLACK	ANSI
RED + GREEN	RED/WHITE + GREEN/WHITE	RED/BLACK + GREEN/BLACK	DM
			MONI
			MONI

REFERENCE:- KUN 672.20

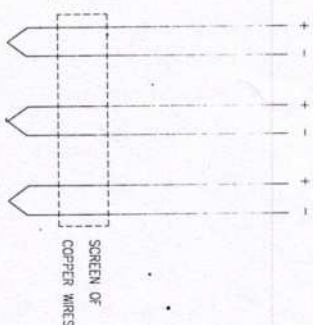
1. THERMOCOATING : THREE PARTS WELD FROM NICKEL-NI (NICKEL CHROMIUM NICKEL)-TYPE. CARE AS SHOWN IN DRAWING.
2. CALIBRATION OF NICKEL-NI WELDS : AS PER EN- ISO-96-94 PART-I AND TOLERANCE CLASS-1.
3. THE HOT INSULATIONS SHALL BE ELECTRICALLY INSULATED FROM METALLIC STEEL BY WICK OR BETTER INSULATION. THE INSULATION RESISTANCE BETWEEN THE TWO THERMOCOATING PARTS AS BETWEEN EACH THERMOCOATING WIRE AND METALLIC STEEL SHALL BE SHOWN AT ROOM TEMP. (20°C) AT 500 VOLT. AND RELATIVE HUMIDITY 45 TO 75%.
4. THE THERMOCOATING SHALL BE USED FOR WEARRESISTANT OF METAL TEMP. UP TO 200°C AND HEAT. ALL MATERIALS USED SHALL BE SUITABLE FOR THAT TEMPERATURE.
5. MATERIAL OF STEEL, WIRE & KNURLED CAP, COLD DRAWN STEEL, C20 AS PER IS 4855, NICKEL PLATED AND MATERIAL, CRIPPLE TO BE FURNISHED.
6. THE WIPER ALONE SHALL BE ABLE TO FREELY MOVE OVER THE SPRING. THE KNURLED CAP SHALL HAVE CLAMPING ARRANGEMENT WITH THE NIPPLE ON. BOTH SIDE AS SHOWN IN THE DRAWING. THE OTHER END OF THE KNURLED CAP SHALL BE SUITABLE FOR SCREWING ON THE SPRING AND THIS SHALL EXHAUST THE SPRING TO BE COMPRESSED FOR WORKING DEPTH OF 100.200MM AND ABOVE. THE THERMOCOATING SHALL BE MOUNTED WITH SPRING TENSION EQUAL TO 15.20 AND 25mm RESPECTIVELY.
7. TESTING OF THERMOCOATING SHALL BE DONE AS PER IS-7238 AND 3 COPIES OF TEST CERTIFICATE SHALL BE FURNISHED BY SUPPLIER.
8. TWO COPIES OF CALCULATION/KNICKING FULL DIMENSIONAL, AND TECH. DETAILS AND MATERIAL SPECIFICATION SHALL BE FURNISHED ALONGWITH QUOTATION BY BIDDER AND THREE COPIES OF SAME AFTER PLACEMENT OF PURCHASE ORDER.
9. BLANK STAINLESS STEEL TWO PLATES SHALL BE FASTENED WITH THE THERMOCOATING.
10. THE INSULATION OF THE INDIVIDUAL CABLE SHALL BE OF DIFFERENT COLOUR IN ORDER TO DISTINGUISH THE SIX TERMINALS AS SHOWN UNDER.
11. DATA SHEET TO BE SUBMITTED FOR APPROVAL, WITH THE OFFER.
12. THE MEANING OF SYMBOL ☐ WILL BE THAT 'SPECIAL CARE IS TO BE TAKEN FOR THESE DIMENSIONS DURING MANUFACTURING'.
- 13- RESPONSE TIME : 10 SEC OR BETTER.

MATERIAL CODE : W90313362017

STEAM TURBINE

[illegible]

A2 500 l./pa./A2 SIZE

[illegible]

SECTION A-A

1 PAIR	2 PAIR	3 PAIR	STANDARD ELEMENT
RED + GREEN	RED/WHITE + GREEN/WHITE	RED/BLACK + GREEN/BLACK	DIN
YELLOW + RED	YELLOW/BROWN + RED/BROWN	YELLOW/BLACK + RED/BLACK	ANSI
			NICHNI
			NICHNI

1. BEFORE DISPATCH TO SITE THE TAG NOS SHOULD BE PUNCHED AT THE STEEL TAG PLATE AS PER SHIPPING LIST.

11- DATA SHEET TO BE SUBMITTED FOR APPROVAL, WITH THE OTHER
12 THE MEANING OF SYMBOL ☐ WILL BE THAT "SPECIAL CARE IS
13 TO BE TAKEN FOR THESE DIMENSIONS DURING MANUFACTURING".
14- RESPONSE TIME : 10 SEC OR BETTER.

REF ID: A63103

1. THERMOELEMENT : THREE PARTS MADE FROM NICK-NI (NICKLE CHROMIUM NICKLE)-TYPE CABLE AS SHOWN IN DRAWING.

1. THERMOCOLLE: THREE PAGES MADE FROM NICKEL-NICKEL CHROMIUM NICKEL-K-TYPE CABLE AS SHOWN IN DRAWING.
2. CALIBRATION OF HIGH-TEMP. PER DS: AS PER DIN EN 584 PART-1 TOLERANCE CLASS-1.
3. THE HOT JOINTS SHALL BE ELECTRICALLY ISOLATED FROM METALLIC SHEATH BY WICA OR BETTER INSULATION. THE INSULATION RESISTANCE BETWEEN THE TWO THERMOELECTRIC PAGES AS BETWEEN COLD THERMOELECTRIC WIRE AND METALLIC SHEATH SHALL BE $>10\text{M}\Omega$ AT ROOM TEMP. (20°C) AT 500 VDC AND RELATIVE HUMIDITY 45 TO 75%.
4. THE THERMOELECTRIC SHALL BE USED FOR MEASUREMENT OF METAL TEMP. UP TO 2000°C AND HIGH-ALUMINUM USED SHALL BE SUITABLE FOR THAT TEMPERATURE.
5. MATERIAL OF SHEATH: NIPPEL & NIPPEL COLD COOL GRAIN STEEL C20 AS PER IS:4855.
6. NICKEL PLATED AND METALLIC CEMENT TO BE OVERSHED.
7. THE WIRE AND CABLE SHALL BE ABLE TO FREELY MOVE OVER THE SPRING. THE NIPPEL COLD CABLE SHALL HAVE CLAMPING ARRANGEMENT WITH THE NIPPEL COLD BOTH SITES AS SHOWN IN THE DRAWING. THE OTHER END OF THE NIPPEL COLD CABLE SHALL BE SUITABLE FOR SCREWING ON THE END OF THE 100.200MM AND ABOVE.
8. THE THERMOELECTRIC SHALL BE MOUNTED WITH SPRING LEVER OF 100.200MM AND ABOVE.
9. TESTING OF THERMOELECTRIC SHALL BE DONE AS PER IS:7554 AND 3 COPIES OF TEST CERTIFICATE SHALL BE FURNISHED BY NIPPEL.
10. TWO COPIES OF CATALOG/DRAWING INCLUDING TOLL DIMENSIONAL AND TECH. DETAILS AND MATERIAL SPECIFICATION SHALL BE FURNISHED ALONGWITH QUOTATION BY BIDDER AND THREE COPIES OF SAME AFTER PLACEMENT OF PURCHASE ORDER.
11. BLACK STAINLESS STEEL TUB PLAYSHELL BE FASTENED WITH THE THERMOELECTRIC.
12. THE INSULATION OF THE INDIVIDUAL CABLE SHALL BE OF DIFFERENT COLOURS IN ORDER TO DISTINGUISH THE SIX TERMINALS AS SHOWN UNDER

STEAM TURBINE

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DRAWING NO. 02099696020

p qama kooN p xopNo/FRST ANGLE PROJECTION

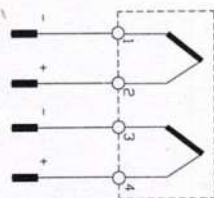
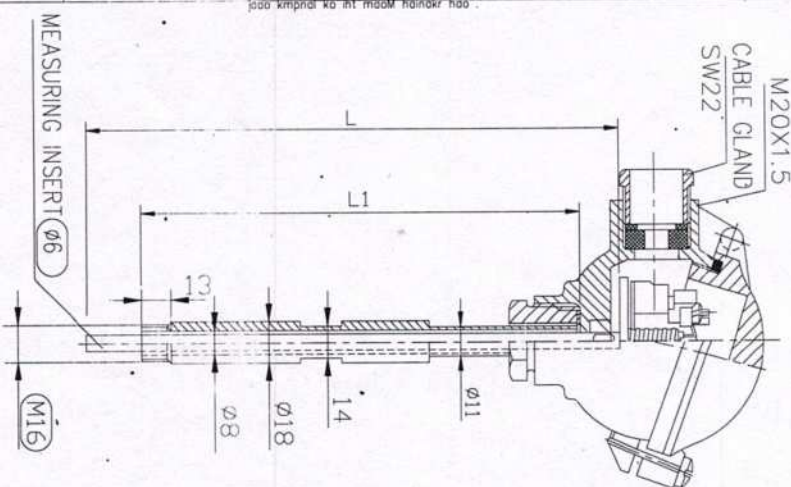
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sdbal ivomocel iMndidmtr moal hOM/ALL DIMENSIONS ARE IN

mm

p-p- Diji 38 (bal)/FORM 38 (B)

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TECHNICAL REQUIREMENTS:-

- 1- THERMOELEMENT : TWO PAIRS NiCr-Ni,
(ACCURACY CLASS 1 AS PER IEC 584 PART II)
- 2- HOT JUNCTION : UNGROUNDED
- 3- ELEMENT :-
Ø6, SPRING LOADED,
- 4- TERMINAL HEAD HINGED, SNAP CLOSURE / SLOT HEAD SCREW.
- 5- FOR OTHER DETAILS REF. TECH. SPEC:- ST-44008
- 6- DATA SHEET TO BE SUBMITTED FOR APPROVAL, WITH THE OFFER.
- 7- RESPONSE TIME : 10 SEC OR BETTER.

NOTE:-
THE MEANING OF SYMBOL WILL BE THAT *SPECIAL CARE IS TO BE TAKEN FOR THESE DIMENSIONS DURING MANUFACTURING*.

