

|                                                                                                  |                                                                                                                                                                                                                                                                                                                                   |           |                  |                  |              |          |              |                                                                                    |             |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------|------------------|--------------|----------|--------------|------------------------------------------------------------------------------------|-------------|
| <br><b>NISOC</b> | <b>نگهداشت و افزایش تولید میدان نفتی بینک</b><br><b>فعالیت های رو زمینی در بسته های کاری تحت الارض</b><br><b>ساخت موقعیت چاه، تأسیسات سرچاهی، خطوط جریانی، تسهیلات</b><br><b>برق رسانی مربوط به موقعیت W007S و توسعه چندراهه کلاستر بینک</b><br><b>DATA SHEETS FOR CONTROL/REGULATOR VALVES - EXTENSION OF BINAK B/C MANIFOLD</b> |           |                  |                  |              |          |              |  |             |
|                                                                                                  | شماره پیمان: 053 - 073 - 9184                                                                                                                                                                                                                                                                                                     | پروژه: BK | بسته کاری: W007S | صادرکننده: PEDCO | تسهیلات: 110 | رشته: IN | نوع مدرک: DT |                                                                                    | سریال: 0006 |

## طرح نگهداشت و افزایش تولید 27 مخزن

### DATA SHEETS FOR CONTROL/REGULATOR VALVES - EXTENSION OF BINAK B/C MANIFOLD

#### نگهداشت و افزایش تولید میدان نفتی بینک

|                                                                                                                                                                                                                                                                                                                                                                                                   |          |                                |               |             |              |                 |
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|                                                                                                                                                                                                                                                                                                                                                                                                   |          |                                |               |             |              |                 |
|                                                                                                                                                                                                                                                                                                                                                                                                   |          |                                |               |             |              |                 |
|                                                                                                                                                                                                                                                                                                                                                                                                   |          |                                |               |             |              |                 |
|                                                                                                                                                                                                                                                                                                                                                                                                   |          |                                |               |             |              |                 |
| D01                                                                                                                                                                                                                                                                                                                                                                                               | JUN.2022 | IFA                            | P.Hajisadeghi | M.Fakharian | M.Mehrshad   |                 |
| D00                                                                                                                                                                                                                                                                                                                                                                                               | MAR.2022 | IFC                            | P.Hajisadeghi | M.Fakharian | M.Mehrshad   |                 |
| Rev.                                                                                                                                                                                                                                                                                                                                                                                              | Date     | Purpose of Issue / Status      | Prepared by:  | Checked by: | Approved by: | Client Approval |
| Class: 2                                                                                                                                                                                                                                                                                                                                                                                          |          | Client Doc. Number: F9Z-707976 |               |             |              |                 |
| <b>status:</b> <b>IDC:</b> Inter-Discipline Check<br><b>IFC:</b> Issued For Comment<br><b>IFA:</b> Issued For Approval<br><b>AFD:</b> Approved For Design<br><b>AFC:</b> Approved For Construction<br><b>AFP:</b> Approved For Purchase<br><b>AFQ:</b> Approved For Quotation<br><b>IFI:</b> Issued For Information<br><b>AB-R:</b> As-Built for CLIENT Review<br><b>AB-A:</b> As-Built –Approved |          |                                |               |             |              |                 |

|                                                                                                  |                                                                                                                                                                                                                                                  |       |           |            |         |      |          |                                                                                    |                     |
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| <br><b>NISOC</b> | <b>نگهداشت و افزایش تولید میدان نفتی بینک</b><br><b>فعالیت های رو زمینی در بسته های کاری تحت الارض</b><br><br><b>ساخت موقعیت چاه، تأسیسات سرچاهی، خطوط جریانی، تسهیلات</b><br><b>برق رسانی مربوط به موقعیت W007S و توسعه چندراهه کلاستر بینک</b> |       |           |            |         |      |          |  |                     |
|                                                                                                  | <b>DATA SHEETS FOR CONTROL/REGULATOR VALVES - EXTENSION OF BINAK B/C MANIFOLD</b>                                                                                                                                                                |       |           |            |         |      |          |                                                                                    |                     |
|                                                                                                  | شماره پیمان:                                                                                                                                                                                                                                     | پروژه | بسته کاری | صادر کننده | تسهیلات | رشته | نوع مدرک |                                                                                    | سریال               |
| 053 - 073 - 9184                                                                                 | BK                                                                                                                                                                                                                                               | W007S | PEDCO     | 110        | IN      | DT   | 0006     | D01                                                                                | شماره صفحه: 2 از 10 |

### REVISION RECORD SHEET

| Page | D00 | D01 | D02 | D03 | D04 | Page | D00 | D01 | D02 | D03 | D04 |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|
| 1    | X   | X   |     |     |     | 65   |     |     |     |     |     |
| 2    | X   | X   |     |     |     | 66   |     |     |     |     |     |
| 3    | X   | X   |     |     |     | 67   |     |     |     |     |     |
| 4    | X   | X   |     |     |     | 68   |     |     |     |     |     |
| 5    | X   | X   |     |     |     | 69   |     |     |     |     |     |
| 6    | X   | X   |     |     |     | 70   |     |     |     |     |     |
| 7    | X   | X   |     |     |     | 71   |     |     |     |     |     |
| 8    | X   | X   |     |     |     | 72   |     |     |     |     |     |
| 9    | X   | X   |     |     |     | 73   |     |     |     |     |     |
| 10   | X   | X   |     |     |     | 74   |     |     |     |     |     |
| 11   |     |     |     |     |     | 75   |     |     |     |     |     |
| 12   |     |     |     |     |     | 76   |     |     |     |     |     |
| 13   |     |     |     |     |     | 77   |     |     |     |     |     |
| 14   |     |     |     |     |     | 78   |     |     |     |     |     |
| 15   |     |     |     |     |     | 79   |     |     |     |     |     |
| 16   |     |     |     |     |     | 80   |     |     |     |     |     |
| 17   |     |     |     |     |     | 81   |     |     |     |     |     |
| 18   |     |     |     |     |     | 82   |     |     |     |     |     |
| 19   |     |     |     |     |     | 83   |     |     |     |     |     |
| 20   |     |     |     |     |     | 84   |     |     |     |     |     |
| 21   |     |     |     |     |     | 85   |     |     |     |     |     |
| 22   |     |     |     |     |     | 86   |     |     |     |     |     |
| 23   |     |     |     |     |     | 87   |     |     |     |     |     |
| 24   |     |     |     |     |     | 88   |     |     |     |     |     |
| 25   |     |     |     |     |     | 89   |     |     |     |     |     |
| 26   |     |     |     |     |     | 90   |     |     |     |     |     |
| 27   |     |     |     |     |     | 91   |     |     |     |     |     |
| 28   |     |     |     |     |     | 92   |     |     |     |     |     |
| 29   |     |     |     |     |     | 93   |     |     |     |     |     |
| 30   |     |     |     |     |     | 94   |     |     |     |     |     |
| 31   |     |     |     |     |     | 95   |     |     |     |     |     |
| 32   |     |     |     |     |     | 96   |     |     |     |     |     |
| 33   |     |     |     |     |     | 97   |     |     |     |     |     |
| 34   |     |     |     |     |     | 98   |     |     |     |     |     |
| 35   |     |     |     |     |     | 99   |     |     |     |     |     |
| 36   |     |     |     |     |     | 100  |     |     |     |     |     |
| 37   |     |     |     |     |     | 101  |     |     |     |     |     |
| 38   |     |     |     |     |     | 102  |     |     |     |     |     |
| 39   |     |     |     |     |     | 103  |     |     |     |     |     |
| 40   |     |     |     |     |     | 104  |     |     |     |     |     |
| 41   |     |     |     |     |     | 105  |     |     |     |     |     |
| 42   |     |     |     |     |     | 106  |     |     |     |     |     |
| 43   |     |     |     |     |     | 107  |     |     |     |     |     |
| 44   |     |     |     |     |     | 108  |     |     |     |     |     |
| 45   |     |     |     |     |     | 109  |     |     |     |     |     |
| 46   |     |     |     |     |     | 110  |     |     |     |     |     |
| 47   |     |     |     |     |     | 111  |     |     |     |     |     |
| 48   |     |     |     |     |     | 112  |     |     |     |     |     |
| 49   |     |     |     |     |     | 113  |     |     |     |     |     |
| 50   |     |     |     |     |     | 114  |     |     |     |     |     |
| 51   |     |     |     |     |     | 115  |     |     |     |     |     |
| 52   |     |     |     |     |     | 116  |     |     |     |     |     |
| 53   |     |     |     |     |     | 117  |     |     |     |     |     |
| 54   |     |     |     |     |     | 118  |     |     |     |     |     |
| 55   |     |     |     |     |     | 119  |     |     |     |     |     |
| 56   |     |     |     |     |     | 120  |     |     |     |     |     |
| 57   |     |     |     |     |     | 121  |     |     |     |     |     |
| 58   |     |     |     |     |     | 122  |     |     |     |     |     |
| 59   |     |     |     |     |     | 123  |     |     |     |     |     |
| 60   |     |     |     |     |     | 124  |     |     |     |     |     |
| 61   |     |     |     |     |     | 125  |     |     |     |     |     |
| 62   |     |     |     |     |     | 126  |     |     |     |     |     |
| 63   |     |     |     |     |     | 127  |     |     |     |     |     |
| 64   |     |     |     |     |     | 128  |     |     |     |     |     |

|                                                                                               |                                                                                                                                                                                                                                     |       |           |            |         |      |          |                                                                                    |                     |
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| <br><br>NISOC | <p>نگهداشت و افزایش تولید میدان نفتی بینک</p> <p>فعالیت های رو زمینی در بسته های کاری تحت الارض</p> <p>ساخت موقعیت چاه، تأسیسات سرچاهی، خطوط جریانی، تسهیلات</p> <p>برق رسانی مربوط به موقعیت W007S و توسعه چندراهه کلاستر بینک</p> |       |           |            |         |      |          |  |                     |
|                                                                                               | DATA SHEETS FOR CONTROL/REGULATOR VALVES - EXTENSION OF BINAK B/C MANIFOLD                                                                                                                                                          |       |           |            |         |      |          |                                                                                    |                     |
|                                                                                               | شماره پیمان:                                                                                                                                                                                                                        | پروژه | بسته کاری | صادر کننده | تسهیلات | رشته | نوع مدرک |                                                                                    | سریال               |
| 053 - 073 - 9184                                                                              | BK                                                                                                                                                                                                                                  | W007S | PEDCO     | 110        | IN      | DT   | 0006     | D01                                                                                | شماره صفحه: 3 از 10 |

#### REFERENCE DOCUMENTS :

|                                                        |                               |
|--------------------------------------------------------|-------------------------------|
| Specification For Instrumentation                      | BK-GNRL-PEDCO-000-IN-SP-0001  |
| Process Basis Of Design                                | BK-GNRL-PEDCO-000-PR-DB-0001  |
| P&ID - Extension of Binak B/C Manifold                 | BK-W007S-PEDCO-110-PR-PI-0001 |
| Piping Material Specification                          | BK-SSGRL-PEDCO-110-PI-SP-0001 |
| Instrument & Control System Design Criteria            | BK-SSGRL-PEDCO-110-IN-DC-0002 |
| Process Flow Diagram - Extension of Binak B/C Manifold | BK-W007S-PEDCO-110-PR-PF-0001 |
| Specification for Control Valve                        | BK-GNRL-PEDCO-000-IN-SP-0005  |
| Process Design Criteria                                | BK-GNRL-PEDCO-000-PR-DC-0001  |

D01

|                                                                                                  |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |         |      |          |       |      |                     |
|--------------------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------|------|----------|-------|------|---------------------|
| <br><b>NISOC</b> |       | <div><div><br/>گرفت نفت و زغال سنگ</div><div><br/>HIRGAN ENERGY</div><div><br/>TE</div></div> <div>نگهداشت و افزایش تولید میدان نفتی بینک</div> <div>فعالیت های رو زمینی در بسته های کاری تحت الارض</div> <div>ساخت موقعیت چاه، تأسیسات سرچاهی، خطوط جریانی، تسهیلات</div> <div>برق رسانی مربوط به موقعیت W007S و توسعه چندراهه کلاستر بینک</div> <div>DATA SHEETS FOR CONTROL/REGULATOR VALVES - EXTENSION OF BINAK B/C MANIFOLD</div> |           |         |      |          |       |      |                     |
| شماره پیمان:<br>053 - 073 - 9184                                                                 | پروژه | بسته کاری                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | صادرکننده | تسهیلات | رشته | نوع مدرک | سریال | نسخه | شماره صفحه: 4 از 10 |
|                                                                                                  | BK    | W007S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | PEDCO     | 110     | IN   | DT       | 0006  | D01  |                     |

#### GENERAL NOTES:

1-The electrical equipment shall be suitable for hazardous area Zone 2, gas group IIB, temperature class T4.

