

SIGN & DATE			HP RELIEF VALVE LIST OF DOCUMENTS AND DRAWINGS				413137W5005																																				
							Rev.00																																				
							Page 1 of 1																																				
SUPERSEDES INVENTORY NO.		A. SCOPE OF THE DOCUMENT: This document lists down the drawings and documents to be followed for executing the order of one number of HP relief valve. B. LIST OF DOCUMENTS AND DRAWINGS: <table border="1"> <thead> <tr> <th>S.no.</th> <th>Item description</th> <th>Drawing / Document no.</th> <th>Rev/ Index</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Specification – HP Relief valve with pneumatic actuator</td> <td>413137W5100</td> <td></td> </tr> <tr> <td>2</td> <td>HP Relief valve drg</td> <td>4-13137-W1101</td> <td></td> </tr> <tr> <td>3</td> <td>Technical purchasing specification: Valves</td> <td>41313795102</td> <td>01</td> </tr> <tr> <td>4</td> <td>Electrical specs for limit switch and solenoid valves</td> <td>41810221002</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>						S.no.	Item description	Drawing / Document no.	Rev/ Index	1	Specification – HP Relief valve with pneumatic actuator	413137W5100		2	HP Relief valve drg	4-13137-W1101		3	Technical purchasing specification: Valves	41313795102	01	4	Electrical specs for limit switch and solenoid valves	41810221002																	
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INVENTORY NO.		CIE	Mudit Jain	Sr. Engr.	TL	Anil Kumar	Sr. Engr.																																				
		AGREED DEPTT.	NAME	Designation	DEPTT.	NAME	Designation																																				

No.	Item	Specifications – HP Relief Valve with Pneumatic Actuator					
1.	Doc no.	41313W5100					
	Rev no.						
2.	Basic data:						
	Valve Body Material : G17CrMo5-5 / GS17CrMo55 equivalent or higher						
	Inlet connection : 168.3 X 10.97 mm (ASTM182F22C2)						
	Outlet connection : 273.1 X 9.27 mm (ASTM182F12C2)						
	Pos*	Description	Dimension acc to ASME B36.10M		Connection		
			NPS	Schedule	Type	Form/Figure	Standard
	G23	Inlet at HP Relief Valve	6"	80	Butt Weld	5B	ASME B16.25
	G24	Outlet at HP Relief Valve	10"	STD	Butt Weld	4	ASME B16.25
	T840	Control Air Connection at HP Relief Valve	G3/4"	-	Thread	-	EN ISO 228-1
	*See Indicative Drawing for details.						
3.	Valve design	Spindle				vertical	
		Steam Flow Direction				Under the valve cone in opening direction	
		Fittings				Perforated cage	
		KVS-Valve				200 m³/h	
		Seat diameter				According to tech. design	
		Valve stroke				According to tech. design	
		Spindle sealing				Graphite /K80S	
		Leakage Class				EN 1349-Seat leakage IV L1(0.01% KVS value)	
		Valve welding ends acc.to.				ASME B 16.25 Fig. 4 & 5 B	
		Yoke Material				Carbon steel	
4.	Pneumatic Actuator	Spring Working Direction				Opens the valve	
		Control Air Working Direction				Closes the valve	
		Solenoid valves idle				Opens the valve	
		Actuator shall be of proven for the application and shall be subject to BHEL approval					
		Travel Time (100% stroke)				Open ≤ 1 sec.	

			Close ≤ 2 sec.
		Fail safe position of actuator	Valve open
		Control Air Connection acc. to	G3/4" (Type Thread as per EN ISO 228-1)
		Pressure of control air	5 bar $\leq p < 10$ bar
		Min available Control Air Pressure for the design of the actuator	5 bar
		Design differential pressure of actuator	≥ 65.4 bar
		Additional force of the actuator	≥ 20 %
5.	Equipment	3/2-Way-Solenoid valves , connected in series. All pneumatic components are piped. All electrical equipments are wired to a terminal box.	2 pieces
		3/2-way pneumatic valve	2 pieces
		Proximity switch OPEN:	1 piece
		Proximity switch CLOSE:	1 piece
		Filter Regulator with pressure gauge: Adjustment range 0-10 bar, adjusted and sealed at 5 bar	1 piece
6.	Design parameter	Pressure [bar abs]	Temperature [°C]
	Design(Operating case)	60.8	354.6
	Maximal long term	58.3	357
	Maximal short term:	63.6	423
	1000h	16.0	480
	15 min. per event and max.10,000h of lifetime	16.0	510
	1 min per single event	64	510
	The following design data of the adjacent pipes have to be considered:		
	Valve Inlet	72.6 bar g	510
	Valve Outlet	36.3 bar g	492
	Maximal temperature difference in operation between valve inlet and valve outlet in design case maximal long term		312.6

	Minimal Pressure at the valve outlet, approx.	0.093 bar (a)	
7.	Seismic Requirements:	Safe operation	Horizontal: 0.3g Vertical: 0.2 g
8.	Installation	Indoor	
	Ambient Conditions	Ambient Temperature min/max	0°C / 50°C
		Absolute Humidity	≥ 60 g/m ³
9.	KKS Labeling	Unit code	
	HP-Relief Valve	LBC41AA051	
	3/2-Way Solenoid Valve 1	LBC41AA051A	
	3/2-Way Solenoid Valve 2	LBC41AA051B	
	3/2-Way Pneumatic Valve 1	LBC41AA051C	
	3/2-Way Pneumatic Valve 2	LBC41AA051D	
	Proximity Switch – Position 100% OPEN	LBC41CG051B	
	Proximity Switch – Position 0% CLOSE	LBC41CG051C	
	Air filter	LBC41AT021	
	Pressure Relief Valve	LBC41AA261	
	Pressure Gauge	LBC41CP501	
	Terminal Box	LBC41GF051	

Prepared by		Approved by	
Anil Kumar	Mudit Jain	Sandeep Sonkar	Ms Saswati Srivastava
Sr.Engr- TL	Sr. Engr-CIE	Sr. Mgr-TL	SDGM-CIE

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Technical drawing of a vertical valve assembly in cross-section. The drawing shows a central vertical shaft with a handle at the top and a seat at the bottom. The handle has a diameter of 530 mm. The seat is labeled "SEAT Ø80 ON-OFF DEVICE". The drawing includes various dimensions: a total height of 273 mm, a handle height of 9.27 mm, a seat height of 10.97 mm, a seat diameter of 80 mm, a base diameter of 168.3 mm, and a base height of 200 mm. The drawing is labeled with "G24" and "G23" in diamond shapes.

1. WELD EDGE AS PER FORM FIG. 2A OF ASME B16.25.
2. TYPE OF ACTUATOR, NUMBER OF CYLINDERS AND DIMENSIONS OF VALVE AND ACTUATOR AS GIVEN IN THIS DRAWING ARE INDICATIVE.



BHEL

BHARAT HEAVY ELECTRICALS LTD.
RANIPUR, HARDWAR

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1. Scope of Application

This Technical Purchasing Specification covers valves for evacuating of bottled up pressurized steam from steam turbine unit during load throw-off. During normal operation of turbine, this valve shall remain in tightly closed position and down steam side of the valve shall be subjected to condenser vacuum. The valve is to be suitably designed to prevent the ingress of air through valve glands into the system.

The requirements of this specification are valid as far as no other requirements are given in the enquiry.

2. Type-tested Valves

Valves with a valid type-testing certificate according to PED97/23/EC and to the corresponding VdTÜV-Merkblätter, of TRD 110 attachment 1 as well as accordingly to the registration of DIN-DVGW fulfill the requirements of this specification.

For these valves the requirements for manufacturing and testing agreed upon with the TÜVs respectively with the DVGW-federation shall be fulfilled (declaration of commitment).

3. Referenced Documents

- AD2000-W 0
- AD2000-W 7
- AD2000-HP 0
- AD2000-HP 5/3
- TRD 100
- EN 287-1
- DIN EN ISO 15607
- DIN EN ISO 15609-1
- DIN EN ISO 15614-1
- EN 1418
- EN 10028
- EN 10204
- EN 10213
- EN 10222
- EN 10273
- DIN 1690-10
- EN 1559-1
- EN 1559-2
- EN 12266-1/-2
- DIN 17175,
- PED 97/23/EC
- ASME B16.34

In case of differences or contradictions of the referenced documents the higher requirements shall be applied.

4. Technical Data and Design

The criteria, e.g. fluid, pressure, temperature, material of the casing, etc., as well as other technical data are given in the enquiry.

5. Inspection certificate / Declaration of Compliance in Dependence on Fluid, Pressure and Temperature

For all valves an Inspection Certification 3.1 according to EN 10204 must be provided.