VAR NO.	DESCRIPTION OF THERMOCOUPLE	HOLDING PIPE LENGTH (L1)	MEASURING INSERT LENGTH (L)	B.H.E.L. SPEC. NO.	B.H.E.L. CODE NO
00	THERMOCOUPLE TYPE-A.L=465	446	465	ST44008	W90313369020
01	THERMOCOUPLE TYPE-B.L=525	476	525	ST44008	W90313369038
02	THERMOCOUPLE TYPE-C.L=465	386	465	ST44008	W90313369046
03	THERMOCOUPLE TYPE-A.L=555	376	555	ST44008	W90313369054
04	THERMOCOUPLE TYPE-A.L=519	446	519	ST44008	W90313369062
05	THERMOCOUPLE TYPE-B.L=635	476	635	ST44008	W90313369070
06	THERMOCOUPLE TYPE-B.L=525	306	525	ST44008	W90313369089
07	THERMOCOUPLE TYPE-B.L=525	316	525	ST44008	W90313369097
08	THERMOCOUPLE TYPE-A.L=655	380	655	ST44008	W90313369100
09	THERMOCOUPLE TYPE-A.L=655	401	655	ST44008	W90313369119
10	THERMOCOUPLE TYPE-B.L=525	382	525	ST44008	W90313369127
11	THERMOCOUPLE TYPE-B.L=525	394	525	ST44008	W90313369135
12	THERMOCOUPLE TYPE-A.L=465	353	465	ST44008	W90313369143

soamaga solcal sah/yoo INVENTORY NO.		histaxor Aor idnaMak/SIGN & DATE		sahMda-1 Aibakip sah/yoo REFERENCE DRG. NO.	
REV.	DATE	ALTERED CHECKED BY:-	Asd'yo ivomocel kO vogo- GRADE OF UNTOLERANCED DIMENSION ma'sahinaga ? eed230208 emro MACHINING - AA0230208 m		
REV.	DATE	ALTERED CHECKED BY:-	voodidmaga ? eed621104 ki Eoonoi bol WELDING-CLASS 'B' OF AA0621104 gootsa kimaga ? eed621101 ki soortnoi		
REV.	DATE	ALTERED CHECKED BY:-	sahMda-1 Aibakip sah/yoo GENERAL CHANGES AS PER C/A NO. STE-19-F0217.		
REV.	DATE	ALTERED CHECKED BY:-	sahMda-1 Aibakip sah/yoo VAR. NO. 12 NEW ADDED AND DRAWING SUPERSEDED AS PER C/A NO. STE-19-F0065.		
sahMda-1 Aibakip sah/yoo INVENTORY NO.		histaxor Aor idnaMak/SIGN & DATE		sahMda-1 Aibakip sah/yoo REFERENCE DRG. NO.	
REV.	DATE	ALTERED CHECKED BY:-	Asd'yo ivomocel kO vogo- GRADE OF UNTOLERANCED DIMENSION ma'sahinaga ? eed230208 emro MACHINING - AA0230208 m		
REV.	DATE	ALTERED CHECKED BY:-	voodidmaga ? eed621104 ki Eoonoi bol WELDING-CLASS 'B' OF AA0621104 gootsa kimaga ? eed621101 ki soortnoi		
REV.	DATE	ALTERED CHECKED BY:-	sahMda-1 Aibakip sah/yoo GENERAL CHANGES AS PER C/A NO. STE-19-F0217.		
REV.	DATE	ALTERED CHECKED BY:-	sahMda-1 Aibakip sah/yoo VAR. NO. 12 NEW ADDED AND DRAWING SUPERSEDED AS PER C/A NO. STE-19-F0065.		
sahMda-1 Aibakip sah/yoo INVENTORY NO.		histaxor Aor idnaMak/SIGN & DATE		sahMda-1 Aibakip sah/yoo REFERENCE DRG. NO.	
REV.	DATE	ALTERED CHECKED BY:-	Asd'yo ivomocel kO vogo- GRADE OF UNTOLERANCED DIMENSION ma'sahinaga ? eed230208 emro MACHINING - AA0230208 m		
REV.	DATE	ALTERED CHECKED BY:-	voodidmaga ? eed621104 ki Eoonoi bol WELDING-CLASS 'B' OF AA0621104 gootsa kimaga ? eed621101 ki soortnoi		
REV.	DATE	ALTERED CHECKED BY:-	sahMda-1 Aibakip sah/yoo GENERAL CHANGES AS PER C/A NO. STE-19-F0217.		
REV.	DATE	ALTERED CHECKED BY:-	sahMda-1 Aibakip sah/yoo VAR. NO. 12 NEW ADDED AND DRAWING SUPERSEDED AS PER C/A NO. STE-19-F0065.		

A3 soc/la/A3 SIZE

02099474313

02099474313

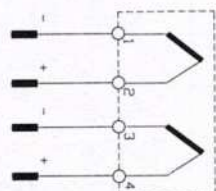
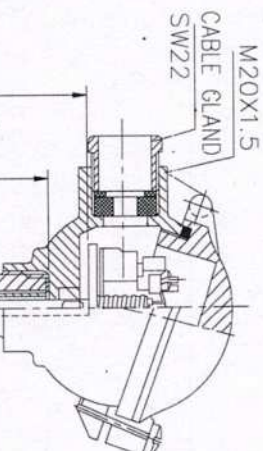
DOC REV NO.: 3

STEAM TURBINE

STEAM TURBINE

STEAM TURBINE

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- NOTE:—
THE MEANING OF SYMBOL  WILL BE THAT 'SPECIAL CARE IS TO BE TAKEN FOR THESE DIMENSIONS DURING MANUFACTURING'.
- 1- THERMELEMENT : TWO PAIRS NICR-NI.
(ACCURACY CLASS 1 AS PER IEC 584 PART II)
- 2- HOT JUNCTION : UNGROUNDED
- 3- ELEMENT :- $\phi 6$, SPRING LOADED,
- 4- TERMINAL HEAD HINGED, SNAP CLOSURE / SLOT HEAD SCREW.
- 5- FOR OTHER DETAILS REF. TECH. SPEC:- ST-44008
- 6- DATA SHEET TO BE SUBMITTED FOR APPROVAL, WITH THE DIFFER.
- 7- BARE RESPONSE TIME : 10 SEC OR BETTER.

VAR NO.	DESCRIPTION OF THERMOCOUPLE	HOLDING PIPE	MEASURING INSERT	B.H.E.L. SPEC NO	B.H.E.L. CODE NO
00	THERMOCOUPLE TYPE-D.L=465	446	465	ST44008	W90313374015
01	THERMOCOUPLE TYPE-D.L=465	386	465	ST44008	W90313374023
02	THERMOCOUPLE TYPE-D.L=465	286	465	ST44008	W90313374031
03	THERMOCOUPLE TYPE-D.L=560	386	560	ST44008	W90313374040

STEAM TURBINE

saomaga1 saolca sam#yoo INVENTORY NO.		hstaxar AoOr idnaMak/SIGN & DATE		saomaga-1 Aibokp sam#yoo REFERENCE DRG. NO.	
REV.	DATE	ALTD. BY	B. LAL	REV.	DATE
03	27/12/16CHD	ASRIVASTAVA		02	05/12/15
DIMENSION CHANGED FROM $\phi 14$ TO $\phi 11$ TECH. REQ. 7 ADDED. CAF NO. STE-16-F0397			VAR 03 THERMOCOUPLE TYPE-D L=560, L1=386 ADDED CAF NO. STE-15-F0402		
DIMENSION CHANGED FROM $\phi 14$ TO $\phi 11$ TECH. REQ. 7 ADDED. CAF NO. STE-16-F0397			VAR 02 THERMOCOUPLE TYPE-D L=465, L1=286 ADDED CAF NO. STE-13-F0092		
ASO YAO INOMAGAGOM KA VOGO- GRADE OF UNTOLERANCED DIMENSION masolmagaga ? eod230208 emro MACHINING - AA0230208 m WELDING-CLASS 'B' OF AA0621104 godoa kimaga ? eod621101 ki soornai					
REV. DATE 01 05/12/15 02 05/12/15 03 05/12/15		B. LAL G. GUPTA KUT/COD/011		STEAM TURBINE BHARAT HEAVY ELECTRICALS LIMITED RANIPUR, HARDWAR MOOP/SCALE N.T.S	
KUT CARD CODE 31337466020		KUT CARD CODE 31337466020		KUT CARD CODE 31337466020	

A3 sool/ja/A3 SIZE

svaʔvaalQakar evaM gaooɲaɲo
[sa p'looK mooM di ga]- soUcnaa Baart
naal [laolOT/ksa ilaɲaToD kl sampiKa ho
[saka p'ɣaxa yaa Ap'ɣaxa \$p moaM
ksal Bal trɪ p'ɣaaga naɪhM ikyaa jaɛ
jaɛ kɪmpnaɪ ka ɪnt moaM naɪnaɪkɪ hɪɔ.



TECH. REQUIREMENTS: —

11. THE FLANGE SHALL BE PROPERLY LASER WELDED WITH THE THERMOCOUPLE SHEATH TO GIVE RIGID JOINT. THE FLANGE WITH SEATH UP TO APPROX 120 mm WILL BE FIXED INSIDE THE METAL FOR METAL TEMP MEASUREMENT AND THE SEATH WILL PASS THROUGH STEAM AT 565°C AND 40 Kg/cm² PRESSURE.
- 12-TESTS:-
- (a) CALIBARATION : AS PER IEC-584 PART-I
- (b) LEAK TIGHTNESS : SHOULD BE TESTED AT 40Kg/cm² .
- (c) INSULATION RESISTANCE : >1000 M OHM .AT ROOM TEMP.(20°C)
- BELOW ELEMENT WIRE > 10 M OHM AT 600 C AT 500 VDC AND SHEATH.
- 13- RESPONSE TIME : 10 SEC OR BETTER.