2-Flow direction shall be specified on the valve body.

3- All flanges shall be in accordance with ASME B16.5.

4- Each valve shall be furnished with name plate as per "specification for control valves" with No. "BK-GNRAI-PEDCO-000-IN-SP-0005".

5- The following items shall be considered:

Design standard for globe valves: IPS-M-IN-160, BS1873

Design standard for plug valves: IPS-M-IN-160 API 599

Valve bonnet and bottom flanges shall be of bolted construction with fully retained gaskets

Trim and seat shall be easily replaceable. seat should be damped or backed up by a seat retainer

Packing material / Packing construction: Teflon/Chevron type

Material test certificate

Dimensional check

Hydrostatic test

Performance and mechanical operation test

Testy certificate including pressure test, visual, Dimensional and nude

Seal leakage test

Casting examination for valves 6 inches and larger in class 600 and higher as per ANSI B 16.34

Casting quality valves shall NDT (RT tested)

Mill test certificate for all metallic parts

6- Screwed bolt-type limit stops, e.g. on the control valve stem, adjustable over the full length of the stroke shall be applied. the vendor shall set the limit/travel stops at the required minimum or maximum valve opening.

7- Environmental Condition For Field Instrumentation Of BINAK oilfield Shall Be Considered As Per The Following:

Maximum ambient temperature: 50 (°C)

Minimum ambient temperature: -5 (°C)

Maximum steel surface exposed to sun: 85 (°C)

Maximum summer dry bulb: - (°C)

DB/RH for Summer HVAC Design: 41 °C / 61 % (Note \*/ Note\*\*)

DB FOR Winter HVAC Design: 6 °C Note \*

\* Refer to " HVAC Design Criteria; N.I.O.C. NO.: F-1-B-422001".

\*\* Refer to "NISOC Meteorological Studies Report".

#### Relative Humidity:

Maximum Design relative humidity (%): 100Minimum Design relative humidity (%): 0

8- Below content to be considered in process condition for all control valves:

H<sub>2</sub>S Mol% = W007S ,W035 , W028 , W046S =0.0003 / W018S , W008N = 0.0004

CO<sub>2</sub> Mol%= W007S ,W035 , W028 , W046S = 0.0014 / W018S, W008N = 0.0022

CL- Content in formation water is 133504 ppm

MAX. Water CUT: ASMARI =20% , BANGESTAN =60%

9- All Control valves shall be IP 65 and weather proof.

10- Standard ISA75.01 for sizing of Control valves shall be considered by vendor.

11- In accordance to IPS-E-IN-160, Control valve body size normally shall not be less than half of normal line size.

12- 2 Nos. Eye-Bolt and 2 Nos. Jack Bolt for each valve to be supplied by vendor.

13- Quick Change Trim type control valve to be designed by vendor.

14- Main parameters such as Noise level, vibration, actuator sizing, valve construction material, CV factor, Fluid specification, ... to be specified as per standard by vendor.

15- The stroking time shall be lower than 5 second for valves up to 4" and 1 second per inch diameter for bigger ones. (VTC)

16- Actuators shall be sized for a minimum air pressure of 3 barg. The normal operating pressure is 4 barg, and the maximum operating pressure is 10 barg. The capacity of the secured instrument air buffer vessel shall be sized for a minimum instrument air supply pressure of 3 barg.

|                                                                                  |  |                                                                                                                                                                                                                  |           |            |         |      |          |                                                                                                                                                                        |      |                     |
|----------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------|---------|------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------|
|  |  | نگهداشت و افزایش تولید میدان نفتی بینک<br>فعالیت های رو زمینی در بسته های کاری تحت الارض<br>ساخت موقعیت چاه، تأسیسات سرچاهی، خطوط جریانی، تسهیلات<br>برق رسانی مربوط به موقعیت W007S و توسعه چندراهه کلاستر بینک |           |            |         |      |          |   |      |                     |
|                                                                                  |  | DATA SHEETS FOR CONTROL/REGULATOR VALVES - EXTENSION OF BINAK B/C MANIFOLD                                                                                                                                       |           |            |         |      |          |                                                                                                                                                                        |      |                     |
| شماره پیمان: 053 - 073 - 9038                                                    |  | پرژه                                                                                                                                                                                                             | بسته کاری | صادر کننده | تسهیلات | رشته | نوع مدرک | سریال                                                                                                                                                                  | نسخه | شماره صفحه: 5 از 10 |
|                                                                                  |  | BK                                                                                                                                                                                                               | W007S     | PEDCO      | 110     | IN   | DT       | 0006                                                                                                                                                                   | D01  |                     |

|                       |              |                                                            |                |                                  |              |                         |                  |                                          |                  |                                                 |          |
|-----------------------|--------------|------------------------------------------------------------|----------------|----------------------------------|--------------|-------------------------|------------------|------------------------------------------|------------------|-------------------------------------------------|----------|
| Control Valve         |              |                                                            |                |                                  |              |                         |                  |                                          |                  | D01                                             |          |
| GENERAL               | 1            | Tag No.                                                    |                |                                  |              | FV-1701A                |                  |                                          |                  |                                                 |          |
|                       | 2            | Service                                                    |                |                                  |              | FROM W018S              |                  |                                          |                  |                                                 |          |
|                       | 3            | Line No.                                                   |                | P&ID No.                         |              | CRD-110-171A-FN05-4"-PT |                  | BK-W007S-PEDCO-110-PR-PI-0001 ( 3 of 6 ) |                  |                                                 |          |
|                       | 4            | Area Classification                                        |                |                                  |              | Zone 2, IIB, T4         |                  |                                          |                  |                                                 |          |
|                       | 5            | Ambient Temperature                                        |                | °C                               | Min.         | Max.                    | -5               |                                          | 50               |                                                 |          |
|                       | 6            | Available Air Supply Pressure                              |                | barg                             | Min.         | Max.                    | 3                |                                          | 8                |                                                 |          |
|                       | 7            | Nace Requirement:                                          |                |                                  |              | Required                |                  |                                          |                  |                                                 |          |
| PIPE & LINE           | 8            | Pipe Class                                                 |                | Pipe Sch.                        |              | FN05                    |                  | SCH. 80                                  |                  |                                                 |          |
|                       | 9            | Pipe Line Insulation  Line Size                            |                | Pipe Material                    |              | PT / 4"                 |                  | API 5L GR.B, SMLS, BE, ASME, B36.10M     |                  |                                                 |          |
| PROCESS CONDITIONS    | 10           | Fluid                                                      |                |                                  |              | Crude oil               |                  |                                          |                  |                                                 |          |
|                       | 11           | State                                                      |                |                                  |              | mixed / 3phase          |                  |                                          |                  |                                                 |          |
|                       | 12           | Valve Design Pressure(barg)/ Actuator Shut Off Pressure DP |                |                                  |              | 102/102                 |                  |                                          |                  |                                                 |          |
|                       | 13           |                                                            |                |                                  |              | Units                   | Max              | Norm.                                    | Min.             |                                                 |          |
|                       | 14           | Flow Rate(vapor/liquid)                                    |                |                                  |              | kg/h                    | 196.02/13242.185 | 178.2/12038.35                           | 53.46/3611.505   |                                                 |          |
|                       | 15           | Inlet Pressure                                             |                |                                  |              | bar-g                   | 12.78            | 12.78                                    | 12.78            |                                                 |          |
|                       | 16           | Pressure Drop                                              |                |                                  |              | bar                     | 2                |                                          |                  |                                                 |          |
|                       | 17           | Inlet Temperature(max)                                     |                |                                  |              | °C                      | 36.31            |                                          |                  |                                                 |          |
|                       | 18           | Liquid Specific Gravity (GI)                               |                |                                  |              | 0.923                   |                  |                                          |                  |                                                 |          |
|                       | 19           | Compressibility Factor(Z)(vapour)                          |                |                                  |              | -                       | 0.9474           |                                          |                  |                                                 |          |
|                       | 20           | Viscosity (vapour/oil/water)                               |                |                                  |              | cP                      | 0.011/8.63/0.69  |                                          |                  |                                                 |          |
|                       | 21           | Specific Heats Ratio(Cp/Cv) (vapour/liquid)                |                |                                  |              | -                       | 1.27/2.31        |                                          |                  |                                                 |          |
|                       | 22           | Vapour Pressure                                            |                |                                  |              | bar-g                   | 52.54            |                                          |                  |                                                 |          |
|                       | 23           | Critical Pressure (liquid)                                 |                |                                  |              | bar-g                   | 386.3            |                                          |                  |                                                 |          |
| CALCULATED RESULTS    | 24           | Flow Coefficient Cv (max-case)                             |                |                                  |              | -                       | 21 (VTC)         |                                          |                  |                                                 |          |
|                       | 25           | Travel (max-case)                                          |                |                                  |              | %                       | 81.2 (VTC)       |                                          |                  |                                                 |          |
|                       | 26           | Sound Pressure Level                                       |                |                                  |              | dBA                     | Max. 85 dBA(VTC) | Max. 85 dBA(VTC)                         | Max. 85 dBA(VTC) |                                                 |          |
| BODY AND TRIM(Note 6) | 27           | Body size                                                  |                | 2" (VTC)                         |              | POSITIONER<br>(Note 5)  | 50               | Type                                     |                  | Electro-Pneumatic Smart                         |          |
|                       | 28           | Rated Cv                                                   |                | (NOTE 4)                         |              |                         | 51               | Input Signal                             |                  | 4-20 mA-HART Smart                              |          |
|                       | 29           | End conn. & Rating IN/OUT                                  |                | 2" # 600 / 2" # 600              |              |                         | 52               | Power Supply                             |                  | 24 VDC loop powered                             |          |
|                       | 30           | Body/Bonnet Material                                       |                | ASTM A216 GR. WCB                |              |                         | 53               | Electrical Connection                    |                  | ISO M20x 1.5                                    |          |
|                       | 31           | Body/Bonnet Type                                           |                | GLOBE / Bolted Flange Bonnet     |              |                         | 54               | Direct/Reverse Act.                      |                  | (NOTE 4)                                        |          |
|                       | 32           | Flow Direction                                             |                | (NOTE 4)                         |              |                         | 55               | Lock Last Position                       |                  | (NOTE 4)                                        |          |
|                       | 33           | Packing Material                                           |                | P.T.F.E.                         |              |                         | 56               | Output Signal                            |                  | 3-15 Psi                                        |          |
|                       | 34           | Trim Type                                                  |                | SINGLE SEATED/CAGE               |              | SOLENOID VALVE          | 57               | I.P./Ex.Protect.                         | Gauge            | 65 / EExia                                      | Yes      |
|                       | 35           | Characteristic                                             |                | EQUAL PERCENTAGE (VTC)           |              |                         | 58               | MFR/Model                                | LCD requirement  | (NOTE 4)                                        | Yes      |
|                       | 36           | Guiding                                                    |                | (NOTE 4)                         |              |                         | 59               | Type                                     | Qty.             | N/A                                             | N/A      |
|                       | 37           | Rated Travel                                               |                | (NOTE 4)                         |              |                         | 60               | MFR                                      | Model            | N/A                                             | N/A      |
|                       | 38           | Plug/Disk Material                                         |                | SS316                            |              | SWITCHES                | 61               | I.P.                                     | Ex.Protect.      | N/A                                             | N/A      |
|                       | 39           | Seat Material                                              |                | SS316                            |              |                         | 62               | MFR                                      | Model            | N/A                                             | N/A      |
|                       | 40           | Cage/Guid Material                                         |                | SS316                            |              |                         | 63               | Type                                     | Qty.             | N/A                                             | N/A      |
|                       | 41           | Stem Material                                              |                | SS316                            |              |                         | 64               | Power Supply                             |                  | N/A                                             |          |
|                       | 42           | Trim Material                                              |                | SS316                            |              |                         | 65               | Contacts / Rating                        |                  | N/A                                             |          |
|                       | 43           | MFR                                                        | Model          | (NOTE 4)                         |              |                         | 66               | Switching Position                       |                  | N/A                                             |          |
| 44                    | Size         | Eff.Area                                                   | (NOTE 4)       |                                  | 67           |                         | I.P.             | Ex.Protect.                              | N/A              | N/A                                             |          |
| ACTUTOR               | 45           | Air Failure                                                | Handwheel      | FAIL CLOSE                       | SIDE MOUNTED | AIR SET                 | 68               | MFR                                      | Model            | N/A                                             | N/A      |
|                       | 46           | Air Action                                                 | Orientation    | AIR TO OPEN                      | VERT. UP     |                         | 69               | Set Pressure                             |                  | Yes (NOTE 4)                                    |          |
|                       | 47           | Actuator Type                                              |                | spring return and diaphragm type |              |                         | 70               | Filter                                   | Gauge            | Yes                                             | Yes      |
|                       | 48           | AIR Press.                                                 | Min/ Max/ Des. | (Barg)                           | 4 (Note3)    |                         | 7.5              | 8.5                                      | 71               | Pnumatic Conn.                                  |          |
|                       | 49           | MFR                                                        | Model          | (NOTE 4)                         |              | (NOTE 4)                | TESTS            | 72                                       | MFR              | Model                                           | (NOTE 4) |
|                       |              |                                                            |                |                                  |              | 73                      |                  | Hydro. Pressure                          |                  | API 598                                         |          |
|                       |              |                                                            |                |                                  |              | 74                      |                  | Leakage Class                            |                  | ANSI IV                                         |          |
|                       |              |                                                            |                |                                  |              | 75                      |                  | Performance Test                         |                  | Required                                        |          |
|                       |              |                                                            |                |                                  |              | 76                      |                  | Internal Tubing                          |                  | Required(with Double Ferrule Compression conn.) |          |
| PURCHASE              | Manufacturer |                                                            | (Note 4)       |                                  |              | OPTIONS                 | 77               | Tube Material                            |                  | 316 S.S L                                       |          |
|                       | Model        |                                                            | (Note 4)       |                                  |              |                         | 78               | Cable Gland                              |                  | M20, Nickel plated brass                        |          |
|                       |              |                                                            |                |                                  |              |                         | 79               | Cable Entry                              |                  | M20 x 1.5                                       |          |

