


11/10/2022/HEP-HPE41500 	HYDRO PROJECT ENGINEERING DIVISION TITLE : SPECIFICATION OF POSITION FEEDBACK DEVICE FOR NOZZLE	SPECIFICATION NO. 241527350-A	REV 00 Page 1 of 4
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1. **PROJECT: RAHUGHAT & KODYAR HEP**

2. **APPLICATION:**

This specification covers detail of Magnetostrictive / Micro-pulse type linear position measuring device for measuring nozzle servomotor position. It shall be mounted inside the nozzle servomotor hydraulic cylinder in the nozzle piston.

Please refer sketch no. **HPE-GC-449 REV.00** for mounting details of sensor.

3. **SCOPE OF SUPPLY:**

Sl. No.	Item Description	Quantity	Electrical Stroke	Project
1.	Position feedback device for Nozzle	20 Set	200 mm	Rahughat & Kodyar HEP
2.	Spares of position feedback device	2 Set	-	1 set for each

3.1 One set of Linear position feedback device consist of the following:

- One No. Rod type sensor along with 'O' ring
- One No. Standard ring magnet
- One No. Standard ring spacer
- Four Nos. Non magnetic screws for mounting Magnet and spacer



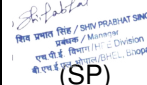
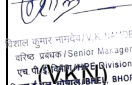
3.2 One set of spares consist of the following:


- 6 Nos. 'O' ring
- 2 Nos. standard ring magnet
- 2 Nos. standard ring spacer

4. **TECHNICAL SPECIFICATION:**


4.1) Rod sensor:

- | | |
|----------------------------|--|
| a) Type | - Magnetostrictive type / Micro-Pulse type |
| b) Measured variable | - Nozzle servomotor position feedback |
| c) Measuring Stroke Length | - As mentioned above |

REV.NO.		DISTRIBUTION.	QTY.	APPROVED:			
PREPARED				 अनिल पाण्डेय/AMIT PANDEY उप महाप्रबन्धक / Up. General Manager रायची ई. विभाग / Raychi E. Division बी.एच.ई.एल., भोपाल / BHEL, BHOPAL			
CHECKED		HPE	01				
APPROVED				 प्रशान्त कुमार / PRASHANT KUMAR डी. प्रबन्धक / D. Manager HPE Division BHEL, Bhopal			
DATE		MM(H)	04	 शिव प्रशान्त सिंह / SHIV PRASHANT SINGH सहायक / Assistant रायची ई. विभाग / Raychi E. Division बी.एच.ई.एल., भोपाल / BHEL, BHOPAL	 वी.के.न. / V.K.N. सहायक प्रबन्धक / Senior Manager रायची ई. विभाग / Raychi E. Division बी.एच.ई.एल., भोपाल / BHEL, BHOPAL	09.11.22	

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- | | |
|--------------------------------|---|
| d) Input Voltage | - 24 V DC |
| e) Output Signal | - Current , 20 - 4 mA (Suitable for load up to 500 Ω) |
| f) Output connection | - Cable type / Right angled connector type
Cable (PTFE / PUR) Length = 10 Meter single
(Check the required protection class at sl. no. r) |
| g) Linearity | - ≤ 0.05 % of FS |
| h) Resolution | - ≤ 0.05 % of FS |
| i) Repeatability | - ≤ 0.05 % of full stroke |
| j) Resolution | - 16 bit |
| k) Operating Temperature Range | - - 10° to +70° C |
| l) Sensor type | - Rod type sensor |
| m) Working pressure | - 100 Bar (Hydraulic piston side) |
| n) Test pressure | - 150 Bar (Hydraulic piston side) |
| o) Electronic head | - Aluminum housing with diagnostic LED (Optional) |
| p) Sensor rod material | - Stainless steel |
| q) Sensor mounting | - Threaded flange (M18 x 1.5)
(Refer Sketch No. HPE-GC-449) |
| r) Protection class | - IP67/ IP68 (Output connection of sensor should be selected to get this protection class) |
| s) Wiring | - Furnish the wiring diagram with color code along with dimensional drawing / catalog by the supplier along with the offer. |
| t) Magnet type | - Standard Ring magnet (Four holes / two holes for mounting) to suit sensor rod dia |
| u) Magnet spacer magnet | - Nonmagnetic spacer to suit ring magnet for mounting |
| v) Screws for Magnet-Space | - Four nos. non magnetic type screws are required for mounting Magnet & spacer on piston. |

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5. DOCUMENTATION:

Along with the offer:

- (a) Catalogues giving all the technical particulars with model code.
- (b) List of deviations, if any. Otherwise, it shall be understood that the vendor is meeting all the requirements specified by us.