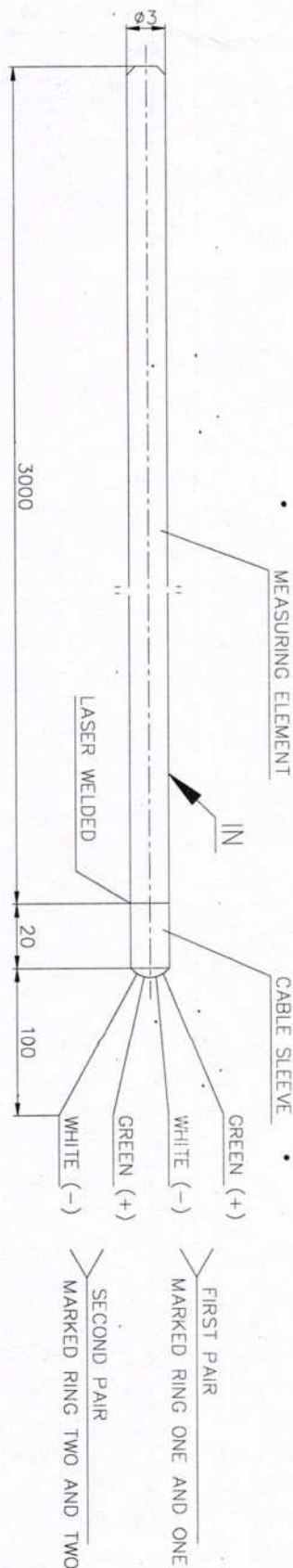
IDENTIFICATION ACCORDING TO HW400397 AT THE PLACE MARKED WITH IN
MANUFACTURER'S IDENTIFICATION/DETAILS FOR THE MATERIAL SHOULD BE
PERMANENTLY MARKED UP.

MATERIAL CODE-W97313372051

A3 soil [g./A3 SIZE]

svaʔvaalQakar evaM gaapnalya
 [sa p'laak maom di ga]- salucanaa Baart
 haval [looiOT/kisa haanaTo di ki sampika hO
 . [saka p'lyaxa yaa Ap'lyaxa \$p maom
 iksal Bal trh p'yagaa nahim ikyaa jaee
 laaa kmpnai'ka int.maom hainakr haa .

31337266110 NO. 337266110



1- MEASURING ELEMENT	:	2XNiC-Ni, DIN EN 60584-1
2- SHELL-MATERIAL	:	INCONEL, 2.4816(V4A)
3- TYPE	:	TC-K-3X3000
4- TOLERANCE	:	CLASS 1 (DIN 43722)
5- THERMOELECTRIC VOLTAGE	:	($\pm 1.5K$)
TOLERANCE		
6- CONNECTION WIRE	:	FLEXIBLE, 0.22mm ² , TEFLON
7- MATERIAL OF DISK	:	1.4571

8- O.D. : 3 MM
9- INSULATION : MGO
10-THERMOCOUPLE HOT : UNGROUNDE ie MEASURING
JUNCTION : JUNCTION INSULATED FROM SHEATH

11-TESTS :-

(c) CALIBRATION

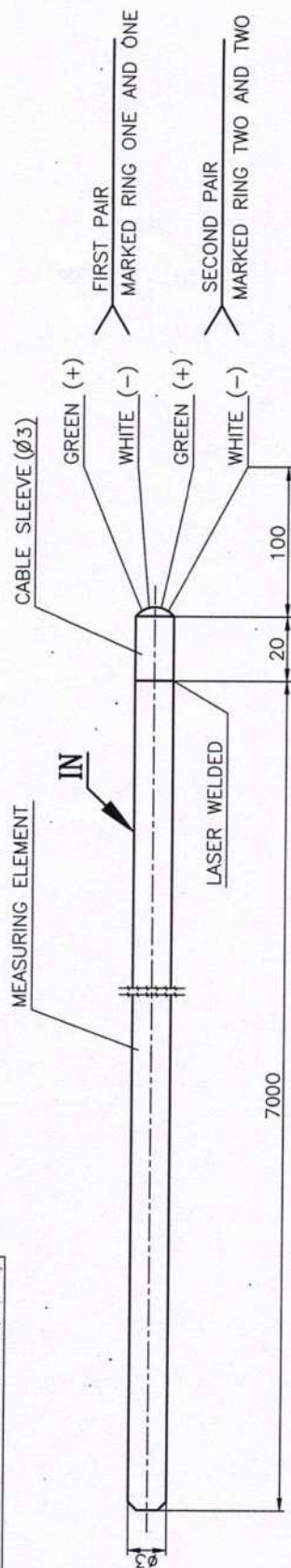
(5) LEAK TIGHTNESS : SHOULD BE TESTED AT 40kg/cm²

(c) INSULATION RESISTANCE : $> 1000 \text{ M OHM AT ROOM TEMP. } (20^\circ \text{C})$
BETWEEN ELEMENT WIRE $> 10 \text{ M OHM AT } 600^\circ \text{C AT } 500 \text{ VDC}$
AND SHEATH.

12- RESPONSE TIME : 10SEC OR BETTER

MATERIAL CODE--W97313372060

[illegible]A3 sof.jp/A3 SIZE



TECH. REQUIREMENTS: -

- | | | | |
|----|------------------------|---|---------------------------------------|
| 1- | MEASURING ELEMENT | : | 2xNiCr-Ni, DIN EN 60584-1 |
| 2- | SHELL-MATERIAL | : | INCONEL, 2.4816(V4A) |
| 3- | TYPE | : | TC-K-2X7000 |
| 4- | TOLERANCE | : | CLASS 1 (DIN 43722) |
| 5- | THERMOELECTRIC VOLTAGE | : | ($\pm 1.5K$) |
| | TOLERANCE | | |
| 6- | CONNECTION WIRE | : | FLEXSIBLE, 0.22mm ² TEFLON |

- 7- O.D. : 3 MM
8- INSULATION : MGO
9-THERMOCOUPLE HOT JUNCTION : UNGROUNDED ie MEASURING JUNCTION INSULATED FROM SHEATH.

- 10-TESTs :-
- (a) CALIBRATION : AS PER IEC-584 PART-I
- (b) LEAK TIGHTNESS : SHOULD BE TESTED AT 40Kg/Cm2
- (c) INSULATION RESISTANCE : >1000 M OHM AT ROOM TEMPERATURE
BETWEEN ELEMENT WIRE > 10 M OHM AT 600 C AT 50% HUMIDITY
AND SHEATH.

MATERIAL CODE-W97313373023

[illegible]

1. THERMOELEMENT : THREE PAIRS MADE FROM NiCr-Ni (NICKEL CHROMIUM NICKEL)-TYPE CABLE AS SHOWN IN DRAWING.

2. CALIBRATION OF NiCr-Ni WRES. : AS PER DIN EC-584 PART-I AND TOLERANCE CLASS-1.

3. THE HOT JUNCTIONS SHALL BE ELECTRICALLY INSULATED FROM METALLIC SLEEVE BY MOCA OR BETTER INSULATION. THE INSULATION RESISTANCE BETWEEN THE TWO THERMOELEMENT PAIRS AS BETWEEN EACH THERMOELEMENT WIRE AND METALLIC SLEEVE SHALL BE >10M AT ROOM TEMP. (20°C) AT 500 V.D.C. AND RELATIVE HUMIDITY 45 TO 75%.

4. THE THERMOCOUPLE SHALL BE USED FOR MEASUREMENT OF METAL TEMP. UP TO 200°C AND HENCE ALL MATERIALS USED SHALL BE SUITABLE FOR THAT TEMPERATURE.

5. MATERIAL OF SLEEVE, NIPPLE & KNURLED CAP: COLD DRAWN STEEL C20 AS PER IS:4855, NICKEL PLATED AND MATERIAL CERTIFICATE TO BE FURNISHED.

6. THE NIPPLE ALONE SHALL BE ABLE TO FREELY MOVE OVER THE SPRING THE KNURLED CAP SHALL HAVE CLAMPING ARRANGEMENT WITH THE NIPPLE ON BOTH SIDE AS SHOWN IN THE DRAWING. THE OTHER END OF THE KNURLED CAP SHALL BE SUITABLE FOR SCREWING ON SPRING. THE SPRING AND THUS SHALL ENABLE THE SPRING TO BE COMPRESSED FOR MOUNTING DEPTH OF 100, 200MM AND ABOVE. THE THERMOCOUPLE SHALL BE MOUNTED WITH SPRING TENSION EQUAL TO 15.20 AND 25mm RESPECTIVELY.

7. TESTING OF THERMOCOUPLE SHALL BE DONE AS PER IS:3750 AND 3 COPIES OF TEST CERTIFICATE SHALL BE FURNISHED BY SUPPLIER.

8. TWO COPIES OF CATALOG/DRAWING INDICATING FULL DIMENSIONAL AND TECH. DETAILS AND MATERIAL SPECIFICATION SHALL BE FURNISHED ALONGWITH QUOTATION BY BIDDER AND THREE COPIES OF SAME AFTER PLACEMENT OF PURCHASE ORDER.

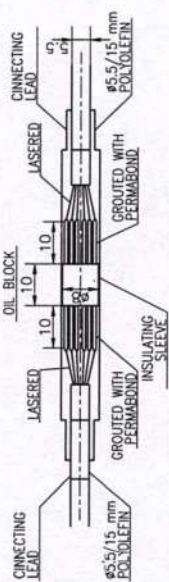
9. BLANK STAINLESS STEEL TAG PLATE SHALL BE FASTENED WITH THE THERMOCOUPLE.

10. THE INSULATION OF THE INDIVIDUAL CABLE SHALL BE OF DIFFERENT COLOUR IN ORDER TO DISTINGUISH THE SIX TERMINALS AS SHOWN UNDER.

11. DATA SHEET TO BE SUBMITTED FOR APPROVAL, WITH THE OFFER.

12. THE MEANING OF SYMBOL WILL BE THAT "SPECIAL CARE IS TO BE TAKEN FOR THESE DIMENSIONS DURING MANUFACTURING".

RESPONSE TIME : 10 SEC. OR BETTER.



NOTE :-

1. LASERED ONE-SIDED, GROUTED DIRECTLY BY A BLOW DRYER WITH PERMABOND
2. PIPE LASERED, GROUTED AND PRESSED AT BLOCK

1 PAIR	2 PAIR	3 PAIR	STANDARD	ELEMENT
YELLOW + RED	YELLOW/BROWN + RED/BROWN	YELLOW/BLACK + RED/BLACK	ANSI	NC/NC
RED + GREEN	RED/WHITE + GREEN/WHITE	RED/BLACK + GREEN/BLACK	DIN	NC/NC

NOTE :—

1. BEFORE DISPATCH TO SITE THE TAG NOS SHOULD BE PUNCHED AT THE STEEL TAG PLATE AS PER SHIPPING LIST.

MAT CODE FOR THERMOCOUPLE				
VAR.	L1	L2	L3	MAT CODE
04	2500	1000	300	99013362076
03	2500	1000	200	99013362068
02	4000	1000	308	99013362050
01	4000	1000	400	99013362041
00	3500	5000	400	99013362021

TYPE OF PRODUCT STEAM TURBINE

NAME OF CUSTOMER/ PROJECT

[illegible]

TRANSMITTERS
IPT REAR BEARING.