6. QA-Requirements regarding the Valve Manufacturer and his Suppliers:

The valve manufacturer as well as his suppliers for the main components like e.g. pressure guiding components, instrumentation and control, shall have an introduced and well-working quality management system, e.g. according to EN ISO 9000 series or equivalent standard. Manufacturers of pressure guiding components shall have in addition a certificate according to AD2000-W 0 respectively TRD 100.

As far as welding will be performed on the valves, the weld shop shall be certified according to AD2000-HP0.

7. Manufacturing and Inspection Plan (MIP)

The valve manufacturer shall prepare a Manufacturing and Inspection Plan containing sufficient information on the sequence and extent of the valve inspections as well as the main raw material and shall deliver this to the purchaser for review at the latest 4 weeks after order receipt, but at least 2 weeks before starting manufacturing.

8. Condition for Manufacturing

Manufacturing of the valve mentioned in point 7 shall not be started before the review for the design as well as for the MIP has been given by the purchaser. To prohibit any delay the valve manufacturer shall call for missing reviews and remind the purchaser on time.

By reviewing the MIP the purchaser does not take on any responsibility for processes or manufacturing details of the valve manufacturer or his suppliers, or for the valve itself.

9. Fabrication and Inspection

9.1 Steel Castings

Steel castings, e.g. valve casings, covers, etc., shall be manufactured and inspected according to EN 10213 and EN 1559 part 1 and part 2 and DIN 1690 part 10, and following minimum requirements:

- Analysis (chemical composition) per heat
- Mechanical properties per heat and heat treatment batch, for castings with an individual weight > 1000 kg testing per casting
- Amount of non-destructive testing according to DIN 1690 part 10:
 - Weld ends of valves without connection pieces: Quality class A with quality grades S1 + V1
 - Transition areas: quality class B with quality grades S2 + V2
 - Weld ends of valves with connection pieces: Quality class B with quality grades S2 + V2
- remaining areas of the casting: quality class D with quality grades S3 + V4; additionally for castings ≥ 500 kg or DN ≥ 400 mm each casting 100% volume inspection shall be performed.

9.2 Rolled or Forged Material

Rolled or forged material, e.g. connection piece, shall be manufactured and inspected according to the corresponding material standard, e.g. EN 10028, EN 10088, EN 10222, EN 10273, DIN EN 10216-2 and DIN 17440, etc. and following supplements:

- Analysis (chemical composition) per heat
- Mechanical properties per heat and heat treatment batch

9.3 Connecting Elements:

Connecting elements shall be manufactured and tested according to AD2000-W 7. As far as there is a requirement for a test certificate for grade properties, this shall be an inspection certificate 3.1 according to EN 10204.

9.4 Welding

As far as welding will be performed on the valves (also in case of fabrication welding on castings):

- Welding shall be performed only by welders tested in line with EN 287 or mechanized welds by welding operators tested in line with EN 1418
- Corresponding welding procedure specifications and procedure approval records according to
 - DIN EN ISO 15607
 - DIN EN ISO 15609-1
 - DIN EN ISO 15614-1 shall be available.
- Fabrication welds on castings shall be inspected according to DIN 1690.
- Fabrication welds having a length ≥ 150 mm or a depth $\geq 40\%$ of the wall thickness or a depth ≥ 25 mm shall be recorded.
- Design welds shall be inspected according to AD2000-HP 5/3. In case of serial production manufacturer-specific inspection concepts may be applied with written agreement of the purchaser.
- If cast steel parts are subjected to heat treatment in the course of valve manufacture, all parts heated shall subsequently be subjected to a 100% surface crack examination.

9.5 Manufacturing Inspections

Manufacturing Inspections shall be performed according to PED 97/23/EC / EN 12266. The PED 97/23/EC as a superior legislation shall be observed and applied. These are especially:

- a) Pressure test
 - Test P10 according to EN 12266 part 1
- b) Leak test
 - Test P11 + P12, leakage class B according to EN 12266 part 1
- c) Functional test
 - Test F20 according to EN12266 part 2
- d) Verification of dimensions
 - Main dimensions
 - connecting dimensions

All tolerance ranges which are important for the function shall be recorded. As

 - Stem diameter
 - Diameters of guides and fits

10. Marking

Valves shall be marked as follows:

- The name and address or other means of identification of the manufacturer and, where appropriate, of his authorized representative established within the Community
- Nominal diameter
- Nominal pressure class
- Casing material
- Flow direction arrow
- Identification-no. (Also commission-no.)
- The year of manufacture
- Identification of the pressure equipment according to its nature, such as type, series or batch identification and serial number
- Essential maximum/minimum allowable limits
- CE marking is applied for European countries.

Valves with a total weight > 1000 kg shall be marked additionally with a permanent information of the weight on the valve or on an safe name- plate.

The provisional KKS-Labels which are fabricated and properly sized are to be made of plastic or similar unbreakable material and attached to the component by wire. The lettering on the labels should include the KKS classification in back, permanent ink.

Marking of the materials for all pressure loaded casing components shall survive during all manufacturing processes according to AD2000-HP 0.

11. Surface Protection

Surface coating of non-stainless steel valves shall be applied as follows

<u>Paint (Coat)</u>	<u>Paint Type</u>	<u>No. of coat</u>	<u>DFT*</u>
Primer Paint	: Epoxy base Zinc rich primer paint	1 Coat	35
Intermediate Paint	: Epoxy TiO ₂ Pigmented Polyamide Cured Paint	1 Coat	70
Finish (Final) Paint	: Aliphatic Acrylic 2 Pack Polyurethane Finish paint	2 Coats	75

*DFT – Dry Film Thickness (final) in microns

- Shade as per RAL – Grey 9002

12. Documentation

All the documentation for the delivered valve shall remain with the valve manufacturer and shall be stored for at least 10 years. This documentation shall be labelled such as to ensure traceability and allocation to the corresponding valve and shall be marked as belonging to BHEL. The valve manufacturer shall check the documentation with respect to completeness and correctness before shipping the valve. The valve manufacturer shall certify this at the time of the delivery. It is the obligation of the valve manufacturer to hand over a copy of the total documentation to the purchaser on request and free-of-charge.

BHEL expects a documentation of the module/parts including all instructions which are necessary for service, installation and maintenance. Amendments will be requested separately.

In accordance to the Machinery Directive (98/37/EC) and Pressure Equipment Directive (97/23/EC) the following records and logs shall be provided to the purchaser in any case:

- manufactures declaration
- Declaration of conformity
- Material certificates
- Pressure test
- Non-destructive tests

The documentation - also that of the sub suppliers - shall be written in English language and shall contain at least:

- Test certificates of the prematerial (at least inspection certificate 3.1B according to EN 10204)
- Records of all inspections performed by the valve manufacturer or his sub suppliers during manufacturing:
 - Non-destructive inspections of e.g. weld areas or welds
 - Verification of dimensions
 - Pressure and leak tests
 - Functional tests
- Heat treatments performed
- The European Union guidelines and standards which are valid and can be used for the area of application (e.g. PED 97/23/EG, Low-Voltage Guideline 73/23/EEG, etc..) are to be designated in the declaration of conformity according to the remarks and applied quality modules, and shall include all relevant data (see e.g. appendix VII of Guideline 97/23/EG). Risk disclosure and danger analyses in accordance with EN 1050 are to be handed over to BHEL if necessary.
- If materials without European material approval are drawn on for the order (order papers/designs) (e.g. ANSI/ASME materials) appropriate substitute certificates from a designated authority shall be procured and documented accordingly. If the order pertains to a component of a total design group, then all certificates and certification of the component of the highest category of the total design group shall be made available.

13. Final inspection

The purchaser reserves the right to perform final inspections on his ordered parts in the shop of the valve manufacturer, as well as in the shop of his sub suppliers

14. Delivery and Packing

Details regarding delivery are given in the order, however at least following details shall be given together with the delivered parts:

Actualization of standards and instructions

- Purchaser
- Order-no. / project
- Manufacturer commission-no. / works-no.
- Specification
- Number of pieces
- Type / item
- Nominal diameter [DN]
- Maximum allowable pressure [PS]
- Maximum allowable temperature [TS]
- Fluid
- Manufacturer drawing-no.
- Identification-no. of the valve
- Piece weight

Together with the delivery of the valve the valve manufacturer shall hand over a certificate 2.1 according to EN 10204 in English, which confirms that the delivered valve fulfills the requirements given in the order and in this specification. Furthermore the valve manufacturer shall confirm that only materials as listed in the design bill of material have been used and that the documentation is available in his shop in line with Item 12 above and that he has checked the documentation carefully.

Packing of the valve shall be as follows:

- The valve shall be packed and locked that way, that in general case any damage will be prohibited.
- All openings shall be plugged.
- Detail parts respectively components shall be packed individually, however assignment shall be

ensured.