Vendor to note that if above documents are not furnished along with the offer; the offer shall be liable for outright rejection.

After placement of order:

- (a) Supplier has to submit the drawing / catalog/datasheet showing over all dimensions, mounting details, wiring schematic and constructional details of Linear position feedback device for our approval within 3 week after placement of P.O.
- (b) Supplier has to submit QAP of Deflector (Linear) position feedback device for our approval.

At the time of supply:

- (a) 2 copies of test certificates / Calibration certificate and guarantee certificates to BHEL items. 1 copy of the above documents shall be put inside the case/ package.
- (b) Shipping / packing lists of the linear position feedback device.
- (c) O & M Manual containing the following (To be sent in soft copy also).
 - Operating principle
 - Mounting details
 - Calibration & adjustment procedure
 - Trouble shooting

6. TEST CERTIFICATES:


- (a) Calibration certificates issued by an ISO 17025 accredited certified Lab / Test certificate from the manufacturer for each linear position feedback device are required.

7. INSPECTION & TESTING:

Functional test of linear position feedback device.is to be carried out and certificate for the same to be furnished.

8. GUARANTEE:

The item must be guaranteed for trouble free operation, good workmanship for a period of 18 months from the date of dispatch.

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9. PACKAGING:

Each Linear position feedback device shall be packed in individual carton with silica gel, adequate cushioning material and waterproof cover to avoid the movement of the internals and ensure that the instrument is capable of withstanding the transit conditions without damages.

10. IDENTIFICATION:

Item shall be identified with following information.

- i) Manufacturer's Name
- ii) Manufacturer's Model No. & Serial No.
- iii) Input voltage
- iv) Output signal
- v) Input/Output connection
- vi) Stroke length in mm

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1. PROJECT: KUTTIYADI, RAHUGHAT & KODYAR HEP

2. DESCRIPTION :

The Nozzle/Deflector position feedback device is linear position feedback device of Magnetostrictive type of sensor (MLDT) with profile housing design, which measures the position of sliding magnet and provides the 4-20 mA DC output for SCADA system. The sliding magnet is connected with the moving part of the nozzle/deflector servomotor. The sliding magnet moves freely on the profile of the sensor.

3. APPLICATION:


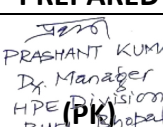
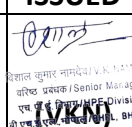
This specification covers detail of Magnetostrictive type linear position feedback device for measuring the stroke of the servomotor (hydraulic cylinder). The sensor design shall be of profile housing type. The profile housing sensor shall be fixed on the upper side of the body of servomotor (hydraulic cylinder) and the sliding magnet is connected with the moving part of the gate servomotor. The sliding magnet moves freely on the profile of the sensor.


4. SCOPE OF SUPPLY:

Sl. No.	Item Description	Active electric stroke	Quantity	Project
1.	Nozzle position feedback device	200 mm	14 Sets	Kuttiyadi
2.	Deflector position feedback device	200 mm	07 sets	Rahughat & Kodyar

4.1 One set of Linear position feedback device consist of the following:


- One No. profile housing type sensor
- One No. Cable with connector
- One No. sliding magnet
- Two nos. mounting clamps along with screws