NOTES:

- All materials shall be in accordance with 'Piping Material Specification' , "Document No.: BK-SSGRL-PEDCO-110-PI-SP-0001".
- VTA: Vendor To Advise VTC: Vendor To Confirm
- Minimum of instrument air pressure supply is 4 barg but 3 barg as minimum working pressure, shall be considered for actuator sizing .
- Shall be stated by vendor at quotaion stage.
- Bypass line and isolating valve shall be considered for valve positioner by vendor.
- Trim part material shall be considered as minimum 316SS or any equal hard steel.

|                                                                                  |                                                                                                                                                                                                                  |       |           |            |         |      |                                                                                                                                                                        |       |
|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|------------|---------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
|  | نگهداشت و افزایش تولید میدان نفتی بینک<br>فعالیت های رو زمینی در بسته های کاری تحت الارض<br>ساخت موقعیت چاه، تأسیسات سرچاهی، خطوط جریانی، تسهیلات<br>برق رسانی مربوط به موقعیت W007S و توسعه چندراهه کلاستر بینک |       |           |            |         |      |   |       |
|                                                                                  | DATA SHEETS FOR CONTROL/REGULATOR VALVES - EXTENSION OF BINAK B/C MANIFOLD                                                                                                                                       |       |           |            |         |      |                                                                                                                                                                        |       |
|                                                                                  | شماره پیمان:                                                                                                                                                                                                     | پروژه | بسته کاری | صادر کننده | تسهیلات | رشته | نوع مدارک                                                                                                                                                              | سریال |
| 053 - 073 - 9038                                                                 | BK                                                                                                                                                                                                               | W007S | PEDCO     | 110        | IN      | DT   | 0006                                                                                                                                                                   | D01   |

  

|                       |                            |                                                            |                |                                  |              |                         |                    |                       |                                                 |                         |                 |         |
|-----------------------|----------------------------|------------------------------------------------------------|----------------|----------------------------------|--------------|-------------------------|--------------------|-----------------------|-------------------------------------------------|-------------------------|-----------------|---------|
| Control Valve         |                            |                                                            |                |                                  |              |                         |                    |                       |                                                 | D01                     |                 |         |
| GENERAL               | 1                          | Tag No.                                                    |                |                                  |              | FV-1701B                |                    |                       |                                                 |                         |                 |         |
|                       | 2                          | Service                                                    |                |                                  |              | FROM W046S              |                    |                       |                                                 |                         |                 |         |
|                       | 3                          | Line No.                                                   |                | P&ID No.                         |              | CRD-110-171B-FN05-4"-PT |                    |                       | BK-W007S-PEDCO-110-PR-PI-0001 ( 3 of 6 )        |                         |                 |         |
|                       | 4                          | Area Classification                                        |                |                                  |              | Zone 2, IIB,T4          |                    |                       |                                                 |                         |                 |         |
|                       | 5                          | Ambient Temperature                                        |                | °C                               | Min.         | Max.                    |                    | -5                    |                                                 | 50                      |                 |         |
|                       | 6                          | Available Air Supply Pressure                              |                | barg                             | Min.         | Max.                    |                    | 3                     |                                                 | 8                       |                 |         |
|                       | 7                          | Nace Requirement:                                          |                |                                  |              | Required                |                    |                       |                                                 |                         |                 |         |
| PIPE & LINE           | 8                          | Pipe Class                                                 |                | Pipe Sch.                        |              | FN05                    |                    |                       | SCH. 80                                         |                         |                 |         |
|                       | 9                          | Pipe Line Insulation  Line Size                            |                | Pipe Material                    |              | PT / 4"                 |                    |                       | API 5L GR.B, SMLS, BE, ASME, B36.10M            |                         |                 |         |
| PROCESS CONDITIONS    | 10                         | Fluid                                                      |                |                                  |              | Crude oil               |                    |                       |                                                 |                         |                 |         |
|                       | 11                         | State                                                      |                |                                  |              | mixed / 3phase          |                    |                       |                                                 |                         |                 |         |
|                       | 12                         | Valve Design Pressure(barg)/ Actuator Shut Off Pressure DP |                |                                  |              | 102/102                 |                    |                       |                                                 |                         |                 |         |
|                       | 13                         |                                                            |                | Units                            | Max          |                         | Norm.              |                       | Min.                                            |                         |                 |         |
|                       | 14                         | Flow Rate(vapor/liquid)                                    |                |                                  |              | kg/h                    | 734.69/29279.096   |                       | 667.9/26617.36                                  |                         | 200.37/7985.208 |         |
|                       | 15                         | Inlet Pressure                                             |                |                                  |              | bar-g                   | 12.78              |                       | 12.78                                           |                         | 12.78           |         |
|                       | 16                         | Pressure Drop                                              |                |                                  |              | bar                     | 2                  |                       |                                                 |                         |                 |         |
|                       | 17                         | Inlet Temperature(max)                                     |                |                                  |              | °C                      | 35.75              |                       |                                                 |                         |                 |         |
|                       | 18                         | Liquid Specific Gravity (GI)                               |                |                                  |              |                         | 1.027              |                       |                                                 |                         |                 |         |
|                       | 19                         | Compressibility Factor(Z)(vapour)                          |                |                                  |              | -                       | 0.943              |                       |                                                 |                         |                 |         |
|                       | 20                         | Viscosity (vapour/oil/water)                               |                |                                  |              | cP                      | 0.011/5.62/0.69    |                       |                                                 |                         |                 |         |
|                       | 21                         | Specific Heats Ratio(Cp/Cv) (vapour/liquid)                |                |                                  |              | -                       | 1.276/2.33         |                       |                                                 |                         |                 |         |
|                       | 22                         | Vapour Pressure                                            |                |                                  |              | bar-g                   | 13.02              |                       |                                                 |                         |                 |         |
| 23                    | Critical Pressure (liquid) |                                                            |                |                                  | bar-g        |                         |                    |                       |                                                 |                         |                 |         |
| CALCULATED RESULTS    | 24                         | Flow Coefficient Cv (max-case)                             |                |                                  |              | -                       | 65 (VTC)           |                       |                                                 |                         |                 |         |
|                       | 25                         | Travel (max-case)                                          |                |                                  |              | %                       | 65.5 (VTC)         |                       |                                                 |                         |                 |         |
|                       | 26                         | Sound Pressure Level                                       |                |                                  |              | dBA                     | Max. 85 dBA(VTC)   |                       | Max. 85 dBA(VTC)                                |                         |                 |         |
| BODY AND TRIM(Note 6) | 27                         | Body size                                                  |                | 3" (VTC)                         |              | POSITIONER<br>(Note 5)  | 50                 | Type                  |                                                 | Electro-Pneumatic Smart |                 |         |
|                       | 28                         | Rated Cv                                                   |                | (NOTE 4)                         |              |                         | 51                 | Input Signal          |                                                 | 4-20 mA-HART Smart      |                 |         |
|                       | 29                         | End conn. & Rating IN/OUT                                  |                | 3" # 600 / 3"#600                |              |                         | 52                 | Power Supply          |                                                 | 24 VDC loop powered     |                 |         |
|                       | 30                         | Body/Bonnet Material                                       |                | ASTM A216 GR. WCB                |              |                         | 53                 | Electrical Connection |                                                 | ISO M20x 1.5            |                 |         |
|                       | 31                         | Body/Bonnet Type                                           |                | GLOBE / Bolted Flange Bonnet     |              |                         | 54                 | Direct/Reverse Act.   |                                                 | (NOTE 4)                |                 |         |
|                       | 32                         | Flow Direction                                             |                | (NOTE 4)                         |              |                         | 55                 | Lock Last Position    |                                                 | (NOTE 4)                |                 |         |
|                       | 33                         | Packing Material                                           |                | P.T.F.E.                         |              | 56                      | Output Signal      |                       | 3-15 Psi                                        |                         |                 |         |
|                       | 34                         | Trim Type                                                  |                | SINGLE SEATED/CAGE               |              | 57                      | I.P./Ex.Protect.   | Gauge                 | 65 / EExia                                      | Yes                     |                 |         |
|                       | 35                         | Characteristic                                             |                | EQUAL PERCENTAGE (VTC)           |              | 58                      | MFR/Model          | LCD requirement       | (NOTE 4)                                        | Yes                     |                 |         |
|                       | 36                         | Guiding                                                    |                | (NOTE 4)                         |              | 59                      | Type               | Qty.                  | N/A                                             | N/A                     |                 |         |
|                       | 37                         | Rated Travel                                               |                | (NOTE 4)                         |              | 60                      | MFR                | Model                 | N/A                                             | N/A                     |                 |         |
|                       | 38                         | Plug/Disk Material                                         |                | SS316                            |              | 61                      | I.P.               | Ex.Protect.           | N/A                                             | N/A                     |                 |         |
|                       | 39                         | Seat Material                                              |                | SS316                            |              | 62                      | MFR                | Model                 | N/A                                             | N/A                     |                 |         |
|                       | 40                         | Cage/Guid Material                                         |                | SS316                            |              | 63                      | Type               | Qty.                  | N/A                                             | N/A                     |                 |         |
|                       | 41                         | Stem Material                                              |                | SS316                            |              | 64                      | Power Supply       |                       | N/A                                             |                         |                 |         |
|                       | 42                         | Trim Material                                              |                | SS316                            |              | 65                      | Contacts / Rating  |                       | N/A                                             |                         |                 |         |
|                       | 43                         | MFR                                                        | Model          | (NOTE 4)                         | (NOTE 4)     | 66                      | Switching Position |                       | N/A                                             |                         |                 |         |
|                       | ACTUATOR                   | 44                                                         | Size           | Eff.Area                         | (NOTE 4)     | (NOTE 4)                | AIR SET            | 69                    | Set Pressure                                    |                         | Yes (NOTE 4)    |         |
| 45                    |                            | Air Failure                                                | Handwheel      | FAIL CLOSE                       | SIDE MOUNTED | 70                      |                    | Filter                | Gauge                                           | Yes                     | Yes             |         |
| 46                    |                            | Air Action                                                 | Orientation    | AIR TO OPEN                      | VERT. UP     | 71                      |                    | Pnumatic Conn.        |                                                 | 1/4 " NPTF              |                 |         |
| 47                    |                            | Actuator Type                                              |                | spring return and diaphragm type |              | 72                      |                    | MFR                   | Model                                           | (NOTE 4)                | (NOTE 4)        |         |
| 48                    |                            | AIR Press.                                                 | Min/ Max/ Des. | (Barg)                           | 4 (Note3)    | 7.5                     | 8.5                | TESTS                 | 73                                              | Hydro. Pressure         |                 | API 598 |
| 49                    |                            | MFR                                                        | Model          | (NOTE 4)                         | (NOTE 4)     | 74                      | Leakage Class      |                       | ANSI IV                                         |                         |                 |         |
| PURCHASE              | Manufacturer               | (Note 4)                                                   |                |                                  | OPTIONS      | 75                      | Performance Test   |                       | Required                                        |                         |                 |         |
|                       | Model                      | (Note 4)                                                   |                |                                  |              | 76                      | Internal Tubing    |                       | Required(with Double Ferrule Compression conn.) |                         |                 |         |
|                       |                            |                                                            |                |                                  |              | 77                      | Tube Material      |                       | 316 S.S L                                       |                         |                 |         |
|                       |                            |                                                            |                |                                  |              | 78                      | Cable Gland        |                       | M20, Nickel plated brass                        |                         |                 |         |
|                       |                            |                                                            |                |                                  |              | 79                      | Cable Entry        |                       | M20 x 1.5                                       |                         |                 |         |

