

OPERATION & MAINTENANCE MANUAL

PETRO-LOAD BLA445

4" compression spring balanced bottom loading arm



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1. GENERAL DESCRIPTION

General Description

The IFC Petro-Load 445 bottom loading arm is designed for heavy duty use with all types of petroleum and liquid oils. It is widely used at petroleum terminal road and rail loading facilities and oil distribution depots.

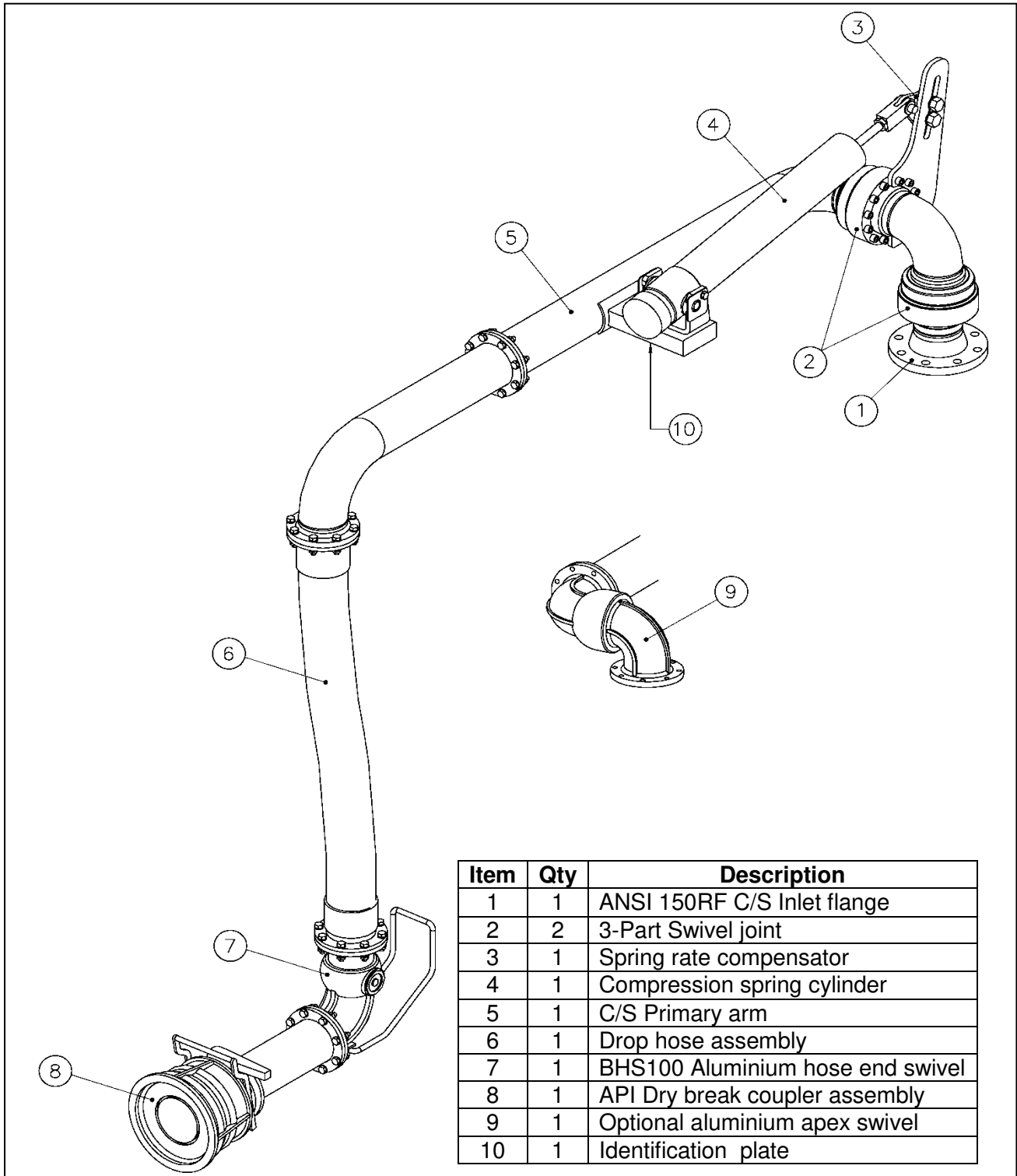
Model BLA445 bottom loading arm

Type : Compression spring balance, suspended hose
 Inlet connection terminal side : 4in Flange ANSI 150RF
 Outlet connection tanker side : 4in Safeload API coupler
 Arm balance : Adjustable heavy duty spring in safety sealed cylinder

Specification & Materials of construction

Primary arm : 4in schedule 40 carbon steel
 Balance assembly : Cast Steel spring with threaded rod adjustment
 Swivel : 4in, 3-part carbon steel outer body flange & body with 304SS inner body & raceway
 Outboard swivel : 4in aluminium with viton seals flanged TTMA
 Drop hose swivel : 4in aluminium with viton seals flanged TTMA
 Swivel product /dust seals : Spring energised PTFE / PTFE o-ring
 Suspended hose : 4in composite flanged TTMA
 Paint finish : Preparation to SA 2.5 shot blasting, primer & undercoat zinc epoxy. Top coat chlorinated rubber varnish. DFT 200µ. Ambient drying 12 hours.

2. GENERAL ARRANGEMENT & PARTS IDENTIFICATION



3. INSTALLATION INSTRUCTIONS & LIFTING PLAN

Installation

To establish the correct orientation for one or more loading arms, refer to operating envelope and loading arm general arrangement drawings.