SIZE	A2
1	10
2	20
3	30
4	40
5	50
6	60
7	70
8	80
9	90
10	100
11	110
12	120
13	130
14	140
15	150
16	160
17	170
18	180
19	190
20	200
21	210
22	220
23	230
24	240
25	250
26	260
27	270
28	280
29	290
30	300
31	310
32	320
33	330
34	340
35	350
36	360
37	370
38	380
39	390
40	400
41	410
42	420
43	430
44	440
45	450
46	460
47	470
48	480
49	490
50	500
51	510
52	520
53	530
54	540
55	550
56	560
57	570
58	580
59	590
60	600
61	610
62	620
63	630
64	640
65	650
66	660
67	670
68	680
69	690
70	700
71	710
72	720
73	730
74	740
75	750
76	760
77	770
78	780
79	790
80	800
81	810
82	820
83	830
84	840
85	850
86	860
87	870
88	880
89	890
90	900
91	910
92	920
93	930
94	940
95	950
96	960
97	970
98	980
99	990
100	1000

SIZE	A2
1	10
2	20
3	30
4	40
5	50
6	60
7	70
8	80
9	90
10	100
11	110
12	120
13	130
14	140
15	150
16	160
17	170
18	180
19	190
20	200
21	210
22	220
23	230
24	240
25	250
26	260
27	270
28	280
29	290
30	300
31	310
32	320
33	330
34	340
35	350
36	360
37	370
38	380
39	390
40	400
41	410
42	420
43	430
44	440
45	450
46	460
47	470
48	480
49	490
50	500
51	510
52	520
53	530
54	540
55	550
56	560
57	570
58	580
59	590
60	600
61	610
62	620
63	630
64	640
65	650
66	660
67	670
68	680
69	690
70	700
71	710
72	720
73	730
74	740
75	750
76	760
77	770
78	780
79	790
80	800
81	810
82	820
83	830
84	840
85	850
86	860
87	870
88	880
89	890
90	900
91	910
92	920
93	930
94	940
95	950
96	960
97	970
98	980
99	990
100	1000

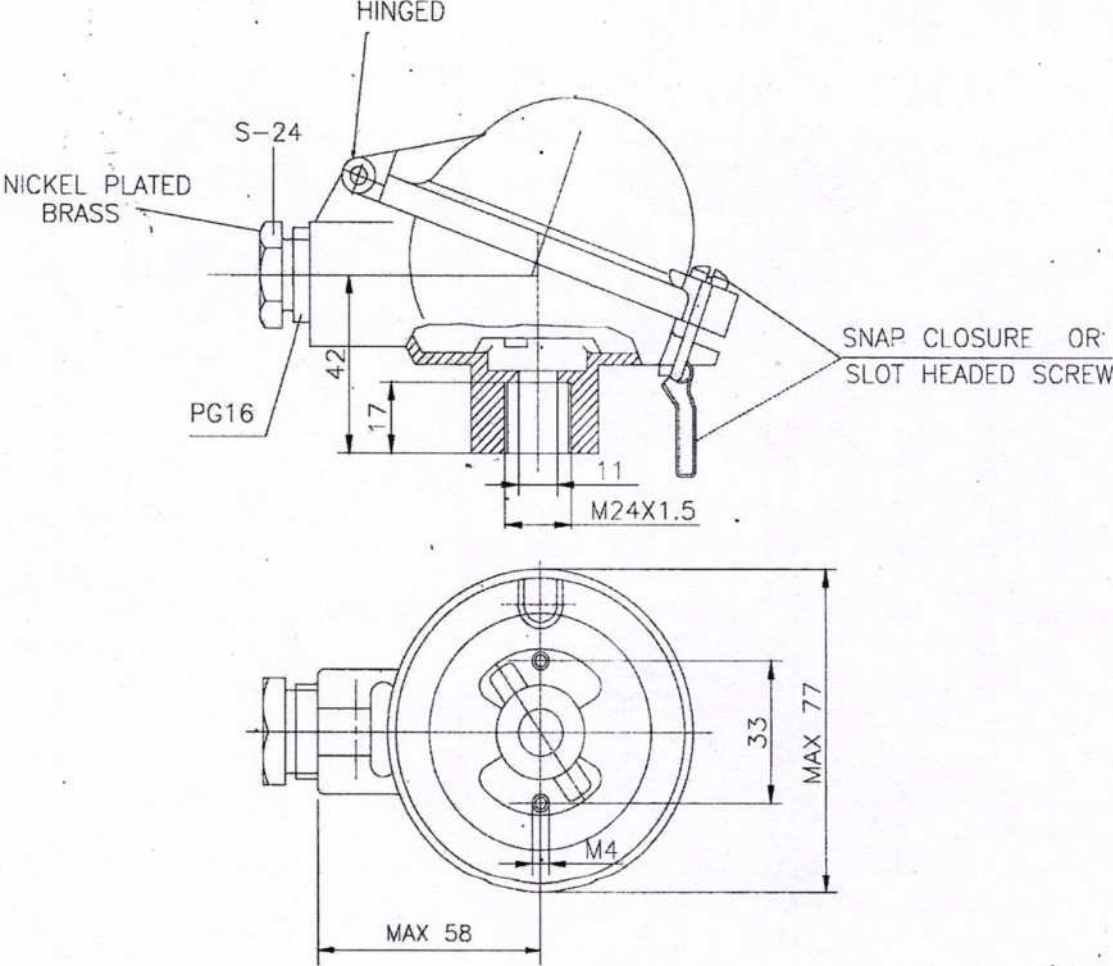
SIGNATURE SIGN & DATE		उत्पाद मानक (हीप : हरिद्वार) PRODUCT STANDARD (HEEP: HARIDWAR)		ST44006 पृष्ठ 10 का 02 Page 02 of 10	
SUPERSEDES INVENTORY भारतीय सूची संख्या से अपडेटिंग कराई	3.2.1 Terminal Blocks : The ceramic terminal block shall be fixed inside the terminal head with the help of spring loaded fixing screws. With the help of spring loaded fixing screws the tip of the protecting sheath shall be pressed to the thermowell in the assembled form of the thermocouple. Metallic parts shall be corrosion resistant. The two terminals of a pair of elements shall be distinguished by suitable marking (+ve) and (-ve) and the two pairs by symbol A & B or 1 & 2 on the terminal block.				
COPYRIGHT AND CONFIDENTIAL The information on this document 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.	3.2.2 Thermocouple and Protecting Sheath : The thermocouple pairs shall be of nickel chromium – nickel (NiCr-Ni, commercially known as chromel-alumel) and temperature voltage characteristics shall conform to Type-K DIN-IEC-584 Part I or IS 2054. The protecting sheath shall be solidly held, the distance between measuring junction of the element and inner side of the innermost protecting sheath shall not exceed 5 mm. Leak tightness of the measuring junction shall withstand 40 Kg/cm² of N₂ test pressure.				
स्वसाक्षिकार एवं संपत्तीय इस दस्तावेज से दी गई सूचना भारत हीवी एलिक्ट्रिकल लिमिटेड की संपत्ति है। इसका प्रयोग केवल भारत हीवी एलिक्ट्रिकल लिमिटेड के ही उपयोग के लिए ही किया जा सकता है।	3.2.3 Insulation : The thermoelements shall be embedded in highly compacted magnesium oxide insulation which shall be sealed at cold end of protecting sheath against humidity with the help of appropriate material. The element including measuring junction shall be electrically insulated from the protecting sheath. The insulation resistance between each thermoelement wire and protective sheath shall be > 10 Mega Ohm at room temp. at 500 V.D.C. as per DIN 43763.				
SIGNATURE SIGN & DATE	3.3 Terminal Head (Fig.3) : The terminal head shall be of die cast Al or light metal alloy. It shall have hinged cap or threaded cap and snap closure or secured by slot headed screw, with protection class IP-65. It shall match to the measuring insert. For compensating cable, Nickel Plated Brass Cable gland shall be provided of PG-16 for two pairs of compensating cable of outer dia 8 mm.				
भारतीय सूची संख्या INVENTORY NO.	REV. NO. 06		निर्माणकर्ता WORKED BY	B. L. RAM	Brijlal 18/09/17
			जांचकर्ता CHECKED BY	SHEETAL SINGH	Sheetal 18/09/17

Revision Number SIGN & DATE		उत्पाद मानक (हीप : हरिद्वार) PRODUCT STANDARD (HEEP: HARIDWAR)		ST44006 पृष्ठ 10 का 03 Page 03 of 10	
SUPERSEDES INVENTORY भारतीय भारी भारी अधिकारियों	4. IDENTIFICATION TAG: In addition to the instrument name plate one separate stainless steel Blank tag (20X60) mm shall be fastened with the thermocouple. 5. INSPECTION: The supplier shall provide, if desired by the purchaser, all facilities to the purchase's inspector or its authorized representative to witness the interstage and final tests.				
COPYRIGHT AND CONFIDENTIAL The information on this document 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	6. TEST CERTIFICATE: All the thermocouples will be tested by the supplier for the following tests and test certificates shall be furnished along with the supply. 6.1 Test for Thermocouple (As per IS-7358): 6.1.1 <u>Insulation Resistance Test :</u> The insulation resistance between the two pairs as well as with thermoelement wire and protecting sheath shall be > 10 Mega Ohm at 20°C room temperature at 500 V.D.C. 6.1.2 <u>Calibration Test :</u> The temp. voltage characteristic shall conform to Type-K as per IS-2054 or DIN IEC-584 Part I and Tolerance class-1 IEC-584 Part-2. 6.1.3 <u>Measuring Junction Leak Tightness Test :</u> At 40 Kg/cm² by N₂ at room temperature for duration of one minute. 6.1.4 <u>Dimensional checkup :</u>				
स्वामित्व और गोपनीय यह दस्तावेज भारतीय भारी भारी लिमिटेड की संपत्ति है। इसका उपयोग केवल उद्देश्य के लिए ही किया जाना चाहिए। इस दस्तावेज को किसी भी रूप में प्रसारित नहीं किया जाना चाहिए।	6.2 Type test certificate: 6.2.1 Type Test Certificate for Protection class of Terminal Head as per clause 3.3. 6.2.2 Bare response time : 10 sec or better.				
Revision Number SIGN & DATE	6.3 Material Certificate: Material Certificate of extension pipe and thermowell to be furnished. 6.4 Tests for Thermowell : 6.4.1 Hydraulic testing of thermowell will be carried out with inside pressure of 300 Kg/cm² for a duration of three minute at room temperature. 6.4.2 Dimensional checkup :				
भारतीय भारी भारी INVENTORY NO.	REV. NO. 06		निर्माणकर्ता WORKED BY	B. L. RAM	Brij Lal 18/09/17
भारतीय भारी भारी INVENTORY NO.			जांचकर्ता CHECKED BY	SHEETAL SINGH	Sheetal 18/09/17