  

NOTES:

- All materials shall be in accordance with 'Piping Material Specification' , "Document No.: BK-SSGRL-PEDCO-110-PI-SP-0001".
- VTA: Vendor To Advise VTC: Vendor To Confirm
- Minimum of instrument air pressure supply is 4 barg but 3 barg as minimum working pressure, shall be considered for actuator sizing .
- Shall be stated by vendor at quotaion stage.
- Bypass line and isolating valve shall be considered for valve positioner by vendor.
- Trim part material shall be considered as minimum 316SS or any equal hard steel.

|                                                                                  |  |                                                                                                                                                                                                                  |           |            |         |      |           |                                                                                                                                                                         |      |                     |
|----------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------|---------|------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------|
|  |  | نگهداشت و افزایش تولید میدان نفتی بینک<br>فعالیت های رو زمینی در بسته های کاری تحت الارض<br>ساخت موقعیت چاه، تأسیسات سرچاهی، خطوط جریانی، تسهیلات<br>برق رسانی مربوط به موقعیت W007S و توسعه چندراهه کلاستر بینک |           |            |         |      |           |   |      |                     |
|                                                                                  |  | DATA SHEETS FOR CONTROL/REGULATOR VALVES - EXTENSION OF BINAK B/C MANIFOLD                                                                                                                                       |           |            |         |      |           |                                                                                                                                                                         |      |                     |
| شماره پیمان: 053 - 073 - 9038                                                    |  | پرورژه                                                                                                                                                                                                           | بسته کاری | صادر کننده | تسهیلات | رشته | نوع مدارک | سریال                                                                                                                                                                   | نسخه | شماره صفحه: 7 از 10 |
|                                                                                  |  | BK                                                                                                                                                                                                               | W007S     | PEDCO      | 110     | IN   | DT        | 0006                                                                                                                                                                    | D01  |                     |