- As far as necessary accessory devices for transportation purposes shall be attached to the valve and/or to the packing, e.g. lifting eyes and lifting signs.
- Bearing areas shall be marked, if necessary.

15. Guarantee

The supplier shall guarantee trouble free operation of the equipment for a period of 2 years after installation and commissioning or a period of 3 years from the date of dispatch of equipment whichever is earlier.

If during erection/commissioning and operation at site, any defect in any component is detected, purchaser's / owner's site representative shall prepare the assessment report and a copy of the same shall be forwarded to the supplier. The supplier shall replace / rectify the concerned items free of charge. The supplier, if he so desires, may depute his representative to site at his own cost otherwise the report of purchaser's / owner's site representative shall be binding on the supplier.

16. Spares

The offer of valves shall include the requirement of spares to be made available at the time of erection & commissioning. A separate offer of spares to be required for 3 to 5 years of operation shall also be separately enclosed along with main offer.

17. Special tools & tackles

Any special tools & tackles, required for erection, commissioning and maintenance of valves shall be included in main offer per set of valves.

18. Supplementary Requirements

The valve manufacturer shall send following documents in triplicate written in English language to the purchaser's department for records. Documents listed under a) and c) shall be delivered with the order acknowledgement:

- a) Part drawing showing the function of the valve and the design bill of material
- b) Operating and maintenance instruction
- c) Spare part list

19. Deviations

Equivalent ASME B16.34 requirements may be considered in place of given in PED 97/23/EC / EN 12266.

Any deviation from this purchasing specification has to be reported to the purchaser immediately.

Any deviation is accepted only if this has been approved or accepted by the purchaser in writing.

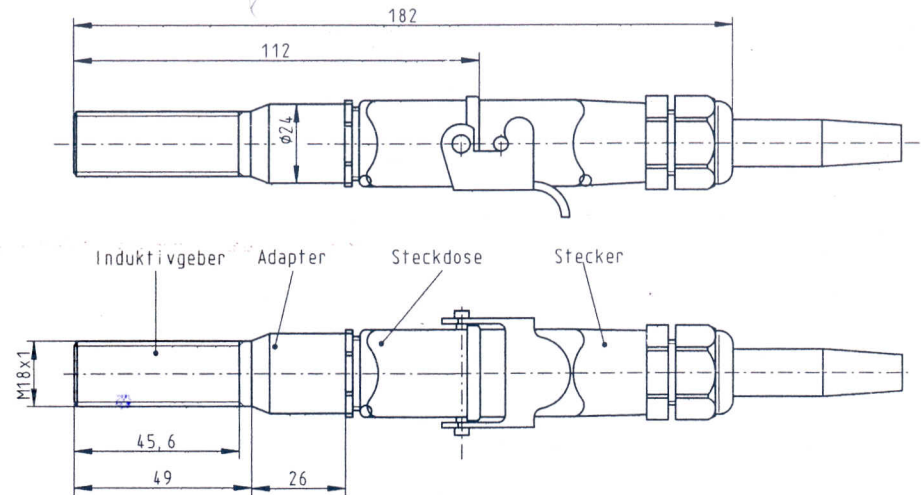
In case of any deviation from the specified properties, also if the proof by testing is not required, the purchaser has the right to reject the material.

BERUEHRUNGSLOSER INDUKTIVGEBER

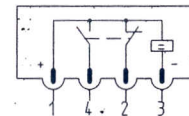
TYP IFL 5-18-11zStPK-1952-2

IFL5-18-11zStPK

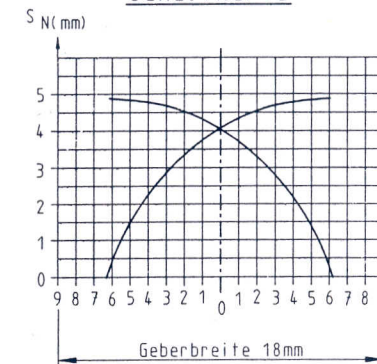
Einbau im Metall	: buendig
Einbaulage	: beliebig
Gehaeuse	: Ms-vernickelt
Sensorflaeche	: Crastin
Anzugsmoment	: max. 1300 Ncm
Schockfestigkeit	: 30g, 11 ms gem. IEC68-2-27
Vibrationsfestigkeit	: 10 Hz-55 Hz, 1 mm gem. IEC68-2-6
Schutzart	: IP 67 fuer den Naeherungsschalter
	: IP 54 fuer die Steckverbindung
schaltend nach	: P
Elektrischer Anschluss	: ueber Steckverbindung Harting HAN 7D mit 0,5mm ² Goldkontakten (Stecker gehoert zum Lieferumfang)
Messart	: induktiv
max Schaltfrequenz	: 500 Hz
Nennspannung	: 24 VDC
Spannungsbereich	: 10-60 VDC
Restwelligkeit	: <10 %
Einschaltdauer	: 100 %
Leerlaufstrom	: <4.8 mA
Laststrom	: <100mA
Verpolungsschutz	: ja
Ueberlast- u. Kurzschlusschutz	: ja
Nennschaltabstand	: 5 mm
Hysteresis bei 20 Grad C	: <0,5 mm (seitliches Anfahren bei 1,5mm Abstand)
Hysteresis bei 110 Grad C	: <1,0 mm (seitliches Anfahren bei 1,5mm Abstand)
Wiederholgenauigkeit bei 20 Grad C	: <0,10 mm (seitliches Anfahren bei 1,5mm Abstand)
Wiederholgenauigkeit bei 110 Grad C	: <0,25 mm (seitliches Anfahren bei 1,5mm Abstand)
Temperatur	: -25 Grad C bis 110 Grad C
Ausgang	: Wechsler
Revisionslose Betriebszeit	: min. 24.000 h
Lieferant	: K. A. Schmersal & Co Moedinghofe 30 5600 Wuppertal 2



Anschlussbild



Schaltkurve



NOTE: 4wire Proximity switch, for taking these wires for termination in JB, NC contact not used, Pl refer, Sh. 4.

Geräteschlüssel: LGBAD
INSTRUMENTATION KEY:

TITEL : PROXIMITY SWITCH

BHART HEAVY ELECTRICAL LTD

HARIDWAR, RANIPUR, INDIA-249403

Drawing No. 41810221002

Sh.1

PROXIMITY SWITCH FOR HPT EVACUATION

Translated version Doc. No. 41810221002

TYP IFL S-18-11zStPK-1952-2

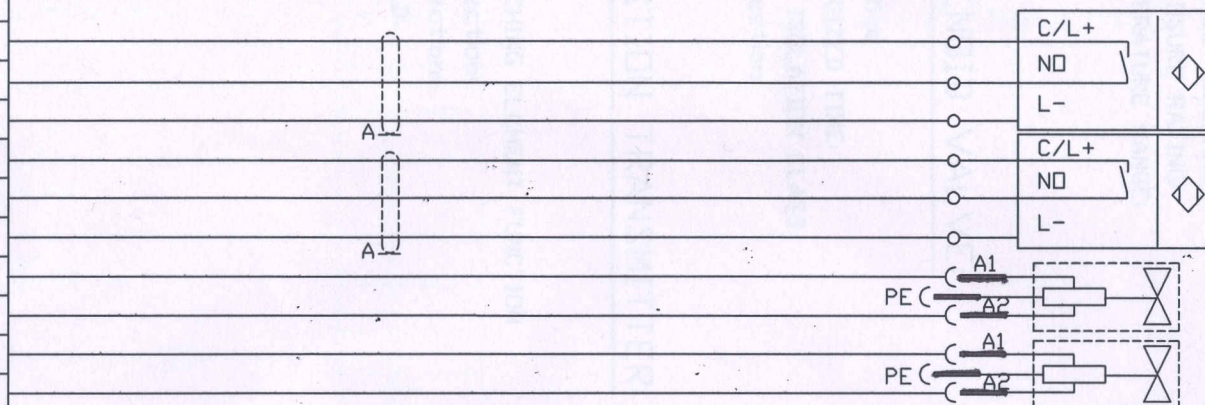
MOUNTING IN METAL:	to be flush in metal
Mounting position:	Any position
Casing:	Ms. Nickel plated
Sensor surface	Crastin
Stud torque	Max 1300 Ncm
Shock reaction	30 gm, 11ms gem. IEC 68-2-27
Resistance to vibration	10Hz 55 Hz, 1mm.
Protection	IP67 for proximity probe
Protection	IP 54 for plug connector
Switching to	P
Electrical connection	4 wire with Harting HAN 7D plug socket, with 0.5 mm ² gold contact
Mode of measurement	Inductive
Max switching frequency	500Hz
Voltage supply	24V
Supply range	10-6 VDC
Residual ripple	≤ 10%
Running time	100%
Stand by current	≤ 4.8 mA
Running current	≤ 100mA
Non reversible	Yes
Overvoltage protection (short ckt. proof):	Yes
Operating distance	5 mm
Switching hysteresis at 20 Deg	≤ 0.5mm(1.5 mm distance)
Switching hysteresis at 110 Deg	≤ 1.0mm(1.5 mm distance)
Repeat accuracy at 20 Deg	≤ 1.0mm(1.5 mm distance)
Repeat accuracy at 110 Deg	≤ .25mm(1.5 mm distance)
Temp sensor	-25°C to 110 °C
Output	1 changeover contact with snap action
Inspection time	min 24000 hr
Manufacturer	KA Schemersal & Co Moeddinghofe & co 5600 Wupertal 2