REV.NO.		DISTRIBUTION	QTY.	APPROVED:			
PREPARED		HPE	01	 अनिल कुमार / Anil Kumar उप महाप्रबंधक / Senior Manager प्रोजेक्ट / Project Division भारतीय भारतीया, भोपाल			
CHECKED				PREPARED	CHECKED	ISSUED	DATE
APPROVED		MHX	01	 प्रशान्त कुमार / Prashant Kumar डी. प्रबंधक / Division Manager HPE Division BHEL, Bhopal			
DATE				 विनायक कुमार नामदेव / V.K. Namdeo वरिष्ठ प्रबंधक / Senior Manager प्रोजेक्ट / Project Division भारतीय भारतीया, भोपाल			
							09.11.22

	11/07/2022/HMD/0100 PROJECTS ENGINEERING DIVISION TITLE : SPECIFICATION OF NOZZLE & DEFLECTOR POSITION FEEDBACK DEVICE	SPECIFICATION NO. 241527350-B	REV 00 Page 2 of 4
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5. TECHNICAL SPECIFICATION:
LINEAR POSITION FEEDBACK DEVICE:

- | | |
|--------------------------------|---|
| a) Type | - Magnetostrictive type |
| b) Sensor type | - Profile housing type sensor |
| c) Measured variable | - Servomotor (servo cylinder) position feedback |
| d) Measuring Stroke Length | - As per table in clause 4 i.e. scope of supply (Active electrical stroke) |
| e) Input Voltage | - 24 V DC, Reverse polarity protection |
| f) Output Signal | - Current, 4 - 20 mA (Suitable for load up to 500 Ω) |
| g) Output connection | - Connector type with Cable (PTFE / PUR),
Cable Length = 10 Meter single |
| h) Linearity | - ≤ 0.05 % of FS |
| i) Resolution | - ≤ 0.05 % of FS |
| j) Repeatability | - ≤ 0.05 % of full stroke |
| k) Resolution | - 16 bit |
| l) Operating Temperature Range | - - 10° to +70° C |
| m) Electronic head | - Aluminum housing with <u>optional diagnostic LED</u> |
| n) Profile housing material | - Aluminum |
| o) Sensor mounting | - Mounting clamps (two nos.) along with nonmagnetic screws should be supplied along with the assembly. |
| p) Protection class | - IP65 or better |
| q) Wiring | - Furnish the wiring diagram with color code along with dimensional drawing / catalog, along with the offer. |
| r) Magnet / Encoder | - Sliding magnet / captive encoder housed in metallic material, moves above and along the profile rail / channel of the sensor. |
| s) Magnet head | - The sliding magnet should have spherical ball bearing type head joints with jointing stud (male / female thread) for connecting it with the moving part of nozzle servomotor. |

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6. DOCUMENTS TO BE FURNISHED:

Along with the offer:

- (a) Catalogues giving all the technical particulars with model code.
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- (b) Supplier has to submit QAP of Deflector (Linear) position feedback device for our approval.

At the time of supply:


- (a) 2 copies of test certificates / Calibration certificate and guarantee certificates to BHEL items. 1 copy of the above documents shall be put inside the case/ package.
- (b) Shipping / packing lists of the linear position feedback device.
- (c) O & M Manual containing the following (To be sent in soft copy also).
 - Operating principle
 - Mounting details
 - Calibration & adjustment procedure
 - Trouble shooting

7. TEST CERTIFICATES:

- (a) Calibration certificates issued by an ISO 17025 accredited certified Lab / Test certificate from the manufacturer for each linear position feedback device are required.

8. GUARANTEE:

The item must be guaranteed for trouble free operation, good workmanship for a period of 18 months from the date of dispatch.

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9. PACKAGING:

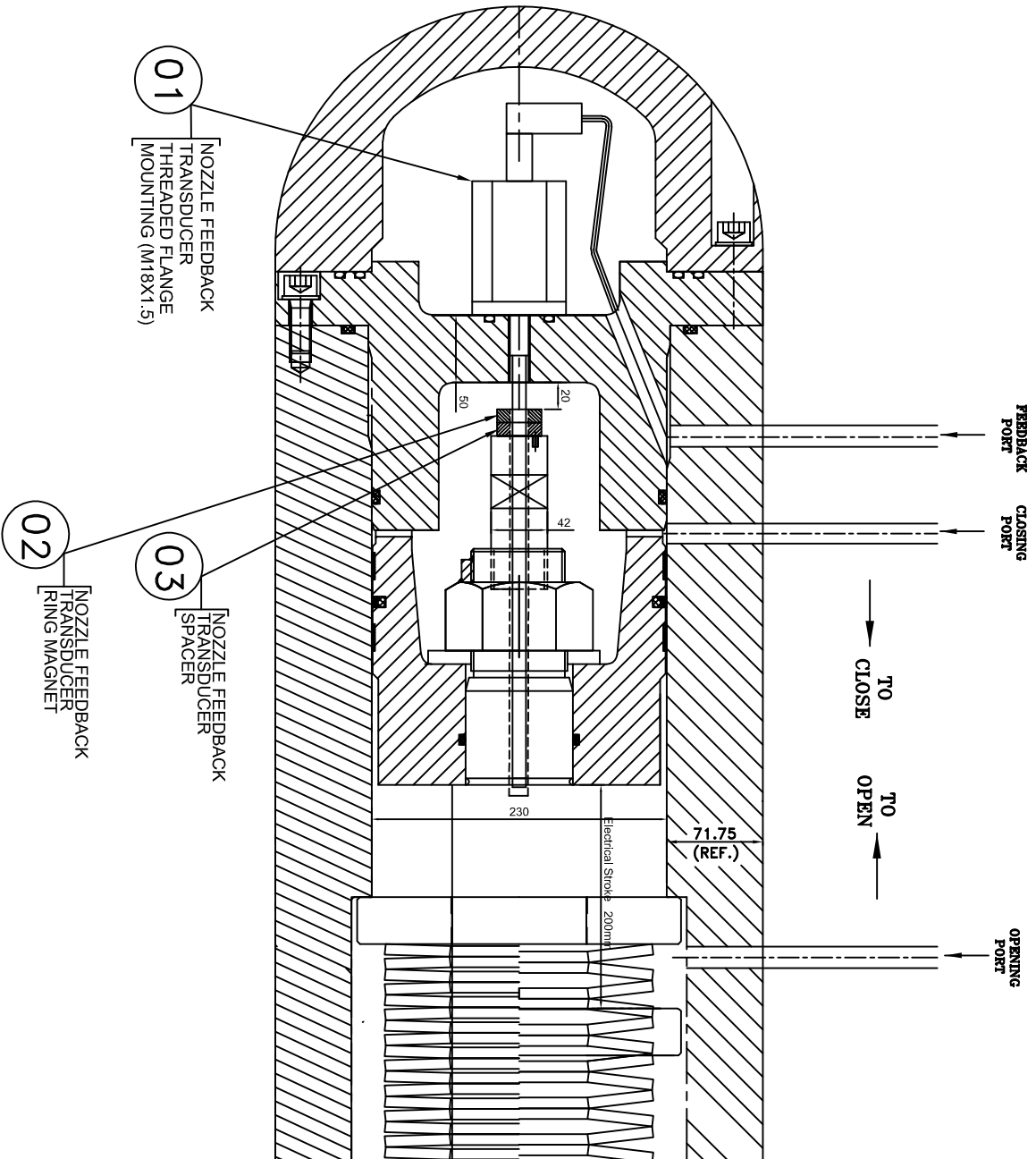
Each Nozzle (Linear) position feedback device shall be packed in individual carton with silica gel, adequate cushioning material and waterproof cover to avoid the movement of the internals and ensure that the instrument is capable of withstanding the transit conditions without damages.

11. IDENTIFICATION:

Item shall be identified with following information.

- i) Manufacturer's Name
- ii) Manufacturer's Model No. & Serial No.
- iii) Input voltage
- iv) Output signal
- v) Input/output connection
- vi) Stroke length in mm

*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*

**NOTE:**

- (A) ITEM NO. 01, 02 & 03 ARE UNDER VENDOR SCOPE OF SUPPLY.
 (B) NOZZLE SERVOMOTOR HAS BEEN SHOWN IN OPEN CONDITION.

NOZZLE POSITION FEEDBACK DEVICE (MAGNETOSTRICTIVE TYPE)

SKETCH NO. HPE/GC/449 Rev. 00.