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक (हीप : हरिद्वार) PRODUCT STANDARD (HEEP: HARIDWAR)		ST44006 पृष्ठ 10 का 04 Page 04 of 10	
सुपरसेड्स INVENTORY	7. GUARANTEE CERTIFICATE: A guarantee certificate for trouble free performance for 24 months from the date of shipment or 12 months from the date of commissioning whichever is earlier shall be furnished. 8. DOCUMENTS: The supplier shall furnish three copies of drawings and catalogues indicating sectional and dimensional details within full technical particulars with the offer. The manufacturing of thermocouples shall be as per the drawing approved by the purchaser. Thermocouple data sheet to be submitted by the bidder along with the offer for approval.				
सार्वजनिक सूचना COPYRIGHT AND CONFIDENTIAL The information on this document 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.	9. PACKING: 9.1 GENERAL:- The thermocouple shall be supplied in assembled form. If mentioned in the enquiry, the packing shall be seaworthy. 9.2 Complete thermocouple should be wrapped or placed inside suitable foam sheet. Adequate silica gel packets to be placed inside this foam sheet wrapping. 9.3 After this complete thermocouple alongwith foam sheet shall be bubble wrapped and sealed with packing tape. 9.4 After this packed thermocouple to be placed in a cardboard carton which shall be filled with woodwool/ scrap paper to ensure that there is no movement of the item inside this box during transit. 9.5 All such cartons to be placed inside a wooden box which must be water proof by using bitumen paper/ plastic sheet/ polythene. 9.6 These wooden box should have multiple steel straps around the box in such a way so that there is no risk of movement of inner items during transit. 9.7 All the above to be ensured before final dispatch of shipment.				
स्वतंत्रता एवं गोपनीयता पर नोट: इस दस्तावेज़ में दी गई सूचना भारत भारती एलेक्ट्रिकल्स लिमिटेड की संपत्ति है। इसका प्रयोग केवल भारत भारती एलेक्ट्रिकल्स लिमिटेड के लिए ही किया जा सकता है। अन्य किसी भी उद्देश्य के लिए इसका प्रयोग करना गैर कानूनी है।					
दिनांक एवं हस्ताक्षर SIGN & DATE					
सार्वजनिक सूचना INVENTORY NO.	REV. NO. 06		निर्माणकर्ता WORKED BY	B. L. RAM	 18/09/17
			जांचकर्ता CHECKED BY	SHEETAL SINGH	 18/09/17

निम्न एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक (हीप : हरिद्वार) PRODUCT STANDARD (HEEP: HARIDWAR)	ST44006					
SUPERSEDES- INVENTORY	पृष्ठ 10 का 05 Page 05 of 10							
सामग्री पूर्ण संख्या के अतिरिक्त बरत है	10. SPARES: The suppliers shall enclose a list of spares required for 5 years normal operation and quote for the same separately.							
TABLE-1 (All dimensions are in mm)								
Thermocouple type		Dimensions (Fig. 1)				Dim. of Fig. 2 L4	Material of Thermowell	Size no.
		d1 0.000 -0.021	L1	L2	L3			
D1	24	140	50	65	315	*10CrMO910	001	
						**13CrMo44	002	
D2	24	200	50	125	375	*10CrMO910	003	
						**13CrMo44	004	
D3	24	200	110	65	375	*10CrMO910	005	
						**13CrMo44	006	
D4	24	260	110	125	435	*10CrMO910	007	
						**13CrMo44	008	
*10CrMO910 as per DIN 17175 or ASTM-A182, Grade F22 or equivalent.								
**13CrMo44 as per DIN 17175 or ASTM-A182- Grade-F 12 or BS 1501-620 Grade-B or equivalent.								
11. NAME PLATE: Manufacturer's name or trademark, type of thermocouple, BHEL standard no. must be mentioned on the name plate.								
12. CROSS REFERRED STANDARD: DIN-43735; IEC-584, IS-2054, DIN-43763 Part 1, 2.								
निम्न एवं हस्ताक्षर SIGN & DATE	स्वसाक्षिकार एवं गोपनीय यह प्रवेश से ही यह प्रमाण प्राप्त है कि उपरोक्त विवरणों की सत्यता है प्रमाण प्रमाण एवं वास्तविक रूप में किसी भी त्रुटि प्रमाण, जो कि कंपनी के लिए से हानिकारक हो न कि प्रमाण							
सामग्री पूर्ण संख्या INVENTORY NO.	REV. NO. 06							
निर्माणकर्ता WORKED BY	B. L. RAM		Brij Lal		18/09/17			
जांचकर्ता CHECKED BY	SHEETAL SINGH		Sheetal		18/09/17			

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक (हीप : हरिद्वार) PRODUCT STANDARD (HEEP: HARIDWAR)		ST.44006 पृष्ठ 10 का 06 Page 06 of 10	
SUPERSEDES INVENTORY	TERMINAL HEAD REF. FIG.3				
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स्वसाक्षिकार एवं गोपनीय यह दस्तावेज मेरी/हमारे द्वारा तैयार किया गया है और इसमें कोई भी त्रुटि या गलती मेरी/हमारे द्वारा ही होगी। मैं/हम इस दस्तावेज की सत्यता और शुद्धता का उत्तरदायी हूँ/हमें।	THERMOCOUPLE FIG.1				
दिनांक एवं हस्ताक्षर SIGN & DATE	REV. NO. 06				
INVENTORY NO. P-579D	REV. NO. 06	निर्माणकर्ता WORKED BY B. L. RAM	जांचकर्ता CHECKED BY SHEETAL SINGH	Original 18/09/17	Sheetal 18/09/17

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक (हीप : हरिद्वार) PRODUCT STANDARD (HEEP: HARIDWAR)		ST44006 पृष्ठ 10 का 08 Page 08 of 10	
निर्यात सूची संख्या को अधिकृतित करता है	SUPERSEDES INVENTORY				
COPYRIGHT AND CONFIDENTIAL The information on this document 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.	स्वामित्व अधिकार एवं गोपनीय इस दस्तावेज में दी गई जानकारी भारत भारती एलेक्ट्रिकल लिमिटेड की संपत्ति है। इसका प्रयोग एवं प्रसारण अन्य किसी भी व्यक्ति को किए बिना भारत भारती एलेक्ट्रिकल लिमिटेड की अनुमति के बिना नहीं किया जा सकता।	PLUG AND SOCKET CONNECTOR (WHEREVER APPLICABLE) SHALL BE OF ALLIED/AMPHETRONIK MAKE			
दिनांक एवं हस्ताक्षर SIGN & DATE	TERMINAL HEAD FIG. 3				
निर्यात सूची संख्या INVENTORY NO.	REV. NO. 06	निर्माणकर्ता WORKED BY	B. L. RAM	Brijlal	30/09/17
निर्यात सूची संख्या INVENTORY NO.	REV. NO. 06	जांचकर्ता CHECKED BY	SHEETAL SINGH	Sheetal	18/09/17

ST44006

पृष्ठ 10 का 09
Page 09 of 10

**SUPERSEDES
INVENTORY**

-सामग्री भूखी संख्या को
. अधिकारमिति करला है

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इस पक्ष में ही गई मुक्ता भाट है। एमेडियलस डिस्टेड की सम्यति है इसका प्रत्यक्ष स्तुति है। यह प्रमाण है कि कल्पनी के लिए है समिकारक हो न किया जाय।

SIGN & DATE

INVENTORY NO.

REV.
NO. 06

निर्माणकर्ता
WORKED BY

B. L. RAM

Brij Lal

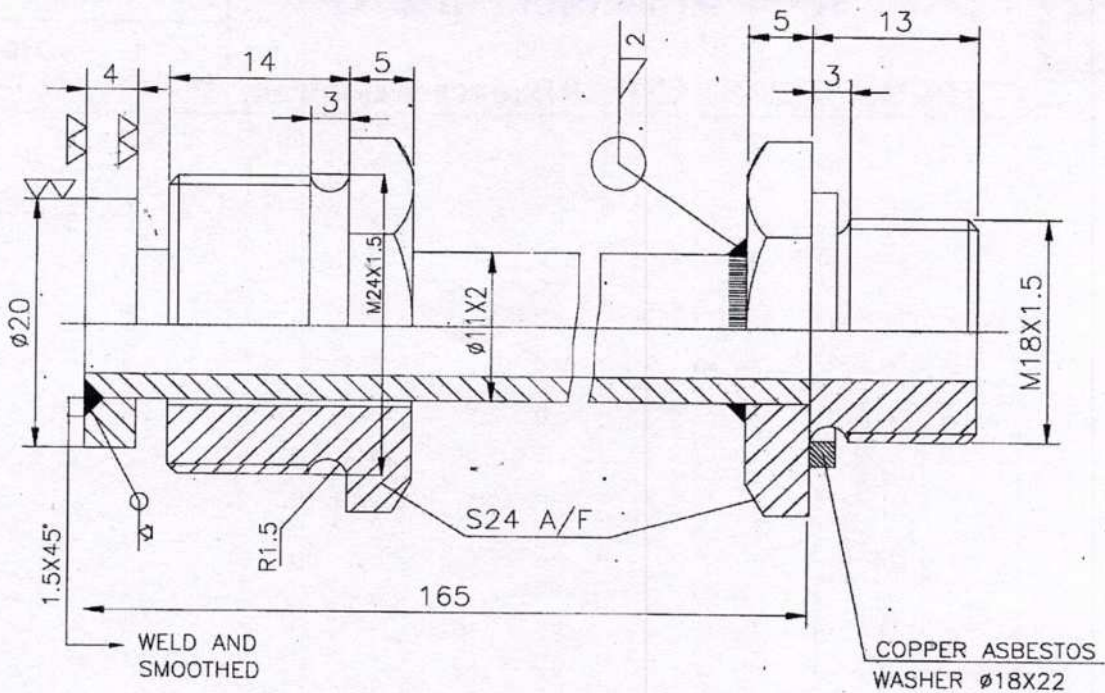
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जांचकर्ता
CHECKED BY

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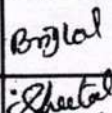
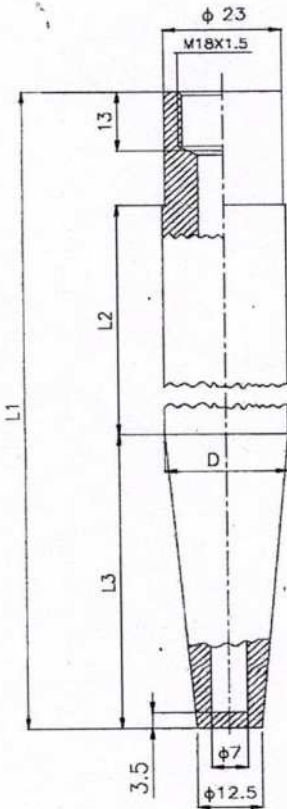
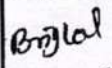
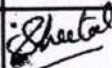
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MATERIAL OF ALL PARTS: STAINLESS STEEL OR EQUIVALENT

EXTENSION PIPE (DIN-43763)

FIG. 4.