TEST & INSPECTION

- 1.0 Type Test
 - 1.1.0: Degree of protection
- 2.0 Routine Test
 - 2.1.1: Functional and calibration test for limit switch
 - 2.1.2 Fail safe position of actuator
 - 2.1.3 Fully assembly i.e. the valve along with Pneumatic actuator shall be
- 3.0 Tested for proper function.
 - 3.1.0 Test and Guarantee Certificate Results of all tests enumerated in above shall be compiled in test certificate and to be submitted.
- 4.0 Vendor shall provide our inspector or authorized representative all facilities to witness the tests.

LBC41GF051:- X01

1	o	LBC41CG051C
2	o	LBC41CG051C
3	o	LBC41CG051C
4	o	LBC41CG051B
5	o	LBC41CG051B
6	o	LBC41CG051B
7	o	LBC41AA051A
8	o	LBC41AA051A
9	o	LBC41AA051B
10	o	LBC41AA051B
SH	o	SHIELD
SH	o	SHIELD
PE	o	GROUND
PE	o	GROUND



ASSIGNMENT OF CORE CONDUCTOR COLOURS (DINIEC 757)

BK: BLACK
 BN: BROWN
 BU: BLUE
 GY: GREEN
 GR: GREY
 OG: ORANGE
 PK: PINK
 PU: PURPLE
 RD: RED
 WH: WHITE
 YE: YELLOW

- * THE JUNCTION BOX AND THE JUNCTION BOX COVER HAS TO BE LABELLED WITH ' LBC41GF051'
- * SHIELD (A), IF AVAILABLE, CONNECTED TO SHIELD TERMINALS (SH)
- * GROUND (PE) CONNECTED TO GROUND TERMINALS

TITLE: CONNECTION DIAGRAM HP DUMP VALVE LBC41

REV

REMARKS



BHARAT HEAVY ELECTRICALS LIMITED
 HARIDWAR

DRAWING NO. 41810221002

SH. NO. 4
 BHEL, HARIDWAR

GENERAL REQUIREMENTS:

VOLTAGE:	24 V DC
VOLTAGE TOLERANCE:	min. +10/-15%
ENCLOSURE RATING:	min. IP65/ NEMA 4
TEMPERATURE RANGE:	+ 5°C TO 70°C (+41°F TO 158°F)

SOLENOID VALVE:

Relative	100%
ENERGIZED TIME:	CONSTANT RATED
COIL ISOLATION CLASS	F
Connection:	plug acc. TO DIN EN 175301-803

POSITION TRANSMITTER:

TYPE:	INDUCTIVE
SWITCHING ELEMENT FUNCTION	PNP NORMAL OPEN
Connection:	3-POLE
Connection:	plug acc. TO DIN EN 175301-803
SHIELD:	NOTREQUIRED BUT WIRED IF AVAILABLE

TITLE: ELECTR. SPEC. SOLENOID/GENERAL
/24DC/INDOOR



BHARAT HEAVY ELECTRICALS LTD
HARIDWAR, RANIPUR, INDIA-249403

DRAWING NO. 41810221002

SH. NO.
5

HOOKUP DIAGRAM NO. 41810221002		date: 09.04.2012	
revision:		check: BSRANA	
		sh no. 61	
		plant: BARA	

Air pressure Spring bar stroke mm		mounting position: vertical	
---	--	-----------------------------	--

Pos.	Qty.	Description	Type/Manuf.	Pne. con.	Part No.
2	1	Air set			
3	2	Solenoid valve			
4	2	3/2 Way Pneumatic valve			
5	2	3/2 way solenoid valve			
6	1	Pneumatic Actuator			
7		Lock up valve			
8		Miscellaneous			
9		Booster			
10					
11					
12		Pn. Connection			
13		Vent Filter			
14		Filter	☐ IP54 ☒ IP65		
15	2	Limit Switches Fa. Schmersal	JFL 5-18-11Z STPK-1952-2		
Pipe		Size	Dimensions	Material	
		25x2,5	[mm]	SS	
Fitting		☒ HERMETO ☐ SWEGELDK ☐ PARKER ☐			
Stroking time		Direction	100...0%	0...100%	DN/OFF with Solenoid valve
		Requested [s]	1s/2s		
		Measured [s]			

DATA SHOWN ARE INDICATIVE.

10 LBC41 AA051

RELATED DRAWINGS:

ADDITIONAL NOTES:-

1. TWO NOS ADAPTORS WITH 1/2" FERRULE FITTING FOR CONNECTION TO G1/2" LINE ARE REQUIRED. ALSO G1/2" LINE (APPROX 2 METERS) ARE REQUIRED.
2. LIMIT SWITCHES AND SOLENOID VALVE SHOULD NOT BE MOUNTED ON VALVE TO AVOID DAMAGE DURING ERECTION OF VALVE. THE SAME SHOULD BE LOOSELY PACKED IN A SEPARATE WOODEN BOX / COMPARTMENT TO AVOID BREAKAGE.
3. PROPER LABELLING SUCH AS 'ITEM NAME', 'PO', ETC SHALL BE CLEARLY INDICATED ON THE LOOSE PACKAGE BOX FOR IDENTIFICATION IN CASE OF MISPLACEMENT.

SIGN & DATE			HP RELIEF VALVE LIST OF DOCUMENTS AND DRAWINGS				413137S5005																																				
							Rev.00																																				
							Page 1 of 1																																				
SUPERSEDES INVENTORY NO.		A. <u>SCOPE OF THE DOCUMENT:</u> This document lists down the drawings and documents to be followed for executing the order of one number of HP relief valve. B. <u>LIST OF DOCUMENTS AND DRAWINGS:</u> <table><thead><tr><th>S.no.</th><th>Item description</th><th>Drawing / Document no.</th><th>Rev/ Index</th></tr></thead><tbody><tr><td>1</td><td>Specification – HP Relief valve with pneumatic actuator</td><td>413137S5100</td><td></td></tr><tr><td>2</td><td>HP Relief valve drg</td><td>4-13137-W1101</td><td></td></tr><tr><td>3</td><td>Technical purchasing specification: Valves</td><td>41313795102</td><td>01</td></tr><tr><td>4</td><td>Electrical specs for limit switch and solenoid valves</td><td>41810221002</td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></tbody></table>						S.no.	Item description	Drawing / Document no.	Rev/ Index	1	Specification – HP Relief valve with pneumatic actuator	413137S5100		2	HP Relief valve drg	4-13137-W1101		3	Technical purchasing specification: Valves	41313795102	01	4	Electrical specs for limit switch and solenoid valves	41810221002																	
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INVENTORY NO.		CIE	Mudit Jain		TL	Anil Kumar																																					
		AGREED DEPTT.	NAME	SIGNATURE & DATE	DEPTT	NAME	SIGNATURE & DATE																																				

No.	Item	Specifications – HP Relief Valve with Pneumatic Actuator					
1.	Doc no.	413137S5100					
	Rev no.						
2.	Basic data:						
	Valve Body Material : G17CrMo5-5 / GS17CrMo55 equivalent or higher						
	Inlet connection : 168.3 X 10.97 mm (ASTM182F12C2)						
	Outlet connection : 273.1 X 9.27 mm (ASTM182F12C2)						
	Pos*	Description	Dimension acc to ASME B36.10M		Connection		
			NPS	Schedule	Type	Form/Figure	Standard
	G23	Inlet at HP Relief Valve	6"	80	Butt Weld	5B	ASME B16.25
	G24	Outlet at HP Relief Valve	10"	STD	Butt Weld	4	ASME B16.25
	T840	Control Air Connection at HP Relief Valve	G3/4"	-	Thread	-	EN ISO 228-1
	*See Indicative Drawing for details.						
3.	Valve design		Spindle			vertical	
			Steam Flow Direction			Under the valve cone in opening direction	
			Fittings			Perforated cage	
			KVS-Valve			192 m³/h	
			Seat diameter			According to tech. design	
			Valve stroke			According to tech. design	
			Spindle sealing			Graphite /K80S	
			Leakage Class			EN 1349-Seat leakage IV L1(0.01% KVS value)	
			Valve welding ends acc.to.			ASME B 16.25 Fig. 4 & 5 B	
			Yoke Material			Carbon steel	
4.	Pneumatic Actuator		Spring Working Direction			Opens the valve	
			Control Air Working Direction			Closes the valve	
			Solenoid valves idle			Opens the valve	
			Actuator shall be of proven for the application and shall be subject to BHEL approval				
			Travel Time (100% stroke)			Open ≤ 1 sec. Close ≤ 2 sec.	