|                       |                    |                                                            |                    |                                  |                        |                         |                  |                                          |                                                 |             |     |     |
|-----------------------|--------------------|------------------------------------------------------------|--------------------|----------------------------------|------------------------|-------------------------|------------------|------------------------------------------|-------------------------------------------------|-------------|-----|-----|
| Control Valve         |                    |                                                            |                    |                                  |                        |                         |                  |                                          |                                                 | D01         |     |     |
| GENERAL               | 1                  | Tag No.                                                    |                    |                                  |                        | FV-1701C                |                  |                                          |                                                 |             |     |     |
|                       | 2                  | Service                                                    |                    |                                  |                        | FROM W008N              |                  |                                          |                                                 |             |     |     |
|                       | 3                  | Line No.                                                   |                    | P&ID No.                         |                        | CRD-110-171C-FN05-4"-PT |                  | BK-W007S-PEDCO-110-PR-PI-0001 ( 4 of 6 ) |                                                 |             |     |     |
|                       | 4                  | Area Classification                                        |                    |                                  |                        | Zone 2, IIB,T4          |                  |                                          |                                                 |             |     |     |
|                       | 5                  | Ambient Temperature                                        |                    | °C                               | Min.                   | Max.                    | -5               |                                          | 50                                              |             |     |     |
|                       | 6                  | Available Air Supply Pressure                              |                    | barg                             | Min.                   | Max.                    | 3                |                                          | 8                                               |             |     |     |
|                       | 7                  | Nace Requirement:                                          |                    |                                  |                        | Required                |                  |                                          |                                                 |             |     |     |
| PIPE & LINE           | 8                  | Pipe Class                                                 |                    | Pipe Sch.                        |                        | FN05                    |                  | SCH. 80                                  |                                                 |             |     |     |
|                       | 9                  | Pipe Line Insulation  Line Size                            |                    | Pipe Material                    |                        | PT / 4"                 |                  | API 5L GR.B, SMLS, BE, ASME, B36.10M     |                                                 |             |     |     |
| PROCESS CONDITIONS    | 10                 | Fluid                                                      |                    |                                  |                        | Crude oil               |                  |                                          |                                                 |             |     |     |
|                       | 11                 | State                                                      |                    |                                  |                        | mixed / 3phase          |                  |                                          |                                                 |             |     |     |
|                       | 12                 | Valve Design Pressure(barg)/ Actuator Shut Off Pressure DP |                    |                                  |                        | 102/102                 |                  |                                          |                                                 |             |     |     |
|                       | 13                 |                                                            |                    |                                  |                        | Units                   | Max              | Norm.                                    | Min.                                            |             |     |     |
|                       | 14                 | Flow Rate(vapor/liquid)                                    |                    |                                  |                        | kg/h                    | 231.88/13206.314 | 210.8/12005.74                           | 63.24/3601.722                                  |             |     |     |
|                       | 15                 | Inlet Pressure                                             |                    |                                  |                        | bar-g                   | 12.78            | 12.78                                    | 12.78                                           |             |     |     |
|                       | 16                 | Pressure Drop                                              |                    |                                  |                        | bar                     | 2                |                                          |                                                 |             |     |     |
|                       | 17                 | Inlet Temperature(max)                                     |                    |                                  |                        | °C                      | 42.67            |                                          |                                                 |             |     |     |
|                       | 18                 | Liquid Specific Gravity (GI)                               |                    |                                  |                        |                         | 0.918            |                                          |                                                 |             |     |     |
|                       | 19                 | Compressibility Factor(Z)(vapour)                          |                    |                                  |                        | -                       | 0.947            |                                          |                                                 |             |     |     |
|                       | 20                 | Viscosity (vapour/oil/water)                               |                    |                                  |                        | cP                      | 0.011/7.81/0.61  |                                          |                                                 |             |     |     |
|                       | 21                 | Specific Heats Ratio(Cp/Cv) (vapour/liquid)                |                    |                                  |                        | -                       | 1.27/2.31        |                                          |                                                 |             |     |     |
|                       | CALCULATED RESULTS | 22                                                         | Vapour Pressure    |                                  |                        |                         | bar-g            | 52.54                                    |                                                 |             |     |     |
| 23                    |                    | Critical Pressure (liquid)                                 |                    |                                  |                        | bar-g                   | 386.6            |                                          |                                                 |             |     |     |
| 24                    |                    | Flow Coefficient Cv (max-case)                             |                    |                                  |                        | -                       | 21 (VTC)         |                                          |                                                 |             |     |     |
| 25                    |                    | Travel (max-case)                                          |                    |                                  |                        | %                       | 83.4 (VTC)       |                                          |                                                 |             |     |     |
| BODY AND TRIM(Note 6) | 26                 | Sound Pressure Level                                       |                    |                                  |                        | dBA                     | Max. 85 dBA(VTC) | Max. 85 dBA(VTC)                         | Max. 85 dBA(VTC)                                |             |     |     |
|                       | 27                 | Body size                                                  |                    | 2" (VTC)                         |                        | POSITIONER<br>(Note 5)  | 50               | Type                                     | Electro-Pneumatic Smart                         |             |     |     |
|                       | 28                 | Rated Cv                                                   |                    | (NOTE 4)                         |                        |                         | 51               | Input Signal                             | 4-20 mA-HART Smart                              |             |     |     |
|                       | 29                 | End conn. & Rating IN/OUT                                  |                    | 2" # 600 / 2" # 600              |                        |                         | 52               | Power Supply                             | 24 VDC loop powered                             |             |     |     |
|                       | 30                 | Body/Bonnet Material                                       |                    | ASTM A216 GR. WCB                |                        |                         | 53               | Electrical Connection                    | ISO M20x 1.5                                    |             |     |     |
|                       | 31                 | Body/Bonnet Type                                           |                    | GLOBE / Bolted Flange Bonnet     |                        |                         | 54               | Direct/Reverse Act.                      | (NOTE 4)                                        |             |     |     |
|                       | 32                 | Flow Direction                                             |                    | (NOTE 4)                         |                        |                         | 55               | Lock Last Position                       | (NOTE 4)                                        |             |     |     |
|                       | 33                 | Packing Material                                           |                    | P.T.F.E.                         |                        |                         | 56               | Output Signal                            | 3-15 Psi                                        |             |     |     |
|                       | SOLENOID VALVE     | 34                                                         | Trim Type          |                                  | SINGLE SEATED/CAGE     |                         | 57               | I.P./Ex.Protect.                         | Gauge                                           | 65 / EEExia | Yes |     |
|                       |                    | 35                                                         | Characteristic     |                                  | EQUAL PERCENTAGE (VTC) |                         | 58               | MFR/Model                                | LCD requirement                                 | (NOTE 4)    | Yes |     |
|                       |                    | 36                                                         | Guiding            |                                  | (NOTE 4)               |                         | 59               | Type                                     | Qty.                                            | N/A         | N/A |     |
|                       |                    | 37                                                         | Rated Travel       |                                  | (NOTE 4)               |                         | 60               | MFR                                      | Model                                           | N/A         | N/A |     |
|                       |                    | 38                                                         | Plug/Disk Material |                                  | SS316                  |                         | 61               | I.P.                                     | Ex.Protect.                                     | N/A         | N/A |     |
|                       |                    | 39                                                         | Seat Material      |                                  | SS316                  |                         | 62               | MFR                                      | Model                                           | N/A         | N/A |     |
|                       |                    | 40                                                         | Cage/Guid Material |                                  | SS316                  |                         | 63               | Type                                     | Qty.                                            | N/A         | N/A |     |
|                       |                    | 41                                                         | Stem Material      |                                  | SS316                  |                         | 64               | Power Supply                             | N/A                                             |             |     |     |
|                       |                    | 42                                                         | Trim Material      |                                  | SS316                  |                         | 65               | Contacts / Rating                        | N/A                                             |             |     |     |
|                       |                    | 43                                                         | MFR                | Model                            | (NOTE 4)               | (NOTE 4)                | 66               | Switching Position                       | N/A                                             |             |     |     |
|                       | ACTUATOR           | 44                                                         | Size               | Eff.Area                         | (NOTE 4)               | (NOTE 4)                | AIR SET          | 67                                       | I.P.                                            | Ex.Protect. | N/A | N/A |
|                       |                    | 45                                                         | Air Failure        | Handwheel                        | FAIL CLOSE             | SIDE MOUNTED            |                  | 68                                       | MFR                                             | Model       | N/A | N/A |
| 46                    |                    | Air Action                                                 | Orientation        | AIR TO OPEN                      | VERT. UP               | 69                      |                  | Set Pressure                             | Yes (NOTE 4)                                    |             |     |     |
| 47                    |                    | Actuator Type                                              |                    | spring return and diaphragm type |                        | 70                      |                  | Filter                                   | Gauge                                           | Yes         | Yes |     |
| 48                    |                    | AIR Press.                                                 | Min/ Max/ D (Barg) | 4 (Note3)                        | 7.5                    | 8.5                     | 71               | Phumatic Conn.                           | 1/4 " NPTF                                      |             |     |     |
| 49                    |                    | MFR                                                        | Model              | (NOTE 4)                         | (NOTE 4)               | 72                      | MFR              | Model                                    | (NOTE 4)                                        | (NOTE 4)    |     |     |
| TESTS                 |                    | 73                                                         | Hydro. Pressure    |                                  | API 598                |                         | 74               | Leakage Class                            | ANSI IV                                         |             |     |     |
|                       |                    | 75                                                         | Performance Test   |                                  | Required               |                         | 76               | Internal Tubing                          | Required(with Double Ferrule Compression conn.) |             |     |     |
|                       | 77                 | Tube Material                                              |                    | 316 S.S L                        |                        | 78                      | Cable Gland      | M20, Nickel plated brass                 |                                                 |             |     |     |
|                       | 79                 | Cable Entry                                                |                    | M20 x 1.5                        |                        |                         |                  |                                          |                                                 |             |     |     |
|                       | 79                 | Cable Entry                                                |                    | M20 x 1.5                        |                        |                         |                  |                                          |                                                 |             |     |     |
| PURCHASE              | Manufacturer       | (Note 4)                                                   |                    |                                  |                        |                         |                  |                                          |                                                 |             |     |     |
|                       | Model              | (Note 4)                                                   |                    |                                  |                        |                         |                  |                                          |                                                 |             |     |     |

NOTES:  
 1- All materials shall be in accordance with "Piping Material Specification", "Document No.: BK-SSGRL-PEDCO-110-PI-SP-0001".  
 2- VTA: Vendor To Advise VTC: Vendor To Confirm  
 3- Minimum of instrument air pressure supply is 4 barg but 3 barg as minimum working pressure, shall be considered for actuator sizing .  
 4- Shall be stated by vendor at quotaion stage.  
 5- Bypass line and isolating valve shall be considered for valve positioner by vendor.  
 6- Trim part material shall be considered as minimum 316SS or any equal hard steel.