Review of document SIGN & DATE 		उत्पाद मानक (हीप : हरिद्वार) PRODUCT STANDARD (HEEP: HARIDWAR)		ST44006	
				पृष्ठ 10 का 10 Page 10 of 10	
SUPERSEDES INVENTORY वापसी पूरी होने पर अधिकारि स्वतः	SURFACE FINISH $\sqrt{3.2}$ ALL OVER (R_a VALUE)				
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TECHNICAL REQ. 1. MATERIAL: AS PER TABLE-1					
					
THERMOWELL FIG.5					
वापसी पूरी होने पर INVENTORY NO. P-5192	REV. NO. 06		निर्माणकर्ता WORKED BY B. L. RAM		18/09/17
			जांचकर्ता CHECKED BY SHEETAL SINGH		18/09/17

दिनांक एवं हस्ताक्षर SIGN & DATE SUPERSEDES INVENTORY NO. भारती सूची संख्या को अतिरिक्त करना है		उत्पाद मानक (हीप : हरिद्वार) PRODUCT STANDARD (HEEP: HARIDWAR)		ST44008 पृष्ठ 10 का 01 Page 01 of 10														
		(OWN EXPERIENCE) DUPLEX TYPE NICKEL CHROMIUM-NICKEL THERMOCOUPLE FOR METAL TEMPERATURE MEASUREMENT AT ONE DEPTH																
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. SCOPE : This specification covers the requirements of Duplex type ungrounded (measuring junction electrically insulated) nickel chromium-nickel thermocouples comprising of spring loaded measuring insert for metal temperature measurement in the continuous maximum range of 0-700°C. With the help of matching thermowell the thermocouple of type B be can also used for fluid temperature measurement in special application.																	
	2. DESIGNATION : A thermocouple of type A with folding pipe length and measuring insert length equal to 386 and 405 mm respectively (ref. table – 1) shall be designated as : 2.1 On drawing – i) Drg. Col : ST 44008.001 ii) Description Col: Thermocouple Type-A, L=405. 2.2 For placing indents on-purchase : Thermocouple type A, L=405, ST 44008.001																	
स्वतंत्राधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत भारती एल.ई.सी. लिमिटेड की संपत्ति है। इसका प्रयोग एवं प्रकाशन अन्य से किसी भी रूप में प्रयोग और कि इसकी को हित में हानिकारक हो न सके।	3. TECHNICAL REQUIREMENT : 3.1 General : The thermocouple (Fig.1&2) shall be suitable for operation in humid, dusty and tropical climate. The thermocouple assembly, dimensions, component parts and material shall be as shown in various figures and tables. The component parts shall match to each other. The component parts of similar size shall be interchangeable in various thermocouple assemblies. 3.2 Measuring Inserts (Fig-3) : It shall be as per DIN 43735 and shall consists of two thermoelement pairs, insulated from each other, ungrounded i.e. measuring junction electrically insulated from protecting sheath. NiCr-Ni should be marked on SS plate as shown in Fig-1 & 2.																	
	<table border="1"> <tr> <td>नाम NAME</td> <td>दिनांक एवं हस्ताक्षर SIGNATURE & DATE</td> </tr> <tr> <td>TRANSLATED BY</td> <td></td> </tr> <tr> <td>WORKED BY</td> <td>BRU LAL RAM 18/09/17</td> </tr> <tr> <td>CHECKED BY</td> <td>A.SRIVASTAVA 18/09/17</td> </tr> <tr> <td>SUPERVISED BY</td> <td>VINOD KUMAR</td> </tr> <tr> <td>APPROVED : B.S. RANA (AGM / CIE)</td> <td>Gr. NO. 3.50</td> </tr> <tr> <td>निर्माण PREPARED : CIE</td> <td>दिनांक DATE : 11.10.80</td> </tr> </table>					नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE	TRANSLATED BY		WORKED BY	BRU LAL RAM 18/09/17	CHECKED BY	A.SRIVASTAVA 18/09/17	SUPERVISED BY	VINOD KUMAR	APPROVED : B.S. RANA (AGM / CIE)	Gr. NO. 3.50	निर्माण PREPARED : CIE
नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE																	
TRANSLATED BY																		
WORKED BY	BRU LAL RAM 18/09/17																	
CHECKED BY	A.SRIVASTAVA 18/09/17																	
SUPERVISED BY	VINOD KUMAR																	
APPROVED : B.S. RANA (AGM / CIE)	Gr. NO. 3.50																	
निर्माण PREPARED : CIE	दिनांक DATE : 11.10.80																	
दिनांक एवं हस्ताक्षर SIGN & DATE भारती सूची संख्या INVENTORY NO. P-5199	दिनांक एवं हस्ताक्षर SIGN & DATE भारती सूची संख्या INVENTORY NO. P-5199																	

निम्न सूची के अनुसार SIGN & DATE		उत्पाद मानक (हीप : हरिद्वार)		ST44008	
		PRODUCT STANDARD (HEEP: HARIDWAR)		पृष्ठ 10 का 02 Page 02 of 10	
SUPERSEDES INVENTORY	3.2.1 Terminal Blocks : The ceramic terminal block shall be fixed inside the terminal head with the help of spring loaded fixing screws. With the help of spring loaded fixing screws the tip of the protecting sheath shall be pressed to the thermowell in assembled form of the thermocouple. Metallic parts shall be corrosion resistant. The two terminals of a pair of elements shall be distinguished by suitable marking (+ve) and (-ve) and the two pairs by symbol A & B or 1 & 2 on the terminal block.				
जारी की गयी तारीख Date of issue	3.2.2 Thermoelement and Protecting Sheath : The thermo element pairs shall be of nickel-chromium-nickel (NiCr -Ni, commercially known as cromel-alumel) and temperature-voltage characteristic shall conform to Type-K DIN-IEC-584 Part I or IS 2054. The protecting sheath shall be solidly held on the terminal block and element wires shall be terminated on brass screws. The distance between measuring junction of the element and inner side of the innermost protecting sheath shall not exceed 5 mm. Leak tightness of the measuring junction shall withstand 40 Kg/cm ² N2 test pressure.				
COPYRIGHT AND CONFIDENTIAL The information on this document 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.	3.2.3 Insulation : The thermoelement shall be embedded in highly compacted magnesium oxide insulation which shall be sealed at cold end of protecting sheath against humidity with the help of appropriate material. The element including measuring junction shall be electrically insulated from the protecting sheath. The insulation resistance between each thermoelement wire and protecting sheath shall be > 10 Mega Ohm at room temp. at 500 V.D.C. as per DIN 43763.				
सहायक निदेश एवं नोट्स इस दस्तावेज में दी गई सूचना भारत भारती उपकरणों के निदेशों की शर्तों के अंतर्गत है। इस दस्तावेज को बिना अनुमति के न प्रसारित किया जाये।	3.3 Terminal Head (Fig.4) : The terminal head shall be of die cast Aluminium or light metal alloy. It shall have threaded cap or hinged cap and snap closure or secured by slot headed screw, with protection class IP-65. It shall match to the measuring insert. For compensating cable, Nickel Plated Brass Cable gland shall be provided of PG-16 for two pairs of compensating cable of outer dia. 8 mm.				
निम्न सूची के अनुसार SIGN & DATE	3.4 Holding Pipe : As per Fig. 5				
जारी की गयी तारीख Date of issue	4. IDENTIFICATION TAG: In addition to the instrument name plate one separate stainless steel blank tag (20X60) mm shall be fastened with the thermocouple.				
जारी की गयी तारीख Date of issue	REV. NO. 06	निर्माणकर्ता WORKED BY	BRIJ LAL RAM	Brij Lal	18/09/17
जारी की गयी तारीख Date of issue	25/9/17	जांचकर्ता CHECKED BY	A.SRIVASTAVA	Ahsud	18/09/17

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक (हीप : हरिद्वार) PRODUCT STANDARD (HEEP: HARIDWAR)		ST44008 पृष्ठ 10 का 03 Page 03 of 10	
SUPERSEDES INVENTORY वापसी पूरी होने पर नॉटिफिकेशन देना है	5.0 INSPECTION: The supplier shall provide, if desired by the purchaser, all facilities to purchase's inspector or its authorized representative to witness the interstage and final tests. 6.0 TEST CERTIFICATE: All the thermocouples shall be tested by the supplier for the following tests and test certificates shall be furnished along with the supply. 6.1 Test for Thermocouple (As per IS-7358) : 6.1.1 <u>Insulation Resistance Test :</u> The insulation resistance between the two pairs as well as each thermoelement wire and protecting sheath shall be >10 Mega Ohm at 20°C room temp. at 500 V.D.C. 6.1.2 <u>Calibration Test :</u> The temp. voltage characteristic shall conform to type-K as per IS 2054 or DIN-IEC-584 Part 1 and tolerance class-1 IEC-584 Part-2. 6.1.3 <u>Measuring Junction Leak Tightness Test :</u> At 40KG/CM² by N₂ at room temperature for duration of one minute. 6.1.4 <u>Dimensional Checkup :</u> 6.2 Type test Certificate: 6.2.1 Type test certificate for protection class of terminal head as per clause 3.3 to be furnished. 6.2.2 Bare response time: 10 Sec or better. 6.3 Material Certificate: Material Certificate of extension pipe, holding pipe to be furnished. 7.0 GUARANTEE CERTIFICATE: A guarantee certificate for trouble free performance for 24 months from the date of shipment or 12 months from the date of commissioning whichever is earlier shall be furnished. 8.0 DOCUMENTS: The supplier shall furnish three copies of drawings & catalogues indicating sectional and dimensional details within full technical particulars with the offer. The manufacturing of the thermocouples shall be as per the drawing approved by the purchaser. Thermocouple data sheet to be submitted with the offer for approval.				
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स्वत्वाधिकार एवं गोपनीयता इस दस्तावेज में दी गई सूचना भारत देश की स्वतंत्रता, सुरक्षा और संपन्नता के लिए आवश्यक रूप से किसी भी तरह से सीधे या अप्रत्यक्ष रूप से हानिकारक हो न सके।					
दिनांक एवं हस्ताक्षर SIGN & DATE 					
वापसी पूरी होने पर INVENTORY NO. P-5799	REV. NO. 06		निर्माणकर्ता WORKED BY BRIJ LAL RAM	Brij Lal	18/09/17
			जांचकर्ता CHECKED BY A.SRIVASTAVA	Ashu	18/09/17