		Fail safe position of actuator	Valve open
		Control Air Connection acc. to	G3/4" (Type Thread as per EN ISO 228-1)
		Pressure of control air	5 bar $\leq p < 10$ bar
		Min available Control Air Pressure for the design of the actuator	5 bar
		Design differential pressure of actuator	≥ 78 bar
		Additional force of the actuator	≥ 20 %
5.	Equipment	3/2-Way-Solenoid valves , connected in series. All pneumatic components are piped. All electrical equipments are wired to a terminal box.	2 pieces
		3/2-way pneumatic valve	2 pieces
		Limit switch-valve OPEN:	1 piece
		Limit switch-valve CLOSED:	1 piece
		Filter Regulator with pressure gauge: Adjustment range 0-10 bar, adjusted and sealed at 5 bar	1 piece
6.	Design parameter	Pressure	Temperature
		[bar abs]	[°C]
	Design(Operating Case)	61	363
	Maximal long term	69	397
	Maximal short term:	75	459
	1000h	25.0	510
	15 min. per event and max.10,000h of lifetime	25.0	480
	1 min per single event	75.0	510
	Inlet Mass flow (KG/S)	37.773	
	The following design data of the adjacent pipes have to be considered:		
	Valve Inlet	73.8 bar	513
	Valve Outlet	36.9 bar	495
	Maximal temperature difference in operation between valve inlet and valve outlet in design case maximal long therm		336

	Minimal Pressure at the valve outlet, approx.	0.21 bar (a)	
7.	Seismic Requirements:	Safe operation	Horizontal: 0.3g Vertical: 0.2 g
8.	Installation	Indoor	
	Ambient Conditions	Ambient Temperature min/max	0°C / 50°C
		Absolute Humidity	≥ 60 g/m ³
9.	KKS Labeling	Unit code	
	HP-Relief Valve	LBC41AA051	
	3/2-Way Solenoid Valve 1	LBC41AA051A	
	3/2-Way Solenoid Valve 2	LBC41AA051B	
	3/2-Way Pneumatic Valve 1	LBC41AA051C	
	3/2-Way Pneumatic Valve 2	LBC41AA051D	
	Proximity Switch – Position 100% OPEN	LBC41CG051B	
	Proximity Switch – Position 0% CLOSE	LBC41CG051C	
	Air filter	LBC41AT021	
	Pressure Relief Valve	LBC41AA261	
	Pressure Gauge	LBC41CP501	
	Terminal Box	LBC41GF051	

Prepared by		Approved by	
Anil Kumar	Mudit Jain	Sandeep Sonkar	Ms Saswati Srivastava
Sr.Engr- TL	Sr. Engr-CIE	Sr.Mgr	SDGM-CIE

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Technical drawing of a valve assembly in cross-section. The drawing shows a vertical valve body with a handle on top and a seat on the bottom. Key dimensions include a top diameter of 530, a total height of 1050, and a base diameter of 273. A seat with a diameter of 80 is labeled "SEAT 80 ON-OFF DEVICE". Two diamond-shaped symbols, G24 and G23, are located on the left and right sides of the valve body. The drawing is oriented vertically, with the handle at the top and the seat at the bottom.

1. WELD EDGE AS PER FORM FIG. 2A OF ASME B16.25.
2. TYPE OF ACTUATOR, NUMBER OF CYLINDERS AND DIMENSIONS OF VALVE AND ACTUATOR AS GIVEN IN THIS DRAWING ARE INDICATIVE.



BHEL

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1. Scope of Application

This Technical Purchasing Specification covers valves for evacuating of bottled up pressurized steam from steam turbine unit during load throw-off. During normal operation of turbine, this valve shall remain in tightly closed position and down steam side of the valve shall be subjected to condenser vacuum. The valve is to be suitably designed to prevent the ingress of air through valve glands into the system.

The requirements of this specification are valid as far as no other requirements are given in the enquiry.

2. Type-tested Valves

Valves with a valid type-testing certificate according to PED97/23/EC and to the corresponding VdTÜV-Merkblätter, of TRD 110 attachment 1 as well as accordingly to the registration of DIN-DVGW fulfill the requirements of this specification.

For these valves the requirements for manufacturing and testing agreed upon with the TÜVs respectively with the DVGW-federation shall be fulfilled (declaration of commitment).

3. Referenced Documents

- AD2000-W 0
- AD2000-W 7
- AD2000-HP 0
- AD2000-HP 5/3
- TRD 100
- EN 287-1
- DIN EN ISO 15607
- DIN EN ISO 15609-1
- DIN EN ISO 15614-1
- EN 1418
- EN 10028
- EN 10204
- EN 10213
- EN 10222
- EN 10273
- DIN 1690-10
- EN 1559-1
- EN 1559-2
- EN 12266-1/-2
- DIN 17175,
- PED 97/23/EC
- ASME B16.34

In case of differences or contradictions of the referenced documents the higher requirements shall be applied.

4. Technical Data and Design

The criteria, e.g. fluid, pressure, temperature, material of the casing, etc., as well as other technical data are given in the enquiry.

5. Inspection certificate / Declaration of Compliance in Dependence on Fluid, Pressure and Temperature

For all valves an Inspection Certification 3.1 according to EN 10204 must be provided.

6. QA-Requirements regarding the Valve Manufacturer and his Suppliers:

The valve manufacturer as well as his suppliers for the main components like e.g. pressure guiding components, instrumentation and control, shall have an introduced and well-working quality management system, e.g. according to EN ISO 9000 series or equivalent standard. Manufacturers of pressure guiding components shall have in addition a certificate according to AD2000-W 0 respectively TRD 100.

As far as welding will be performed on the valves, the weld shop shall be certified according to AD2000-HP0.

7. Manufacturing and Inspection Plan (MIP)

The valve manufacturer shall prepare a Manufacturing and Inspection Plan containing sufficient information on the sequence and extent of the valve inspections as well as the main raw material and shall deliver this to the purchaser for review at the latest 4 weeks after order receipt, but at least 2 weeks before starting manufacturing.

8. Condition for Manufacturing

Manufacturing of the valve mentioned in point 7 shall not be started before the review for the design as well as for the MIP has been given by the purchaser. To prohibit any delay the valve manufacturer shall call for missing reviews and remind the purchaser on time.

By reviewing the MIP the purchaser does not take on any responsibility for processes or manufacturing details of the valve manufacturer or his suppliers, or for the valve itself.

9. Fabrication and Inspection

9.1 Steel Castings

Steel castings, e.g. valve casings, covers, etc., shall be manufactured and inspected according to EN 10213 and EN 1559 part 1 and part 2 and DIN 1690 part 10, and following minimum requirements:

- Analysis (chemical composition) per heat
- Mechanical properties per heat and heat treatment batch, for castings with an individual weight > 1000 kg testing per casting
- Amount of non-destructive testing according to DIN 1690 part 10:
 - Weld ends of valves without connection pieces: Quality class A with quality grades S1 + V1
 - Transition areas: quality class B with quality grades S2 + V2
 - Weld ends of valves with connection pieces: Quality class B with quality grades S2 + V2
- remaining areas of the casting: quality class D with quality grades S3 + V4; additionally for castings ≥ 500 kg or DN ≥ 400 mm each casting 100% volume inspection shall be performed.

9.2 Rolled or Forged Material

Rolled or forged material, e.g. connection piece, shall be manufactured and inspected according to the corresponding material standard, e.g. EN 10028, EN 10088, EN 10222, EN 10273, DIN EN 10216-2 and DIN 17440, etc. and following supplements:

- Analysis (chemical composition) per heat
- Mechanical properties per heat and heat treatment batch

9.3 Connecting Elements:

Connecting elements shall be manufactured and tested according to AD2000-W 7. As far as there is a requirement for a test certificate for grade properties, this shall be an inspection certificate 3.1 according to EN 10204.