|                                                                                  |                                                                                                                                                                                                                  |                                                            |                |                                  |              |                         |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|----------------|----------------------------------|--------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-------------------------------------------------|-------------------------|--------------|---------|
|  | نگهداشت و افزایش تولید میدان نفتی بینک<br>فعالیت های رو زمینی در بسته های کاری تحت الارض<br>ساخت موقعیت چاه، تأسیسات سرچاهی، خطوط جریانی، تسهیلات<br>برق رسانی مربوط به موقعیت W007S و توسعه چندراهه کلاستر بینک |                                                            |                |                                  |              |                         |   |                                          |                                                 |                         |              |         |
|                                                                                  | DATA SHEETS FOR CONTROL/REGULATOR VALVES - EXTENSION OF BINAK B/C MANIFOLD                                                                                                                                       |                                                            |                |                                  |              |                         |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
| شماره پیمان: 053 - 073 - 9038                                                    |                                                                                                                                                                                                                  | پروژه                                                      | بسته کاری      | صادر کننده                       | تسهیلات      | رشته                    | نوع مدارک                                                                                                                                                              | سریال                                    | نسخه                                            |                         |              |         |
|                                                                                  |                                                                                                                                                                                                                  | BK                                                         | W007S          | PEDCO                            | 110          | IN                      | DT                                                                                                                                                                     | 0006                                     | D01                                             |                         |              |         |
| شماره صفحه: 8 از 10                                                              |                                                                                                                                                                                                                  |                                                            |                |                                  |              |                         |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
| Control Valve <span style="float: right;">D01</span>                             |                                                                                                                                                                                                                  |                                                            |                |                                  |              |                         |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
| GENERAL                                                                          | 1                                                                                                                                                                                                                | Tag No.                                                    |                |                                  |              | FV-1701D                |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
|                                                                                  | 2                                                                                                                                                                                                                | Service                                                    |                |                                  |              | FROM W028               |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
|                                                                                  | 3                                                                                                                                                                                                                | Line No.                                                   |                | P&ID No.                         |              | CRD-110-171D-FN05-4"-PT |                                                                                                                                                                        | BK-W007S-PEDCO-110-PR-PI-0001 ( 4 of 6 ) |                                                 |                         |              |         |
|                                                                                  | 4                                                                                                                                                                                                                | Area Classification                                        |                |                                  |              | Zone 2, IIB,T4          |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
|                                                                                  | 5                                                                                                                                                                                                                | Ambient Temperature                                        |                | °C                               | Min.         | Max.                    | -5                                                                                                                                                                     |                                          | 50                                              |                         |              |         |
|                                                                                  | 6                                                                                                                                                                                                                | Available Air Supply Pressure                              |                | barg                             | Min.         | Max.                    | 3                                                                                                                                                                      |                                          | 8                                               |                         |              |         |
|                                                                                  | 7                                                                                                                                                                                                                | Nace Requirement:                                          |                |                                  |              | Required                |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
| PIPE & LINE                                                                      | 8                                                                                                                                                                                                                | Pipe Class                                                 |                | Pipe Sch.                        |              | FN05                    |                                                                                                                                                                        | SCH. 80                                  |                                                 |                         |              |         |
|                                                                                  | 9                                                                                                                                                                                                                | Pipe Line Insulation  Line Size                            |                | Pipe Material                    |              | PT / 4"                 |                                                                                                                                                                        | API 5L GR.B, SMLS, BE, ASME, B36.10M     |                                                 |                         |              |         |
| PROCESS CONDITIONS                                                               | 10                                                                                                                                                                                                               | Fluid                                                      |                |                                  |              | Crude oil               |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
|                                                                                  | 11                                                                                                                                                                                                               | State                                                      |                |                                  |              | mixed / 3phase          |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
|                                                                                  | 12                                                                                                                                                                                                               | Valve Design Pressure(barg)/ Actuator Shut Off Pressure DP |                |                                  |              | 102/102                 |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
|                                                                                  | 13                                                                                                                                                                                                               |                                                            |                |                                  | Units        | Max                     | Norm.                                                                                                                                                                  | Min.                                     |                                                 |                         |              |         |
|                                                                                  | 14                                                                                                                                                                                                               | Flow Rate(vapor/liquid)                                    |                |                                  | kg/h         | 1427.8/37270.222        | 1298/33882.02                                                                                                                                                          | 389.4/10164.606                          |                                                 |                         |              |         |
|                                                                                  | 15                                                                                                                                                                                                               | Inlet Pressure                                             |                |                                  | bar-g        | 12.78                   | 12.78                                                                                                                                                                  | 12.78                                    |                                                 |                         |              |         |
|                                                                                  | 16                                                                                                                                                                                                               | Pressure Drop                                              |                |                                  | bar          | 2                       |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
|                                                                                  | 17                                                                                                                                                                                                               | Inlet Temperature(max)                                     |                |                                  | °C           | 54.97                   |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
|                                                                                  | 18                                                                                                                                                                                                               | Liquid Specific Gravity (GI)                               |                |                                  |              | 1.013                   |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
|                                                                                  | 19                                                                                                                                                                                                               | Compressibility Factor(Z)(vapour)                          |                |                                  | -            | 0.9462                  |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
|                                                                                  | 20                                                                                                                                                                                                               | Viscosity (vapour/oil/water)                               |                |                                  | cP           | 0.012/4.38/0.49         |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
|                                                                                  | 21                                                                                                                                                                                                               | Specific Heats Ratio(Cp/Cv) (vapour/liquid)                |                |                                  | -            | 1.24/2.33               |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
|                                                                                  | 22                                                                                                                                                                                                               | Vapour Pressure                                            |                |                                  | bar-g        | 10.76                   |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
| 23                                                                               | Critical Pressure (liquid)                                                                                                                                                                                       |                                                            |                | bar-g                            | -            |                         |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
| CALCULATED RESULTS                                                               | 24                                                                                                                                                                                                               | Flow Coefficient Cv (max-case)                             |                |                                  |              | 94 (VTC)                |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
|                                                                                  | 25                                                                                                                                                                                                               | Travel (max-case)                                          |                |                                  |              | 80 (VTC)                |                                                                                                                                                                        |                                          |                                                 |                         |              |         |
|                                                                                  | 26                                                                                                                                                                                                               | Sound Pressure Level                                       |                |                                  |              | dBA                     | Max. 85 dBA(VTC)                                                                                                                                                       | Max. 85 dBA(VTC)                         | Max. 85 dBA(VTC)                                |                         |              |         |
| BODY AND TRIM(Note 6)                                                            | 27                                                                                                                                                                                                               | Body size                                                  |                | 4" (VTC)                         |              | POSITIONER<br>(Note 5)  | 50                                                                                                                                                                     | Type                                     |                                                 | Electro-Pneumatic Smart |              |         |
|                                                                                  | 28                                                                                                                                                                                                               | Rated Cv                                                   |                | (NOTE 4)                         |              |                         | 51                                                                                                                                                                     | Input Signal                             |                                                 | 4-20 mA-HART Smart      |              |         |
|                                                                                  | 29                                                                                                                                                                                                               | End conn. & Rating IN/OUT                                  |                | 4" # 600 / 4"#600                |              |                         | 52                                                                                                                                                                     | Power Supply                             |                                                 | 24 VDC loop powered     |              |         |
|                                                                                  | 30                                                                                                                                                                                                               | Body/Bonnet Material                                       |                | ASTM A216 GR. WCB                |              |                         | 53                                                                                                                                                                     | Electrical Connection                    |                                                 | ISO M20x 1.5            |              |         |
|                                                                                  | 31                                                                                                                                                                                                               | Body/Bonnet Type                                           |                | GLOBE / Bolted Flange Bonnet     |              |                         | 54                                                                                                                                                                     | Direct/Reverse Act.                      |                                                 | (NOTE 4)                |              |         |
|                                                                                  | 32                                                                                                                                                                                                               | Flow Direction                                             |                | (NOTE 4)                         |              |                         | 55                                                                                                                                                                     | Lock Last Position                       |                                                 | (NOTE 4)                |              |         |
|                                                                                  | 33                                                                                                                                                                                                               | Packing Material                                           |                | P.T.F.E.                         |              | 56                      | Output Signal                                                                                                                                                          |                                          | 3-15 Psi                                        |                         |              |         |
|                                                                                  | 34                                                                                                                                                                                                               | Trim Type                                                  |                | SINGLE SEATED/CAGE               |              | 57                      | I.P./Ex.Protect.                                                                                                                                                       | Gauge                                    | 65 / EExia                                      | Yes                     |              |         |
|                                                                                  | 35                                                                                                                                                                                                               | Characteristic                                             |                | EQUAL PERCENTAGE (VTC)           |              | 58                      | MFR/Model                                                                                                                                                              | LCD requirement                          | (NOTE 4)                                        | Yes                     |              |         |
|                                                                                  | 36                                                                                                                                                                                                               | Guiding                                                    |                | (NOTE 4)                         |              | 59                      | Type                                                                                                                                                                   | Qty.                                     | N/A                                             | N/A                     |              |         |
|                                                                                  | 37                                                                                                                                                                                                               | Rated Travel                                               |                | (NOTE 4)                         |              | 60                      | MFR                                                                                                                                                                    | Model                                    | N/A                                             | N/A                     |              |         |
|                                                                                  | 38                                                                                                                                                                                                               | Plug/Disk Material                                         |                | SS316                            |              | 61                      | I.P.                                                                                                                                                                   | Ex.Protect.                              | N/A                                             | N/A                     |              |         |
|                                                                                  | 39                                                                                                                                                                                                               | Seat Material                                              |                | SS316                            |              | 62                      | MFR                                                                                                                                                                    | Model                                    | N/A                                             | N/A                     |              |         |
|                                                                                  | 40                                                                                                                                                                                                               | Cage/Guid Material                                         |                | SS316                            |              | 63                      | Type                                                                                                                                                                   | Qty.                                     | N/A                                             | N/A                     |              |         |
|                                                                                  | 41                                                                                                                                                                                                               | Stem Material                                              |                | SS316                            |              | 64                      | Power Supply                                                                                                                                                           |                                          | N/A                                             |                         |              |         |
|                                                                                  | 42                                                                                                                                                                                                               | Trim Material                                              |                | SS316                            |              | 65                      | Contacts / Rating                                                                                                                                                      |                                          | N/A                                             |                         |              |         |
|                                                                                  | 43                                                                                                                                                                                                               | MFR                                                        | Model          | (NOTE 4)                         | (NOTE 4)     | 66                      | Switching Position                                                                                                                                                     |                                          | N/A                                             |                         |              |         |
|                                                                                  | ACTUATOR                                                                                                                                                                                                         | 44                                                         | Size           | Eff.Area                         | (NOTE 4)     | (NOTE 4)                | AIR SET                                                                                                                                                                | 69                                       | Set Pressure                                    |                         | Yes (NOTE 4) |         |
| 45                                                                               |                                                                                                                                                                                                                  | Air Failure                                                | Handwheel      | FAIL CLOSE                       | SIDE MOUNTED | 70                      |                                                                                                                                                                        | Filter                                   | Gauge                                           | Yes                     | Yes          |         |
| 46                                                                               |                                                                                                                                                                                                                  | Air Action                                                 | Orientation    | AIR TO OPEN                      | VERT. UP     | 71                      |                                                                                                                                                                        | Pnumatic Conn.                           |                                                 | 1/4 " NPTF              |              |         |
| 47                                                                               |                                                                                                                                                                                                                  | Actuator Type                                              |                | spring return and diaphragm type |              | 72                      |                                                                                                                                                                        | MFR                                      | Model                                           | (NOTE 4)                | (NOTE 4)     |         |
| 48                                                                               |                                                                                                                                                                                                                  | AIR Press.                                                 | Min/ Max/ Des. | (Barg)                           | 4 (Note3)    | 7.5                     | 8.5                                                                                                                                                                    | TESTS                                    | 73                                              | Hydro. Pressure         |              | API 598 |
| 49                                                                               |                                                                                                                                                                                                                  | MFR                                                        | Model          | (NOTE 4)                         | (NOTE 4)     | 74                      | Leakage Class                                                                                                                                                          |                                          | ANSI IV                                         |                         |              |         |
| PURCHASE                                                                         | Manufacturer                                                                                                                                                                                                     |                                                            | (Note 4)       |                                  | OPTIONS      | 75                      | Performance Test                                                                                                                                                       |                                          | Required                                        |                         |              |         |
|                                                                                  | Model                                                                                                                                                                                                            |                                                            | (Note 4)       |                                  |              | 76                      | Internal Tubing                                                                                                                                                        |                                          | Required(with Double Ferrule Compression conn.) |                         |              |         |
|                                                                                  |                                                                                                                                                                                                                  |                                                            |                |                                  |              | 77                      | Tube Material                                                                                                                                                          |                                          | 316 S.S L                                       |                         |              |         |
|                                                                                  |                                                                                                                                                                                                                  |                                                            |                |                                  |              | 78                      | Cable Gland                                                                                                                                                            |                                          | M20, Nickel plated brass                        |                         |              |         |
|                                                                                  |                                                                                                                                                                                                                  |                                                            |                |                                  | 79           | Cable Entry             |                                                                                                                                                                        | M20 x 1.5                                |                                                 |                         |              |         |

NOTES:

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2- VTA: Vendor To Advise      VTC: Vendor To Confirm

3- Minimum of instrument air pressure supply is 4 barg but 3 barg as minimum working pressure, shall be considered for actuator sizing .

4- Shall be stated by vendor at quotaion stage.

5- Bypass line and isolating valve shall be considered for valve positioner by vendor.

6- Trim part material shall be considered as minimum 316SS or any equal hard steel.

|                                                                                  |                                                                                                                                                                                                                  |       |           |            |         |      |                                                                                                                                                                        |       |      |
|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|------------|---------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|
|  | نگهداشت و افزایش تولید میدان نفتی بینک<br>فعالیت های رو زمینی در بسته های کاری تحت الارض<br>ساخت موقعیت چاه، تأسیسات سرچاهی، خطوط جریانی، تسهیلات<br>برق رسانی مربوط به موقعیت W007S و توسعه چندراهه کلاستر بینک |       |           |            |         |      |   |       |      |
|                                                                                  | DATA SHEETS FOR CONTROL/REGULATOR VALVES - EXTENSION OF BINAK B/C MANIFOLD                                                                                                                                       |       |           |            |         |      |                                                                                                                                                                        |       |      |
| شماره پیمان: 053 - 073 - 9038                                                    |                                                                                                                                                                                                                  | پروژه | بسته کاری | صادر کننده | تسهیلات | رشته | نوع مدارک                                                                                                                                                              | سریال | نسخه |
|                                                                                  |                                                                                                                                                                                                                  | BK    | W007S     | PEDCO      | 110     | IN   | DT                                                                                                                                                                     | 0006  | D01  |
| شماره صفحه: 9 از 10                                                              |                                                                                                                                                                                                                  |       |           |            |         |      |                                                                                                                                                                        |       |      |