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक (हीप : हरिद्वार) PRODUCT STANDARD (HEEP: HARIDWAR)		ST44008 पृष्ठ 10 का 04 Page 04 of 10	
मासिक सूची संख्या INVENTORY NO.	SUPERSEDES INVENTORY	9.0 PACKING:			
COPYRIGHT AND CONFIDENTIAL The information on this document 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.	भारतीय सूची संख्या को संशोधित करना है	9.1 GENERAL:- The thermocouple shall be supplied in assembled form. If mentioned in the enquiry, the packing shall be seaworthy. 9.2 Complete thermocouple should be wrapped or placed inside suitable foam sheet. Adequate silica gel packets to be placed inside this foam sheet wrapping. 9.3 After this complete thermocouple alongwith foam sheet shall be bubble wrapped and sealed with packing tape. 9.4 After this packed thermocouple to be placed in a cardboard carton which shall be filled with woodwool/ scrap paper to ensure that there is no movement of the item inside this box during transit. 9.5 All such cartons to be placed inside a wooden box which must be water proof by using bitumen paper/ plastic sheet/ polythene. 9.6 These wooden box should have multiple steel straps around the box in such a way so that there is no risk of movement of inner items during transit. 9.7 All the above to be ensured before final dispatch of shipment.			
		10.0 SPARES: The suppliers shall enclose a list of spares required for 5 years normal operation and quote for the same separately.			
भारतीय सूची संख्या INVENTORY NO.	REV. NO. 06		निर्माणकर्ता WORKED BY	BRIJ LAL RAM	Brij Lal 18/09/17
भारतीय सूची संख्या INVENTORY NO.	REV. NO. 06		जांचकर्ता CHECKED BY	A.SRIVASTAVA	A.Srivi 18/09/17

निर्माणक SIGN & DATE		उत्पाद मानक (हीप : हरिद्वार) PRODUCT STANDARD (HEEP: HARIDWAR)	ST44008																																			
SUPERSEDES INVENTORY - मासिक सूची संकाय को अतिरिक्त करण है	TABLE-1 (All dimensions are in mm)																																					
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<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Thermocouple type</th> <th style="width: 20%;">Holding Pipe Length L 1 (Fig 5) mm</th> <th style="width: 20%;">Measuring insert Length L (Fig 3) mm</th> <th style="width: 20%;">Size No.</th> </tr> </thead> <tbody> <tr> <td rowspan="5" style="text-align: center; vertical-align: middle;">A</td> <td style="text-align: center;">200</td> <td style="text-align: center;">219</td> <td style="text-align: center;">005</td> </tr> <tr> <td style="text-align: center;">386</td> <td style="text-align: center;">405</td> <td style="text-align: center;">001</td> </tr> <tr> <td style="text-align: center;">446</td> <td style="text-align: center;">465</td> <td style="text-align: center;">002</td> </tr> <tr> <td style="text-align: center;">496</td> <td style="text-align: center;">515</td> <td style="text-align: center;">003</td> </tr> <tr> <td style="text-align: center;">546</td> <td style="text-align: center;">565</td> <td style="text-align: center;">004</td> </tr> <tr> <td rowspan="4" style="text-align: center; vertical-align: middle;">B</td> <td style="text-align: center;">316</td> <td style="text-align: center;">375</td> <td style="text-align: center;">011</td> </tr> <tr> <td style="text-align: center;">446</td> <td style="text-align: center;">515</td> <td style="text-align: center;">012</td> </tr> <tr> <td style="text-align: center;">396</td> <td style="text-align: center;">465</td> <td style="text-align: center;">013</td> </tr> <tr> <td style="text-align: center;">386</td> <td style="text-align: center;">465</td> <td style="text-align: center;">014</td> </tr> </tbody> </table>						Thermocouple type	Holding Pipe Length L 1 (Fig 5) mm	Measuring insert Length L (Fig 3) mm	Size No.	A	200	219	005	386	405	001	446	465	002	496	515	003	546	565	004	B	316	375	011	446	515	012	396	465	013	386	465	014
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	386	465	014																																			
11 NAME PLATE: Manufacturer's name or trademark, type of Thermocouple., BHEL standard no. must be mentioned on the name plate.																																						
12 CROSS REFERRED STANDARD: DIN-43763, DIN-43735, IEC-584 Part-1&2, IS-2054, IS-7358.																																						
निर्माणक SIGN & DATE 																																						
मासिक सूची संकाय INVENTORY NO. P-5799	REV. NO. 06		निर्माणकर्ता WORKED BY BRIJ LAL RAM		18/09/17																																	
			जांचकर्ता CHECKED BY A.SRIVASTAVA		18/09/17																																	

 निर्माणक
SIGN & DATE

 मासिक सूची संकाय
INVENTORY NO.
P-5799

 निर्माणकर्ता
WORKED BY

BRIJ LAL RAM



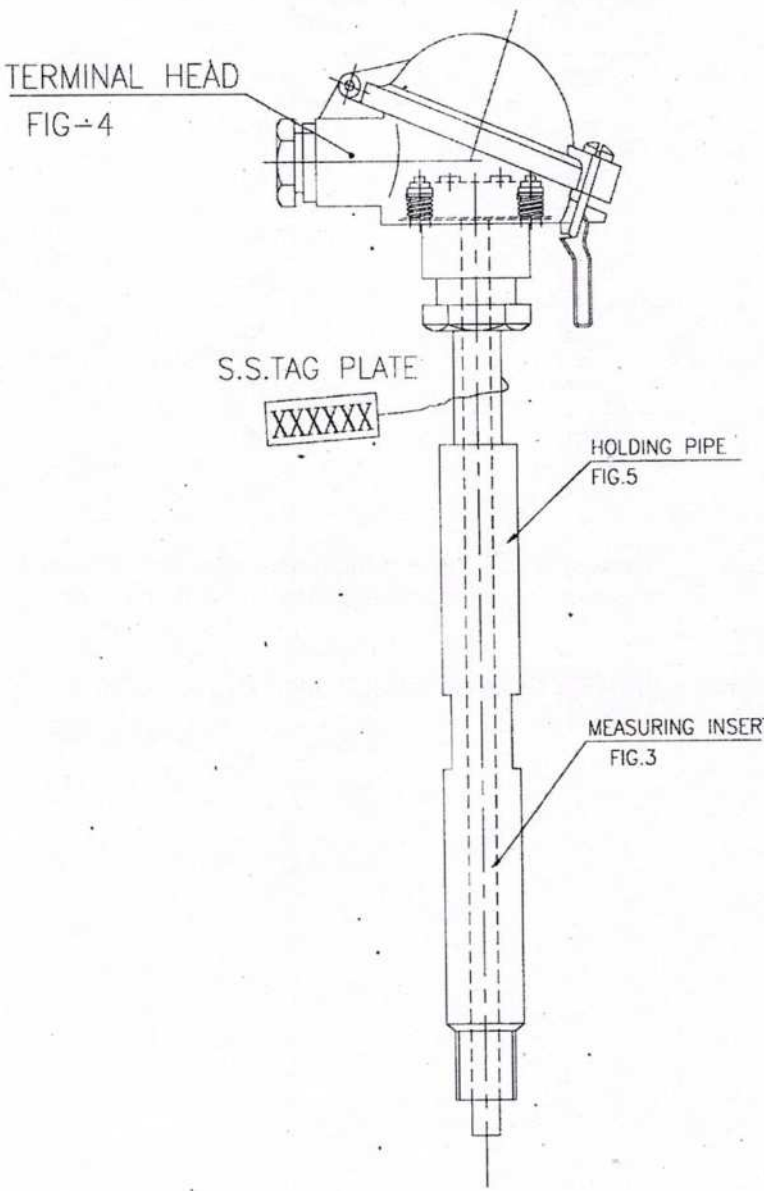
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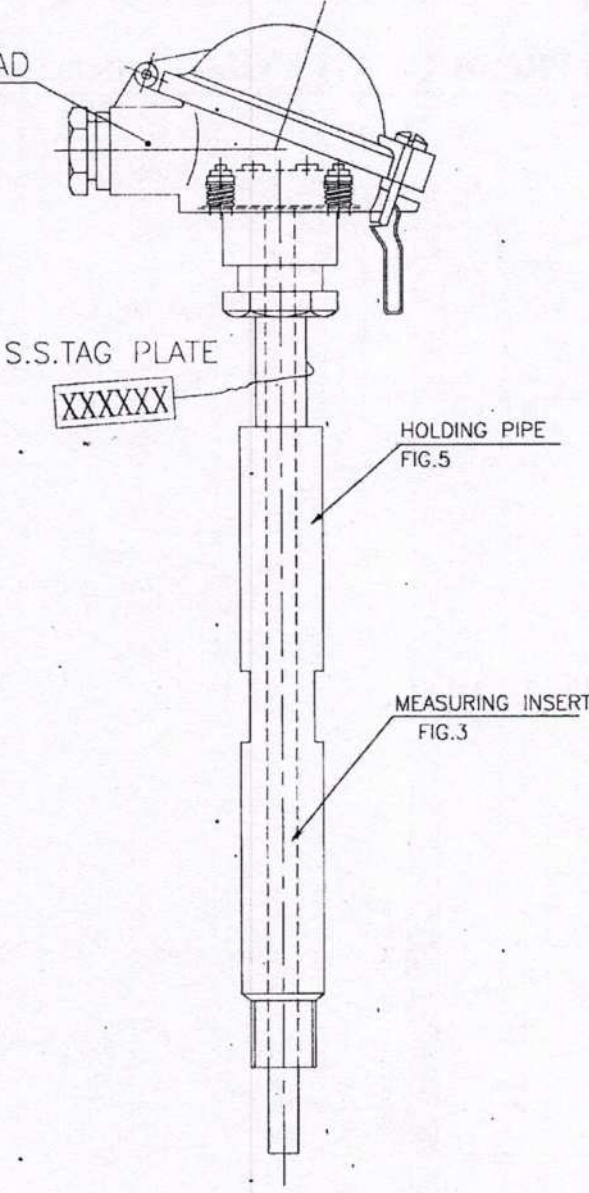
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CHECKED BY