9.4 Welding

As far as welding will be performed on the valves (also in case of fabrication welding on castings):

- Welding shall be performed only by welders tested in line with EN 287 or mechanized welds by welding operators tested in line with EN 1418
- Corresponding welding procedure specifications and procedure approval records according to
 - DIN EN ISO 15607
 - DIN EN ISO 15609-1
 - DIN EN ISO 15614-1 shall be available.
- Fabrication welds on castings shall be inspected according to DIN 1690.
- Fabrication welds having a length ≥ 150 mm or a depth $\geq 40\%$ of the wall thickness or a depth ≥ 25 mm shall be recorded.
- Design welds shall be inspected according to AD2000-HP 5/3. In case of serial production manufacturer-specific inspection concepts may be applied with written agreement of the purchaser.
- If cast steel parts are subjected to heat treatment in the course of valve manufacture, all parts heated shall subsequently be subjected to a 100% surface crack examination.

9.5 Manufacturing Inspections

Manufacturing Inspections shall be performed according to PED 97/23/EC / EN 12266. The PED 97/23/EC as a superior legislation shall be observed and applied. These are especially:

- a) Pressure test
 - Test P10 according to EN 12266 part 1
- b) Leak test
 - Test P11 + P12, leakage class B according to EN 12266 part 1
- c) Functional test
 - Test F20 according to EN12266 part 2
- d) Verification of dimensions
 - Main dimensions
 - connecting dimensions

All tolerance ranges which are important for the function shall be recorded. As

 - Stem diameter
 - Diameters of guides and fits

10. Marking

Valves shall be marked as follows:

- The name and address or other means of identification of the manufacturer and, where appropriate, of his authorized representative established within the Community
- Nominal diameter
- Nominal pressure class
- Casing material
- Flow direction arrow
- Identification-no. (Also commission-no.)
- The year of manufacture
- Identification of the pressure equipment according to its nature, such as type, series or batch identification and serial number
- Essential maximum/minimum allowable limits
- CE marking is applied for European countries.

Valves with a total weight > 1000 kg shall be marked additionally with a permanent information of the weight on the valve or on an safe name- plate.

The provisional KKS-Labels which are fabricated and properly sized are to be made of plastic or similar unbreakable material and attached to the component by wire. The lettering on the labels should include the KKS classification in back, permanent ink.

Marking of the materials for all pressure loaded casing components shall survive during all manufacturing processes according to AD2000-HP 0.

11. Surface Protection

Surface coating of non-stainless steel valves shall be applied as follows

<u>Paint (Coat)</u>	<u>Paint Type</u>	<u>No. of coat</u>	<u>DFT*</u>
Primer Paint	: Epoxy base Zinc rich primer paint	1 Coat	35
Intermediate Paint	: Epoxy TiO ₂ Pigmented Polyamide Cured Paint	1 Coat	70
Finish (Final) Paint	: Aliphatic Acrylic 2 Pack Polyurethane Finish paint	2 Coats	75

*DFT – Dry Film Thickness (final) in microns

- Shade as per RAL – Grey 9002

12. Documentation

All the documentation for the delivered valve shall remain with the valve manufacturer and shall be stored for at least 10 years. This documentation shall be labelled such as to ensure traceability and allocation to the corresponding valve and shall be marked as belonging to BHEL. The valve manufacturer shall check the documentation with respect to completeness and correctness before shipping the valve. The valve manufacturer shall certify this at the time of the delivery. It is the obligation of the valve manufacturer to hand over a copy of the total documentation to the purchaser on request and free-of-charge.

BHEL expects a documentation of the module/parts including all instructions which are necessary for service, installation and maintenance. Amendments will be requested separately.

In accordance to the Machinery Directive (98/37/EC) and Pressure Equipment Directive (97/23/EC) the following records and logs shall be provided to the purchaser in any case:

- manufactures declaration
- Declaration of conformity
- Material certificates
- Pressure test
- Non-destructive tests

The documentation - also that of the sub suppliers - shall be written in English language and shall contain at least:

- Test certificates of the prematerial (at least inspection certificate 3.1B according to EN 10204)
- Records of all inspections performed by the valve manufacturer or his sub suppliers during manufacturing:
 - Non-destructive inspections of e.g. weld areas or welds
 - Verification of dimensions
 - Pressure and leak tests
 - Functional tests
- Heat treatments performed
- The European Union guidelines and standards which are valid and can be used for the area of application (e.g. PED 97/23/EG, Low-Voltage Guideline 73/23/EEG, etc..) are to be designated in the declaration of conformity according to the remarks and applied quality modules, and shall include all relevant data (see e.g. appendix VII of Guideline 97/23/EG). Risk disclosure and danger analyses in accordance with EN 1050 are to be handed over to BHEL if necessary.
- If materials without European material approval are drawn on for the order (order papers/designs) (e.g. ANSI/ASME materials) appropriate substitute certificates from a designated authority shall be procured and documented accordingly. If the order pertains to a component of a total design group, then all certificates and certification of the component of the highest category of the total design group shall be made available.

13. Final inspection

The purchaser reserves the right to perform final inspections on his ordered parts in the shop of the valve manufacturer, as well as in the shop of his sub suppliers

14. Delivery and Packing

Details regarding delivery are given in the order, however at least following details shall be given together with the delivered parts:

Actualization of standards and instructions

- Purchaser
- Order-no. / project
- Manufacturer commission-no. / works-no.
- Specification
- Number of pieces
- Type / item
- Nominal diameter [DN]
- Maximum allowable pressure [PS]
- Maximum allowable temperature [TS]
- Fluid
- Manufacturer drawing-no.
- Identification-no. of the valve
- Piece weight

Together with the delivery of the valve the valve manufacturer shall hand over a certificate 2.1 according to EN 10204 in English, which confirms that the delivered valve fulfills the requirements given in the order and in this specification. Furthermore the valve manufacturer shall confirm that only materials as listed in the design bill of material have been used and that the documentation is available in his shop in line with Item 12 above and that he has checked the documentation carefully.

Packing of the valve shall be as follows:

- The valve shall be packed and locked that way, that in general case any damage will be prohibited.
- All openings shall be plugged.
- Detail parts respectively components shall be packed individually, however assignment shall be

ensured.

- As far as necessary accessory devices for transportation purposes shall be attached to the valve and/or to the packing, e.g. lifting eyes and lifting signs.
- Bearing areas shall be marked, if necessary.

15. Guarantee

The supplier shall guarantee trouble free operation of the equipment for a period of 2 years after installation and commissioning or a period of 3 years from the date of dispatch of equipment whichever is earlier.

If during erection/commissioning and operation at site, any defect in any component is detected, purchaser's / owner's site representative shall prepare the assessment report and a copy of the same shall be forwarded to the supplier. The supplier shall replace / rectify the concerned items free of charge. The supplier, if he so desires, may depute his representative to site at his own cost otherwise the report of purchaser's / owner's site representative shall be binding on the supplier.

16. Spares

The offer of valves shall include the requirement of spares to be made available at the time of erection & commissioning. A separate offer of spares to be required for 3 to 5 years of operation shall also be separately enclosed along with main offer.

17. Special tools & tackles

Any special tools & tackles, required for erection, commissioning and maintenance of valves shall be included in main offer per set of valves.

18. Supplementary Requirements

The valve manufacturer shall send following documents in triplicate written in English language to the purchaser's department for records. Documents listed under a) and c) shall be delivered with the order acknowledgement:

- a) Part drawing showing the function of the valve and the design bill of material
- b) Operating and maintenance instruction
- c) Spare part list

19. Deviations

Equivalent ASME B16.34 requirements may be considered in place of given in PED 97/23/EC / EN 12266.

Any deviation from this purchasing specification has to be reported to the purchaser immediately.

Any deviation is accepted only if this has been approved or accepted by the purchaser in writing.

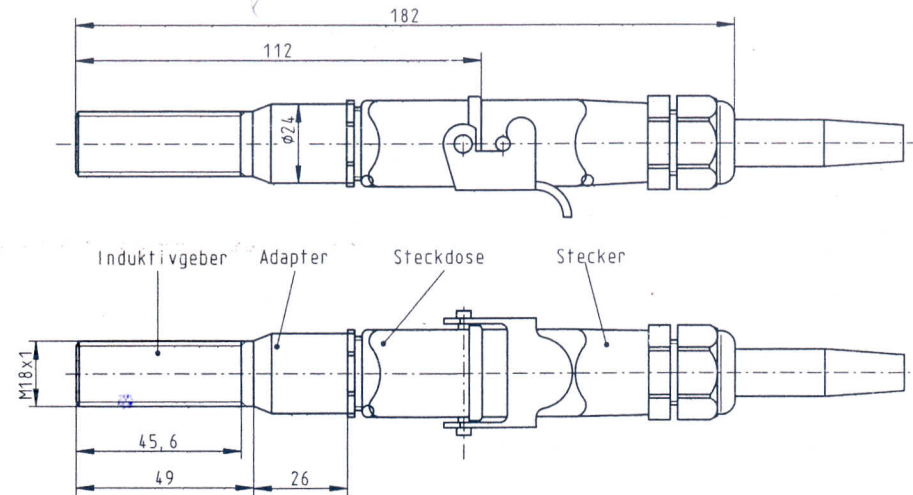
In case of any deviation from the specified properties, also if the proof by testing is not required, the purchaser has the right to reject the material.