| Control Valve      |                       |                                                            |                 |                              |                                  |                         |                                                 |                                          |                     |                         |                   |
|--------------------|-----------------------|------------------------------------------------------------|-----------------|------------------------------|----------------------------------|-------------------------|-------------------------------------------------|------------------------------------------|---------------------|-------------------------|-------------------|
| GENERAL            | 1                     | Tag No.                                                    |                 |                              |                                  | FV-1701E                |                                                 |                                          |                     |                         |                   |
|                    | 2                     | Service                                                    |                 |                              |                                  | FROM W035               |                                                 |                                          |                     |                         |                   |
|                    | 3                     | Line No.                                                   |                 | P&ID No.                     |                                  | CRD-110-171E-FN05-4"-PT |                                                 | BK-W007S-PEDCO-110-PR-PI-0001 ( 5 of 6 ) |                     |                         |                   |
|                    | 4                     | Area Classification                                        |                 |                              |                                  | Zone 2, IIB,T4          |                                                 |                                          |                     |                         |                   |
|                    | 5                     | Ambient Temperature                                        |                 | °C                           | Min.                             | Max.                    | -5                                              |                                          | 50                  |                         |                   |
|                    | 6                     | Available Air Supply Pressure                              |                 | barg                         | Min.                             | Max.                    | 3                                               |                                          | 8                   |                         |                   |
|                    | 7                     | Nace Requirement:                                          |                 |                              |                                  | Required                |                                                 |                                          |                     |                         |                   |
| PIPE & LINE        | 8                     | Pipe Class                                                 |                 | Pipe Sch.                    |                                  | FN05                    |                                                 | SCH. 80                                  |                     |                         |                   |
|                    | 9                     | Pipe Line Insulation  Line Size                            |                 | Pipe Material                |                                  | PT / 4"                 |                                                 | API 5L GR.B, SMLS, BE, ASME, B36.10M     |                     |                         |                   |
| PROCESS CONDITIONS | 10                    | Fluid                                                      |                 |                              |                                  | Crude oil               |                                                 |                                          |                     |                         |                   |
|                    | 11                    | State                                                      |                 |                              |                                  | mixed / 3phase          |                                                 |                                          |                     |                         |                   |
|                    | 12                    | Valve Design Pressure(barg)/ Actuator Shut Off Pressure DP |                 |                              |                                  | 102/102                 |                                                 |                                          |                     |                         |                   |
|                    | 13                    |                                                            |                 | Units                        | Max                              | Norm.                   | Min.                                            |                                          |                     |                         |                   |
|                    | 14                    | Flow Rate(vapor/liquid)                                    |                 |                              |                                  | kg/h                    | 1383.8/48654.529                                | 1258/44231.39                            | 377.4/13269.417     |                         |                   |
|                    | 15                    | Inlet Pressure                                             |                 |                              |                                  | bar-g                   | 12.78                                           | 12.78                                    | 12.78               |                         |                   |
|                    | 16                    | Pressure Drop                                              |                 |                              |                                  | bar                     | 2                                               |                                          |                     |                         |                   |
|                    | 17                    | Inlet Temperature(max)                                     |                 |                              |                                  | °C                      | 51.01                                           |                                          |                     |                         |                   |
|                    | 18                    | Liquid Specific Gravity (GI)                               |                 |                              |                                  |                         | 1.016                                           |                                          |                     |                         |                   |
|                    | 19                    | Compressibility Factor(Z)(vapor)                           |                 |                              |                                  | -                       | 0.9456                                          |                                          |                     |                         |                   |
|                    | 20                    | Viscosity (vapor/oil/water)                                |                 |                              |                                  | cP                      | 0.012/4.62/0.53                                 |                                          |                     |                         |                   |
|                    | 21                    | Specific Heats Ratio(Cp/Cv) (vapor/liquid)                 |                 |                              |                                  | -                       | 1.25/2.33                                       |                                          |                     |                         |                   |
|                    | CALCULATED RESULTS    | 22                                                         | Vapour Pressure |                              |                                  |                         | bar-g                                           | 96.51                                    |                     |                         |                   |
| 23                 |                       | Critical Pressure (liquid)                                 |                 |                              |                                  | bar-g                   | -                                               |                                          |                     |                         |                   |
|                    | 24                    | Flow Coefficient Cv (max-case)                             |                 |                              |                                  | -                       | 94 (VTC)                                        |                                          |                     |                         |                   |
|                    | 25                    | Travel (max-case)                                          |                 |                              |                                  | %                       | 79.9 (VTC)                                      |                                          |                     |                         |                   |
|                    | 26                    | Sound Pressure Level                                       |                 |                              |                                  | dBA                     | Max. 85 dBA(VTC)                                | Max. 85 dBA(VTC)                         | Max. 85 dBA(VTC)    |                         |                   |
|                    | BODY AND TRIM(Note 6) | 27                                                         | Body size       |                              | 3" (VTC)                         |                         | POSITIONER<br>(Note 5)                          | 50                                       | Type                | Electro-Pneumatic Smart |                   |
| 28                 |                       | Rated Cv                                                   |                 | (NOTE 4)                     |                                  | 51                      |                                                 | Input Signal                             | 4-20 mA-HART Smart  |                         |                   |
| 29                 |                       | End conn. & Rating IN/OUT                                  |                 | 3" # 600 / 3" #600           |                                  | 52                      |                                                 | Power Supply                             | 24 VDC loop powered |                         |                   |
| 30                 |                       | Body/Bonnet Material                                       |                 | ASTM A216 GR. WCB            |                                  | 53                      |                                                 | Electrical Connection                    | ISO M20x 1.5        |                         |                   |
| 31                 |                       | Body/Bonnet Type                                           |                 | GLOBE / Bolted Flange Bonnet |                                  | 54                      |                                                 | Direct/Reverse Act.                      | (NOTE 4)            |                         |                   |
| 32                 |                       | Flow Direction                                             |                 | (NOTE 4)                     |                                  | 55                      | Lock Last Position                              | (NOTE 4)                                 |                     |                         |                   |
| 33                 |                       | Packing Material                                           |                 | P.T.F.E.                     |                                  | 56                      | Output Signal                                   | 3-15 Psi                                 |                     |                         |                   |
| 34                 |                       | Trim Type                                                  |                 | SINGLE SEATED/CAGE           |                                  | 57                      | I.P./Ex.Protect.                                | Gauge                                    | 65 / EExia Yes      |                         |                   |
| 35                 |                       | Characteristic                                             |                 | EQUAL PERCENTAGE (VTC)       |                                  | 58                      | MFR/Model                                       | LCD requirement                          | (NOTE 4) Yes        |                         |                   |
| 36                 |                       | Guiding                                                    |                 | (NOTE 4)                     |                                  | SOLENOID VALVE          | 59                                              | Type                                     | Qty.                | N/A N/A                 |                   |
| 37                 |                       | Rated Travel                                               |                 | (NOTE 4)                     |                                  |                         | 60                                              | MFR                                      | Model               | N/A N/A                 |                   |
| 38                 |                       | Plug/Disk Material                                         |                 | SS316                        |                                  |                         | 61                                              | I.P.                                     | Ex.Protect.         | N/A N/A                 |                   |
| 39                 |                       | Seat Material                                              |                 | SS316                        |                                  |                         | 62                                              | MFR                                      | Model               | N/A N/A                 |                   |
| 40                 |                       | Cage/Guid Material                                         |                 | SS316                        |                                  |                         | 63                                              | Type                                     | Qty.                | N/A N/A                 |                   |
| ACTUTOR            |                       | 41                                                         | Stem Material   |                              | SS316                            |                         | SWITCHES                                        | 64                                       | Power Supply        | N/A                     |                   |
|                    | 42                    | Trim Material                                              |                 | SS316                        |                                  | 65                      |                                                 | Contacts / Rating                        | N/A                 |                         |                   |
|                    | 43                    | MFR                                                        | Model           | (NOTE 4)                     | (NOTE 4)                         | 66                      |                                                 | Switching Position                       | N/A                 |                         |                   |
|                    | 44                    | Size                                                       | Eff.Area        | (NOTE 4)                     | (NOTE 4)                         | 67                      |                                                 | I.P.                                     | Ex.Protect.         | N/A N/A                 |                   |
|                    | 45                    | Air Failure                                                | Handwheel       | FAIL CLOSE                   | SIDE MOUNTED                     | 68                      |                                                 | MFR                                      | Model               | N/A N/A                 |                   |
|                    |                       | 46                                                         | Air Action      | Orientation                  | AIR TO OPEN                      | VERT. UP                | AIR SET                                         | 69                                       | Set Pressure        | Yes (NOTE 4)            |                   |
|                    |                       | 47                                                         | Actuator Type   |                              | spring return and diaphragm type |                         |                                                 | 70                                       | Filter              | Gauge                   | Yes Yes           |
|                    |                       | 48                                                         | AIR Press.      | Min/ Max/ Des. (Barg)        | 4 (Note3)                        | 7.5                     |                                                 | 8.5                                      | 71                  | Pnumatic Conn.          | 1/4 " NPTF        |
|                    |                       | 49                                                         | MFR             | Model                        | (NOTE 4)                         | (NOTE 4)                |                                                 | 72                                       | MFR                 | Model                   | (NOTE 4) (NOTE 4) |
|                    |                       | PURCHASE                                                   | 73              | Hydro. Pressure              |                                  | API 598                 |                                                 | TESTS                                    | 74                  | Leakage Class           | ANSI IV           |
| 75                 | Performance Test      |                                                            | Required        |                              | 76                               | Internal Tubing         | Required(with Double Ferrule Compression conn.) |                                          |                     |                         |                   |
| 77                 | Tube Material         |                                                            | 316 S.S L       |                              | 78                               | Cable Gland             | M20, Nickel plated brass                        |                                          |                     |                         |                   |
| 79                 | Cable Entry           |                                                            | M20 x 1.5       |                              |                                  |                         |                                                 |                                          |                     |                         |                   |
|                    |                       |                                                            |                 |                              |                                  |                         |                                                 |                                          |                     |                         |                   |

NOTES:

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- VTA: Vendor To Advise VTC: Vendor To Confirm
- Minimum of instrument air pressure supply is 4 barg but 3 barg as minimum working pressure, shall be considered for actuator sizing .
- Shall be stated by vendor at quotaion stage.
- Bypass line and isolating valve shall be considered for valve positioner by vendor.
- Trim part material shall be considered as minimum 316SS or any equal hard steel.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                  |                                                            |                    |                              |                                                 |                         |                                                                                                                                                                        |                                         |                              |               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|--------------------|------------------------------|-------------------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|------------------------------|---------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | نگهداشت و افزایش تولید میدان نفتی بینک<br>فعالیت های رو زمینی در بسته های کاری تحت الارض<br>ساخت موقعیت چاه، تأسیسات سرچاهی، خطوط جریانی، تسهیلات<br>برق رسانی مربوط به موقعیت W007S و توسعه چندراهه کلاستر بینک |                                                            |                    |                              |                                                 |                         |   |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | DATA SHEETS FOR CONTROL/REGULATOR VALVES - EXTENSION OF BINAK B/C MANIFOLD                                                                                                                                       |                                                            |                    |                              |                                                 |                         |                                                                                                                                                                        |                                         |                              |               |
| شماره پیمان: 053 - 073 - 9038                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                  | پروژه                                                      | بسته کاری          | صادر کننده                   | تسهیلات                                         | رشته                    | نوع مدارک                                                                                                                                                              | سریال                                   | نسخه                         |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                  | BK                                                         | W007S              | PEDCO                        | 110                                             | IN                      | DT                                                                                                                                                                     | 0006                                    | D01                          |               |
| شماره صفحه: 10 از 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                  |                                                            |                    |                              |                                                 |                         |                                                                                                                                                                        |                                         |                              |               |
| Control Valve                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                  |                                                            |                    |                              |                                                 |                         |                                                                                                                                                                        |                                         |                              |               |
| GENERAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1                                                                                                                                                                                                                | Tag No.                                                    |                    |                              |                                                 | FV-1701F                |                                                                                                                                                                        |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2                                                                                                                                                                                                                | Service                                                    |                    |                              |                                                 | FROM W007S              |                                                                                                                                                                        |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 3                                                                                                                                                                                                                | Line No.                                                   |                    | P&ID No.                     |                                                 | CRD-110-171F-FN05-4"-PT |                                                                                                                                                                        | BK-W007S-PEDCO-110-PR-PI-0001 ( 5 of 6) |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 4                                                                                                                                                                                                                | Area Classification                                        |                    |                              |                                                 | Zone 2, IIB,T4          |                                                                                                                                                                        |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 5                                                                                                                                                                                                                | Ambient Temperature                                        |                    | °C                           | Min.                                            | Max.                    | -5                                                                                                                                                                     |                                         | 50                           |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 6                                                                                                                                                                                                                | Available Air Supply Pressure                              |                    | barg                         | Min.                                            | Max.                    | 3                                                                                                                                                                      |                                         | 8                            |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 7                                                                                                                                                                                                                | Nace Requirement:                                          |                    |                              |                                                 | Required                |                                                                                                                                                                        |                                         |                              |               |
| PIPE & LINE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 8                                                                                                                                                                                                                | Pipe Class                                                 |                    | Pipe Sch.                    |                                                 | FN05                    |                                                                                                                                                                        | SCH. 80                                 |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 9                                                                                                                                                                                                                | Pipe Line Insulation  Line Size                            |                    | Pipe Material                |                                                 | PT / 4"                 |                                                                                                                                                                        | API 5L GR.B, SMLS, BE, ASME, B36.10M    |                              |               |
| PROCESS CONDITIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 10                                                                                                                                                                                                               | Fluid                                                      |                    |                              |                                                 | Crude oil               |                                                                                                                                                                        |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 11                                                                                                                                                                                                               | State                                                      |                    |                              |                                                 | mixed / 3phase          |                                                                                                                                                                        |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 12                                                                                                                                                                                                               | Valve Design Pressure(barg)/ Actuator Shut Off Pressure DP |                    |                              |                                                 | 102/102                 |                                                                                                                                                                        |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 13                                                                                                                                                                                                               |                                                            |                    | Units                        | Max                                             | Norm.                   | Min.                                                                                                                                                                   |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 14                                                                                                                                                                                                               | Flow Rate(vapor/liquid)                                    |                    | kg/h                         | 557.59/19457.504                                | 506.9/17688.64          | 152.07/5306.592                                                                                                                                                        |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 15                                                                                                                                                                                                               | Inlet Pressure                                             |                    | bar-g                        | 12.78                                           | 12.78                   | 12.78                                                                                                                                                                  |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 16                                                                                                                                                                                                               | Pressure Drop                                              |                    | bar                          | 2                                               |                         |                                                                                                                                                                        |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 17                                                                                                                                                                                                               | Inlet Temperature(max)                                     |                    | °C                           | 51.98                                           |                         |                                                                                                                                                                        |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 18                                                                                                                                                                                                               | Liquid Specific Gravity (GI)                               |                    | 1.015                        |                                                 |                         |                                                                                                                                                                        |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 19                                                                                                                                                                                                               | Compressibility Factor(Z)(vapour)                          |                    | 0.9457                       |                                                 |                         |                                                                                                                                                                        |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 20                                                                                                                                                                                                               | Viscosity (vapour/oil/water)                               |                    | cP                           | 0.012/4.56/0.52                                 |                         |                                                                                                                                                                        |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 21                                                                                                                                                                                                               | Specific Heats Ratio(Cp/Cv) (vapour/liquid)                |                    | 1.25/2.33                    |                                                 |                         |                                                                                                                                                                        |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CALCULATED RESULTS                                                                                                                                                                                               | 22                                                         | Vapour Pressure    |                              | bar-g                                           | 96.51                   |                                                                                                                                                                        |                                         |                              |               |
| 23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                  | Critical Pressure (liquid)                                 |                    | bar-g                        | -                                               |                         |                                                                                                                                                                        |                                         |                              |               |
| 24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                  | Flow Coefficient Cv (max-case)                             |                    | -                            | 50 (VTC)                                        |                         |                                                                                                                                                                        |                                         |                              |               |
| BODY AND TRIM(Note 6)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 25                                                                                                                                                                                                               | Travel (max-case)                                          |                    | %                            | 61 (VTC)                                        |                         |                                                                                                                                                                        |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 26                                                                                                                                                                                                               | Sound Pressure Level                                       |                    | dBA                          | Max. 85 dBA(VTC)                                |                         | Max. 85 dBA(VTC)                                                                                                                                                       |                                         | Max. 85 dBA(VTC)             |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 27                                                                                                                                                                                                               | Body size                                                  |                    | 2" (VTC)                     |                                                 | POSITIONER<br>(Note 5)  | 50 Type                                                                                                                                                                |                                         | Electro-Pneumatic Smart      |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 28                                                                                                                                                                                                               | Rated Cv                                                   |                    | (NOTE 4)                     |                                                 |                         | 51 Input Signal                                                                                                                                                        |                                         | 4-20 mA-HART Smart           |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 29                                                                                                                                                                                                               | End conn. & Rating IN/OUT                                  |                    | 2" # 600 / 2" #600           |                                                 |                         | 52 Power Supply                                                                                                                                                        |                                         | 24 VDC loop powered          |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 30                                                                                                                                                                                                               | Body/Bonnet Material                                       |                    | ASTM A216 GR. WCB            |                                                 |                         | 53 Electrical Connection                                                                                                                                               |                                         | ISO M20x 1.5                 |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 31                                                                                                                                                                                                               | Body/Bonnet Type                                           |                    | GLOBE / Bolted Flange Bonnet |                                                 |                         | 54 Direct/Reverse Act.                                                                                                                                                 |                                         | (NOTE 4)                     |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 32                                                                                                                                                                                                               | Flow Direction                                             |                    | (NOTE 4)                     |                                                 | 55 Lock Last Position   |                                                                                                                                                                        | (NOTE 4)                                |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 33                                                                                                                                                                                                               | Packing Material                                           |                    | P.T.F.E.                     |                                                 | 56 Output Signal        |                                                                                                                                                                        | 3-15 Psi                                |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 34                                                                                                                                                                                                               | Trim Type                                                  |                    | SINGLE SEATED/CAGE           |                                                 | SOLENOID VALVE          | 57 I.P./Ex.Protect.                                                                                                                                                    |                                         | Gauge 65 / EExia Yes         |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 35                                                                                                                                                                                                               | Characteristic                                             |                    | EQUAL PERCENTAGE (VTC)       |                                                 |                         | 58 MFR/Model                                                                                                                                                           |                                         | LCD requirement (NOTE 4) Yes |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 36                                                                                                                                                                                                               | Guiding                                                    |                    | (NOTE 4)                     |                                                 |                         | 59 Type                                                                                                                                                                |                                         | Qty. N/A N/A                 |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 37                                                                                                                                                                                                               | Rated Travel                                               |                    | (NOTE 4)                     |                                                 |                         | 60 MFR                                                                                                                                                                 |                                         | Model N/A N/A                |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 38                                                                                                                                                                                                               | Plug/Disk Material                                         |                    | SS316                        |                                                 |                         | 61 I.P.                                                                                                                                                                |                                         | Ex.Protect. N/A N/A          |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ACTUATOR                                                                                                                                                                                                         | 39                                                         | Seat Material      |                              | SS316                                           |                         | SWITCHES                                                                                                                                                               | 62 MFR                                  |                              | Model N/A N/A |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                  | 40                                                         | Cage/Guid Material |                              | SS316                                           |                         |                                                                                                                                                                        | 63 Type                                 |                              | Qty. N/A N/A  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                  | 41                                                         | Stem Material      |                              | SS316                                           |                         |                                                                                                                                                                        | 64 Power Supply                         |                              | N/A           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                  | 42                                                         | Trim Material      |                              | SS316                                           |                         |                                                                                                                                                                        | 65 Contacts / Rating                    |                              | N/A           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                  | 43                                                         | MFR                | Model                        | (NOTE 4)                                        | (NOTE 4)                |                                                                                                                                                                        | 66 Switching Position                   |                              | N/A           |
| AIR SET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                  | 44                                                         | Size               | Eff.Area                     | (NOTE 4)                                        | (NOTE 4)                | 67 I.P.                                                                                                                                                                |                                         | Ex.Protect. N/A N/A          |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                  | 45                                                         | Air Failure        | Handwheel                    | FAIL CLOSE                                      | SIDE MOUNTED            | 68 MFR                                                                                                                                                                 |                                         | Model N/A N/A                |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                  | 46                                                         | Air Action         | Orientation                  | AIR TO OPEN                                     | VERT. UP                | 69 Set Pressure                                                                                                                                                        |                                         | Yes (NOTE 4)                 |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                  | 47                                                         | Actuator Type      |                              | spring return and diaphragm type                |                         | 70 Filter                                                                                                                                                              |                                         | Gauge Yes Yes                |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                  | 48                                                         | AIR Press.         | Min/ Max/ Des. (Barg)        | 4 (Note3)                                       | 7.5                     | 8.5                                                                                                                                                                    | 71 Pnumatic Conn.                       |                              | 1/4 " NPTF    |
| TESTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 49                                                                                                                                                                                                               | MFR                                                        | Model              | (NOTE 4)                     | (NOTE 4)                                        | 72 MFR                  |                                                                                                                                                                        | Model (NOTE 4) (NOTE 4)                 |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 73                                                                                                                                                                                                               | Hydro. Pressure                                            |                    | API 598                      |                                                 |                         |                                                                                                                                                                        |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 74                                                                                                                                                                                                               | Leakage Class                                              |                    | ANSI IV                      |                                                 |                         |                                                                                                                                                                        |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 75                                                                                                                                                                                                               | Performance Test                                           |                    | Required                     |                                                 |                         |                                                                                                                                                                        |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | OPTIONS                                                                                                                                                                                                          | 76                                                         | Internal Tubing    |                              | Required(with Double Ferrule Compression conn.) |                         |                                                                                                                                                                        |                                         |                              |               |
| 77                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                  | Tube Material                                              |                    | 316 S.S L                    |                                                 |                         |                                                                                                                                                                        |                                         |                              |               |
| 78                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                  | Cable Gland                                                |                    | M20, Nickel plated brass     |                                                 |                         |                                                                                                                                                                        |                                         |                              |               |
| 79                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                  | Cable Entry                                                |                    | M20 x 1.5                    |                                                 |                         |                                                                                                                                                                        |                                         |                              |               |
| PURCHASE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Manufacturer                                                                                                                                                                                                     |                                                            | (Note 4)           |                              |                                                 |                         |                                                                                                                                                                        |                                         |                              |               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Model                                                                                                                                                                                                            |                                                            | (Note 4)           |                              |                                                 |                         |                                                                                                                                                                        |                                         |                              |               |
| NOTES:<br>1- All materials shall be in accordance with 'Piping Material Specification' , "Document No.: BK-SSGRL-PEDCO-110-PI-SP-0001".<br>2- VTA: Vendor To Advise VTC: Vendor To Confirm<br>3- Minimum of instrument air pressure supply is 4 barg but 3 barg as minimum working pressure, shall be considered for actuator sizing .<br>4- Shall be stated by vendor at quotaion stage.<br>5- Bypass line and isolating valve shall be considered for valve positioner by vendor.<br>6- Trim part material shall be considered as minimum 316SS or any equal hard steel. |                                                                                                                                                                                                                  |                                                            |                    |                              |                                                 |                         |                                                                                                                                                                        |                                         |                              |               |