A.SRIVASTAVA



18/09/17

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SUPERSEDES INVENTORY इसकी पूर्ति हेतु को अतिरिक्त खर्च है					
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स्वसाक्षिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स लिमिटेड की संपत्ति है। इसका प्रयोग एवं प्रसारण केवल केवल के निर्देशों के बिना ही नहीं किया जा सकता है।					
Review and Sign SIGN & DATE 					
इसकी पूर्ति संख्या INVENTORY NO. P-5799	REV. NO. 06		निर्माणकर्ता WORKED BY BRIJ LAL RAM	Brij Lal	18/09/17
			जांचकर्ता CHECKED BY A.SRIVASTAVA	A.Sriva	18/09/17

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक (हीप : हरिद्वार) PRODUCT STANDARD (HEEP: HARIDWAR)		ST44008 पृष्ठ 10 का 07 Page 07 of 10	
सुपरसेडिंग SUPERSEDES INVENTORY	भारती बुरी किता को अधिकृतित करना है	TERMINAL HEAD FIG-4  S.S. TAG PLATE XXXXXX HOLDING PIPE FIG.5 MEASURING INSERT FIG.3 THERMOCOUPLE TYPE B FIG. 2			
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स्वसाधिकाए एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत भारती एलेक्ट्रिकल लिमिटेड की संपत्ति है। इसका प्रयोग एवं प्रसारण अन्य से किसी को एवं प्रयोग और कि किसी के बिना से अनुमति प्राप्त होना आवश्यक है।					
दिनांक एवं हस्ताक्षर SIGN & DATE 	REV. NO. 06				
भारती बुरी किता INVENTORY NO. P-5199	REV. NO. 06		निर्माणकर्ता WORKED BY	BRJ LAL RAM	Brij Lal 18/09/17
			जांचकर्ता CHECKED BY	A. SRIVASTAVA	A. Srivastava 18/09/17



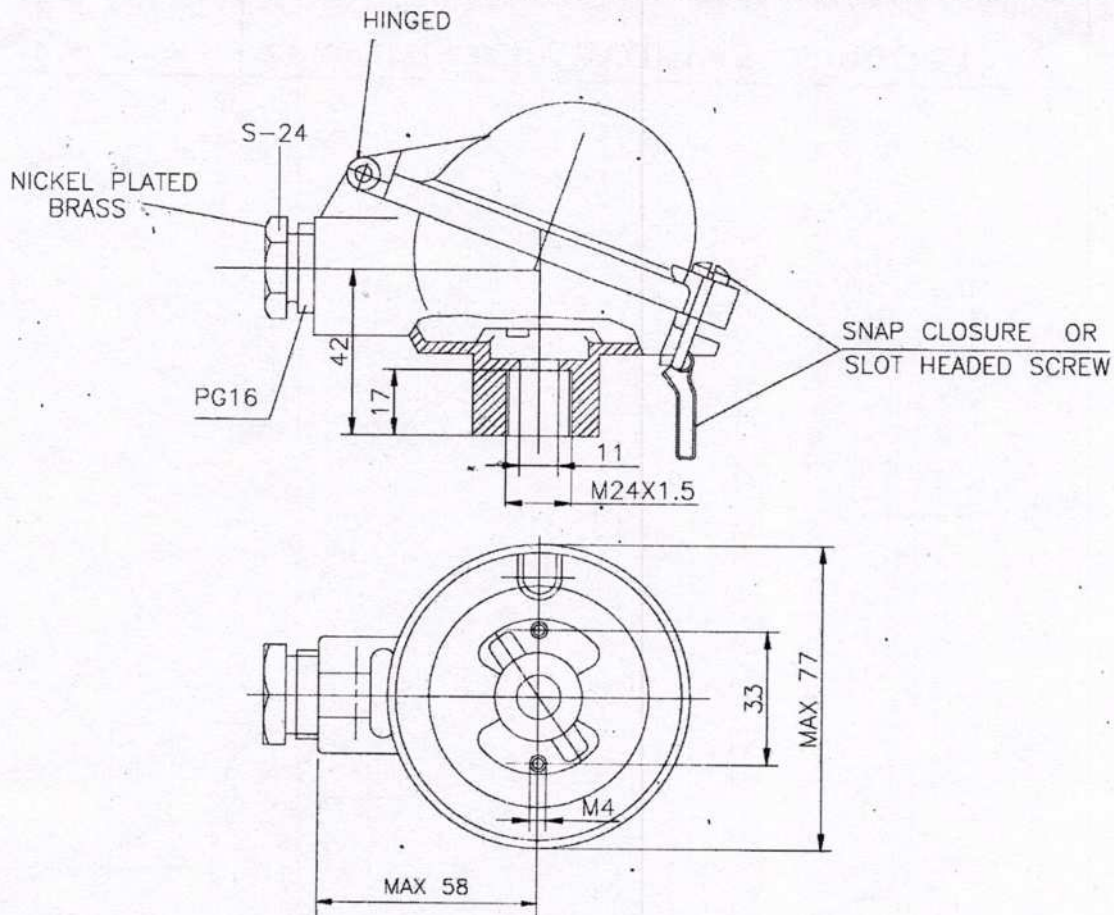
उत्पाद मानक (हीप : हरिद्वार)

ST44008

PRODUCT STANDARD (HEEP: HARIDWAR)

पृष्ठ 10 का 09

Page 09 of 10



TERMINAL HEAD
FIG. 3

PLUG AND SOCKET CONNECTOR (WHEREVER APPLICABLE) SHALL BE OF ALLIED/AMPHETRONIK MAKE

निर्माणकर्ता
SIGN & DATE
[Signature]

समरी सूची संख्या
INVENTORY NO.
B-0999

REV.
NO. 06

निर्माणकर्ता
WORKED BY

BRJ LAL RAM

[Signature]

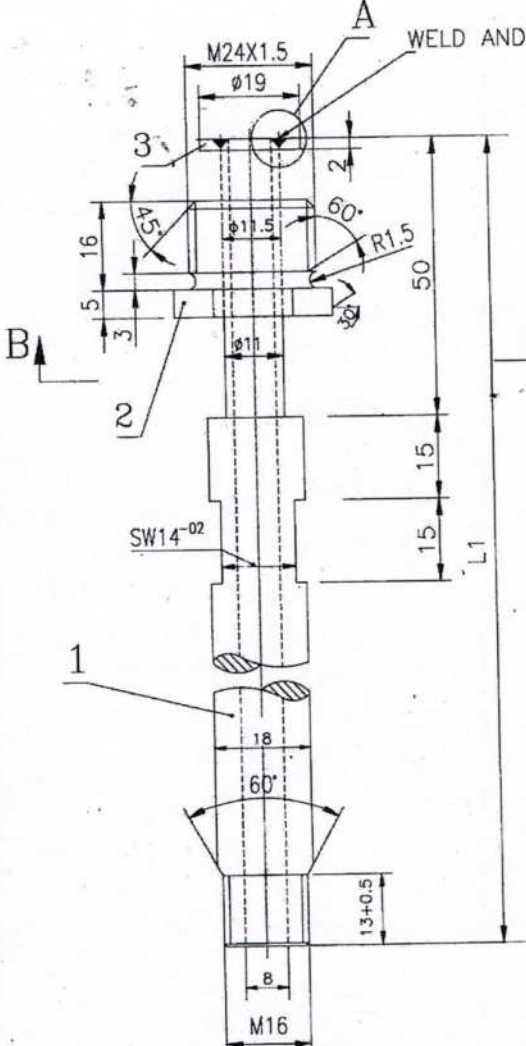
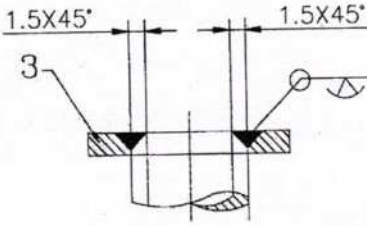
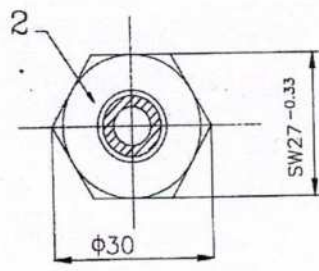
18/09/17

जांचकर्ता
CHECKED BY

A.SRIVASTAVA

[Signature]

18/09/17

SIGNATURE SIGN & DATE		उत्पाद मानक (हीप : हरिद्वार) PRODUCT STANDARD (HEEP: HARIDWAR)	ST44008			
SUPERSEDES INVENTORY	SUPERSEDES INVENTORY	SURFACE FINISH $\sqrt{3.2}$ / THE REST (R_a VALUE)	पृष्ठ 10 का 10 Page 10 of 10			
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Brij Lal Ram Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.	COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Brij Lal Ram Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.		 			
स्वतंत्रतापूर्वक एवं गोपनीय इस दस्तावेज़ में दी गई जानकारी केवल निर्माण के लिए है। इसका उपयोग किसी भी अन्य उद्देश्य के लिए नहीं किया जा सकता है।	स्वतंत्रतापूर्वक एवं गोपनीय इस दस्तावेज़ में दी गई जानकारी केवल निर्माण के लिए है। इसका उपयोग किसी भी अन्य उद्देश्य के लिए नहीं किया जा सकता है।	MATERIAL OF ALL TYPES— S.S. OR EQUIVALENT HOLDING PIPE FIG.—5				
SIGNATURE SIGN	SIGNATURE SIGN					
INVENTORY NO. 25799	REV. NO. 06		निर्माणकर्ता WORKED BY	BRIJ LAL RAM	Brij Lal	18/09/17
			जांचकर्ता CHECKED BY	A.SRIVASTAVA	Ashu	18/09/17