BERUEHRUNGSLOSER INDUKTIVGEBER

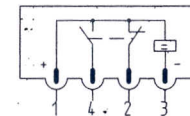
TYP IFL 5-18-11zStPK-1952-2

IFL5-18-11zStPK

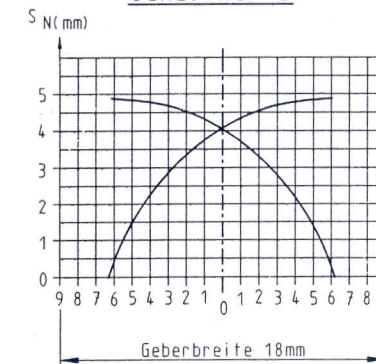
Einbau im Metall	: buendig
Einbaulage	: beliebig
Gehaeuse	: Ms-vernickelt
Sensorflaeche	: Crastin
Anzugsmoment	: max. 1300 Ncm
Schockfestigkeit	: 30g, 11 ms gem. IEC68-2-27
Vibrationsfestigkeit	: 10 Hz-55 Hz, 1 mm gem. IEC68-2-6
Schutzart	: IP 67 fuer den Naeherungsschalter
	: IP 54 fuer die Steckverbindung
schaltend nach	: P
Elektrischer Anschluss	: ueber Steckverbindung Harting HAN 7D mit 0,5mm ² Goldkontakten (Stecker gehoert zum Lieferumfang)
Messart	: induktiv
max Schaltfrequenz	: 500 Hz
Nennspannung	: 24 VDC
Spannungsbereich	: 10-60 VDC
Restwelligkeit	: <10 %
Einschaltdauer	: 100 %
Leerlaufstrom	: <4.8 mA
Laststrom	: <100mA
Verpolungsschutz	: ja
Ueberlast- u. Kurzschlusschutz	: ja
Nennschaltabstand	: 5 mm
Hysteresis bei 20 Grad C	: <0,5 mm (seitliches Anfahren bei 1,5mm Abstand)
Hysteresis bei 110 Grad C	: <1,0 mm (seitliches Anfahren bei 1,5mm Abstand)
Wiederholgenauigkeit bei 20 Grad C	: <0,10 mm (seitliches Anfahren bei 1,5mm Abstand)
Wiederholgenauigkeit bei 110 Grad C	: <0,25 mm (seitliches Anfahren bei 1,5mm Abstand)
Temperatur	: -25 Grad C bis 110 Grad C
Ausgang	: Wechsler
Revisionslose Betriebszeit	: min. 24.000 h
Lieferant	: K. A. Schmersal & Co Moedinghofe 30 5600 Wuppertal 2



Anschlussbild



Schaltkurve



NOTE: 4wire Proximity switch, for taking these wires for termination in JB, NC contact not used, Pl refer, Sh. 4.

Geräteschlüssel: LGBAD
INSTRUMENTATION KEY:

TITEL : PROXIMITY SWITCH

BHART HEAVY ELECTRICAL LTD

HARIDWAR, RANIPUR, INDIA-249403

Drawing No. 41810221002

Sh.1

PROXIMITY SWITCH FOR HPT EVACUATION

Translated version Doc. No. 41810221002

TYP IFL S-18-11zStPK-1952-2

MOUNTING IN METAL: to be flush in metal
Mounting position: Any position
Casing: Ms. Nickel plated
Sensor surface: Crastin
Stud torque: Max 1300 Ncm
Shock reaction: 30 gm, 11ms gem. IEC 68-2-27

Resistance to vibration: 10Hz 55 Hz, 1mm.
Protection: IP67 for proximity probe
Protection: IP 54 for plug connector
Switching to: P
Electrical connection: 4 wire with Harting HAN 7D plug socket, with 0.5 mm² gold contact

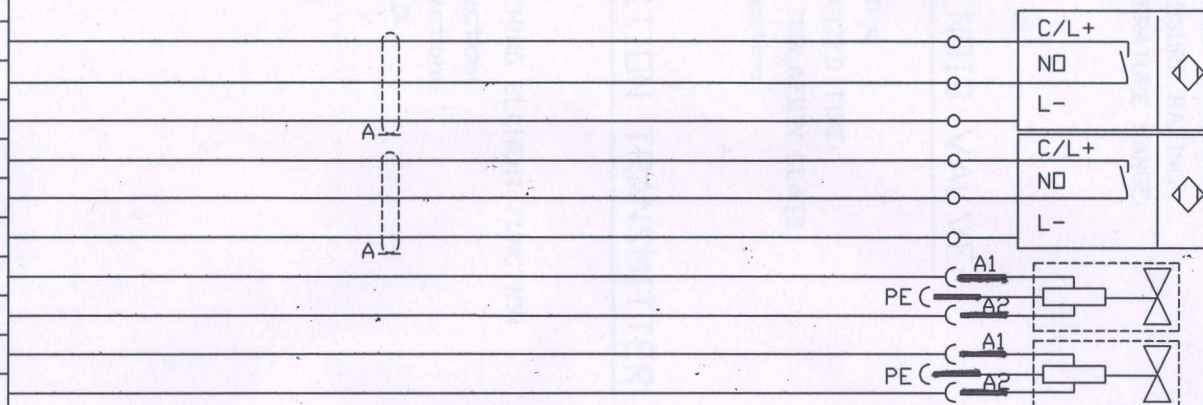
Mode of measurement: Inductive
Max switching frequency: 500Hz
Voltage supply: 24V
Supply range: 10-6 VDC
Residual ripple: $\leq 10\%$
Running time: 100%
Stand by current: $\leq 4.8 \text{ mA}$
Running current: $\leq 100 \text{ mA}$
Non reversible: Yes
Overvoltage protection (short ckt. proof): Yes
Operating distance: 5 mm
Switching hysteresis at 20 Deg: $\leq 0.5 \text{ mm}$ (1.5 mm distance)
Switching hysteresis at 110 Deg: $\leq 1.0 \text{ mm}$ (1.5 mm distance)
Repeat accuracy at 20 Deg: $\leq 1.0 \text{ mm}$ (1.5 mm distance)
Repeat accuracy at 110 Deg: $\leq .25 \text{ mm}$ (1.5 mm distance)
Temp sensor: -25°C to 110 °C
Output: 1 changeover contact with snap action
Inspection time: min 24000 hr
Manufacturer: KA Schemersal & Co
Moeddinghofe & co
5600 Wupertal 2

TEST & INSPECTION

- 1.0 Type Test
 - 1.1.0: Degree of protection
- 2.0 Routine Test
 - 2.1.1: Functional and calibration test for limit switch
 - 2.1.2 Fail safe position of actuator
 - 2.1.3 Fully assembly i.e. the valve along with Pneumatic actuator shall be
- 3.0 Tested for proper function.
 - 3.1.0 Test and Guarantee Certificate Results of all tests enumerated in above shall be compiled in test certificate and to be submitted.
- 4.0 Vendor shall provide our inspector or authorized representative all facilities to witness the tests.

LBC41GF051:- X01

1	o	LBC41CG051C
2	o	LBC41CG051C
3	o	LBC41CG051C
4	o	LBC41CG051B
5	o	LBC41CG051B
6	o	LBC41CG051B
7	o	LBC41AA051A
8	o	LBC41AA051A
9	o	LBC41AA051B
10	o	LBC41AA051B
SH	o	SHIELD
SH	o	SHIELD
PE	o	GROUND
PE	o	GROUND



ASSIGNMENT OF CORE CONDUCTOR COLOURS (DINIEC 757)

BK: BLACK
 BN: BROWN
 BU: BLUE
 GY: GREEN
 GR: GREY
 OG: ORANGE
 PK: PINK
 PU: PURPLE
 RD: RED
 WH: WHITE
 YE: YELLOW

- * THE JUNCTION BOX AND THE JUNCTION BOX COVER HAS TO BE LABELLED WITH ' LBC41GF051'
- * SHIELD (A), IF AVAILABLE, CONNECTED TO SHIELD TERMINALS (SH)
- * GROUND (PE) CONNECTED TO GROUND TERMINALS

TITLE: CONNECTION DIAGRAM HP DUMP VALVE LBC41

REV

REMARKS



BHARAT HEAVY ELECTRICALS LIMITED
 HARIDWAR

DRAWING NO. 41810221002

SH. NO. 4
 BHEL, HARIDWAR

GENERAL REQUIREMENTS:

VOLTAGE:	24 V DC
VOLTAGE TOLERANCE:	min. +10/-15%
ENCLOSURE RATING:	min. IP65/ NEMA 4
TEMPERATURE RANGE:	+ 5°C TO 70°C (+41°F TO 158°F)

SOLENOID VALVE:

Relative	100%
ENERGIZED TIME:	CONSTANT RATED
COIL ISOLATION CLASS	F
Connection:	plug acc. TO DIN EN 175301-803

POSITION TRANSMITTER:

TYPE:	INDUCTIVE
SWITCHING ELEMENT FUNCTION	PNP NORMAL OPEN
Connection:	3-POLE
Connection:	plug acc. TO DIN EN 175301-803
SHIELD:	NOTREQUIRED BUT WIRED IF AVAILABLE

TITLE: ELECTR. SPEC. SOLENOID/GENERAL
/24DC/INDOOR



BHARAT HEAVY ELECTRICALS LTD
HARIDWAR, RANIPUR, INDIA-249403

DRAWING NO. 41810221002

SH. NO.
5

HOOKUP DIAGRAM NO. 41810221002		date: 09.04.2012	
revision:		check: BSRANA	
		sh no. 61	
		plant: BARA	

Air pressure Spring bar stroke mm		mounting position: vertical	
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Pos.	Qty.	Description	Type/Manuf.	Pne. con.	Part No.
2	1	Air set			
3	2	Solenoid valve			
4	2	3/2 Way Pneumatic valve			
5	2	3/2 way solenoid valve			
6	1	Pneumatic Actuator			
7		Lock up valve			
8		Miscellaneous			
9		Booster			
10					
11					
12		Pn. Connection			
13		Vent Filter			
14		Filter	☐ IP54 ☒ IP65		
15	2	Limit Switches Fa. Schmersal	JFL 5-18-11Z STPK-1952-2		
Pipe		Size	Dimensions	Material	
		25x2,5	[mm]	SS	
Fitting		☒ HERMETO ☐ SWEGELDK ☐ PARKER ☐			
Stroking time		Direction	100...0%	0...100%	DN/OFF with Solenoid valve
		Requested [s]			1s/2s
		Measured [s]			

DATA SHOWN ARE INDICATIVE.

10 LBC41 AA051

RELATED DRAWINGS:

ADDITIONAL NOTES:-

1. TWO NOS ADAPTORS WITH 1/2" FERRULE FITTING FOR CONNECTION TO G1/2" LINE ARE REQUIRED. ALSO G1/2" LINE (APPROX 2 METERS) ARE REQUIRED.
2. LIMIT SWITCHES AND SOLENOID VALVE SHOULD NOT BE MOUNTED ON VALVE TO AVOID DAMAGE DURING ERECTION OF VALVE. THE SAME SHOULD BE LOOSELY PACKED IN A SEPARATE WOODEN BOX / COMPARTMENT TO AVOID BREAKAGE.
3. PROPER LABELLING SUCH AS 'ITEM NAME', 'PO', ETC SHALL BE CLEARLY INDICATED ON THE LOOSE PACKAGE BOX FOR IDENTIFICATION IN CASE OF MISPLACEMENT.

MANUFACTURER'S NAME AND ADDRESS			STANDARD QUALITY PLAN					TO BE FILLED BY BHEL		TO BE FILLED BY BHEL				
BHEL	VENDOR'S NAME	ITEM	HP RELIEF VALVE		QP NO.	QA_BI_QP_116								
				DATED	10/02/13									
		DRG. NO.		AS PER PO										
		SPEC.		AS PER PO										
		REV	00			Page 1 of 2								
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS		CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY			REMARKS
										M	B	N		
1	2	3		4	5	6	7	8	9	D	10			11

1.0- RAW MATERIALS & BOUGHT OUT ITEMS												
1.1	Body and Bonnet	Physical & Chemical Properties	MA	Physical & Chemical Examinations	One per Heat	BHEL, Approved Data Sheet	BHEL, Approved Data Sheet	Test Certificate	√	P	V	
1.2		Heat Treatment	MA	Verification	One per Heat	BHEL, Approved Data Sheet	BHEL, Approved Data Sheet	Test Certificate	√	P	V	
1.3		Visual Examination	MA	Visual Examination	100%	BHEL, Approved Data Sheet	BHEL, Approved Data Sheet	Test Certificate	√	P	V	
1.4		Internal Soundness	CR	Radiograph Test	100% on CA	ASME Sec V	ASME B 1634 Appendix I	Test Certificate	√	P	V	
1.5		Sub surface inspection	CR	Magnetic particle test	100% on Access Area	ASME Sec V	ASME B 1634 Appendix II	Test Certificate	√	P	V	
1.6	Trim (Plug Seat Ring & Stem)	Physical & Chemical Properties	MA	Physical & Chemical Examinations	One per Heat	BHEL, Approved Data Sheet	BHEL, Approved Data Sheet	Test Certificate	√	P	V	
1.7	Prosser Resisting Fasteners	Physical & Chemical Properties	MA	Physical & Chemical Examinations	One per Heat	BHEL, Approved Data Sheet	BHEL, Approved Data Sheet	Test Certificate	√	P	V	
1.8	Accessories	Visual	MA	Visual/Model Verification	100%	BHEL, Approved Data Sheet	BHEL, Approved Data Sheet	Compliance Certificate	√	P	V	
2.0- IN PROCESS INSPECTION												
2.1	Body, Bonnet, Plug, Seat Rings after machining	Dimensional Check	MA	Measurement	100%	BHEL, Approved Data Sheet/Drawing	BHEL, Approved Data Sheet/Drawing	IR	√	P	V	
2.2	Body & Bonnet	Pressure Resistance	CR	Hydro Test	100%	ASME B 1634/ BHEL, Approved Data Sheet	No Leak	IR	√	P	V	
2.3	Plug & Seat Contact	Blue match	MA	Plug & Seat Contact	100%	BHEL, Approved Data Sheet	Full line contact	IR	√	P	V	

		LEGEND: ! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER	FOR CUSTOMER USE	
MANUFACTURER/SUBCONTRACTOR				APPROVED BY

MANUFACTURER'S NAME AND ADDRESS			STANDARD QUALITY PLAN					TO BE FILLED BY BHEL		TO BE FILLED BY BHEL				
BHEL	VENDOR'S NAME	ITEM	HP RELIEF VALVE		QP NO.	QA_BI_QP_116								
				DATED	10/02/13									
		DRG. NO.		AS PER PO										
		SPEC.		AS PER PO										
		REV		00		Page 2 of 2								
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS		CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY			REMARKS
										M	B	N		
1	2	3		4	5	6	7	8	9	D	10			11

3.0- FINAL INSPECTION & TESTING														
3.1	Performance Test on Assembled valve fitted with Accessories	Hydro Test	CR	Hydro Test	100%	BHEL, Approved Data Sheet/Drawing	BHEL, Approved Data Sheet/Drawing	Test Certificate	√	P	W			
3.2		Seat Leak Test	CR	Leak Test	100%	BHEL, Approved Data Sheet/Drawing	BHEL, Approved Data Sheet/Drawing	Test Certificate	√	P	W			
3.3		Performance test of Valve	CR	Calibration (hyerisis, Travel, stroke, Stroking time)	100%	BHEL, Approved Data Sheet	BHEL, Approved Data Sheet	Test Certificate	√	P	W			
3.4		Packing Tightness	CR	Packing Leal Test	100%	BHEL, Approved Data Sheet	BHEL, Approved Data Sheet	Test Certificate	√	P	W			
3.5		Control Valve Flow Capacity	CR	Capacity Test	One / Type	BHEL Approved Date Sheet/ISA 75.02	Full Capacity	Test Certificate	√	P	V			
3.6		Model Verification of Actuator and positioner	MA	Visual	100%	BHEL Approved Date Sheet	BHEL, Approved Data Sheet	Test Certificate	√	P	W			
4.0 PAINTING, PRESERVATION & PACKING														
4.1	Final Inspection	Dimension & Visual	MA	Over all Dimension & Visual	100%	App GA Drawing	App GA Drawing	Test Certificate	-	P	W			
4.2	Painting	Paint finish color shade	MA	Visual DFT Measurement	100%	Purchase Specification	Purchase Specification	-	-	P	V			
4.3	Assembled Valve Completeness	Marking/Name Plate & Tagging	MA	Marking/Name Plate & Tagging	100%	BHEL, Approved Data Sheet	BHEL, Approved Data Sheet	-	-	P	W			
4.4	Packing	Packing List, Safety	MA	Verification	100%	Customer Spec	Customer Spec	-	√	P	V			

		LEGEND: ! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER	FOR CUSTOMER USE	
MANUFACTURER/SUBCONTRACTOR				APPROVED BY