Lifting plan

- The approximate weight of the 445 loading arm is 120Kg.
- Care should be taken when lifting the loading arm as it contains swivel joints that may rotate during the lift.
- When manoeuvring the loading arm into position it is important that the raised face of the inlet flange is level with the stand post outlet flange.
- **Never attempt to remove the rod spacer until the arm has been flooded up.**
- Use two strops as shown below (highlighted red). This is the best location for lifting the loading arm. Do not use chains as they will damage the paint.
- Always use a suitable gasket between the mating surfaces of the loading arm inlet flange and stand post outlet flange.



4. OPERATING INSTRUCTIONS & MAINTENANCE

Operation

The loading arm is designed to be operated at ground level. It is spring balanced, which allows easy vertical alignment to the tanker. It moves vertically and horizontally via a series of swivels. This ensures the arm is easy to operate by a single person and that connection to the tanker can be completed safely and easily.

Note:

Please follow all on site operational and safety instructions including use of appropriate personal protective equipment (PPE).

- 1) To move the arm into position hold the handle on the bottom hose swivel and push to the appropriate point.
- 2) Connect the arm to the tanker using the appropriate coupler connection following the coupler operating instructions.

Safety Notes

- 1) Do not allow arm to swing uncontrolled.
- 2) Do not add additional weight to the arm as this can affect the spring balance and operation.
- 3) Ensure the arm is parked clear of the loading area after use.

Maintenance

12 monthly

- 1) Lubricate all swivel joints including primary arm base swivel, apex swivel (if present) and bottom hose swivel.

Remove the raceway plugs and apply a commercial grade high pressure molybdenum disulphide grease to the raceways.

Note: The bearing area is sealed between two 'O' rings and care should be taken to avoid over lubricating as excess pressure from too much grease could damage the seals.

- 2) Inspect all flange gasket connections for signs of leaks.
- 3) Inspect product drop hose and tanker coupler for damage and leaks.

5 Yearly

Fully service all swivel joints including replacing swivel product and dust seals.

Product Seal Change – see section 8 & 9

1. Remove cap head screws & flange
2. Remove the product seal
3. Clean the sealing faces of the flange & inner body
4. Replace the product seal, re-grease, re-assemble and pressure test.

445 Balance Adjustment

All 445 bottom loading arms are designed so the primary arm is horizontal when the API coupler is approximately 750mm above the ground.

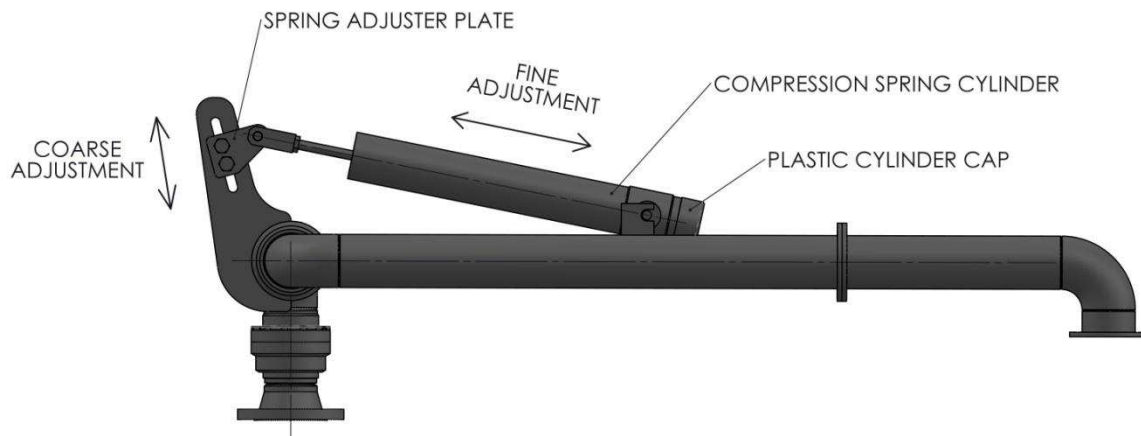
Coarse Adjustment

Note: This is a 2 man operation.

1. Using two 30mm spanners, loosen off the two M20 screws holding the spring adjuster plate in place. (see illustration below)
2. Take the weight of, and elevate the loading arm to approximately 45° above horizontal to slacken the tension on the compression spring.
3. Tap the adjuster plate upward to increase spring tension or downward to reduce it.
4. Re-tighten the screws fully and test the balance. Make further adjustments as required.

Fine Adjustment

More precise balance adjustments can be made from within the spring cylinder. See next section 'Compression Spring Balance Cylinder' for details.



6. COMPRESSION SPRING BALANCE CYLINDER

General Description

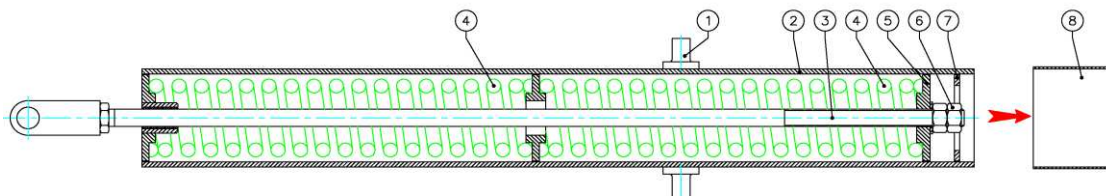
The 445 API Ranger bottom loading arm is balanced via a compression spring cylinder. The cylinder is comprised of compression springs, a spring compression shaft and spring housing. The “balancing” output force of the spring cylinder ranges from 5.0 KN to 13.5 KN typically.

Adjusting Cylinder Output Force

The spring balance cylinder contains constant force compression springs (item 4). To increase or decrease the output force of the cylinder, the pre compression of the springs can be adjusted as follows:-

1. Carefully remove the protective plastic cap from the end of the spring cylinder.
2. Using a 30mm deep throat socket, remove the M20 locking nut & turn the M20 spring adjusting nut (Clockwise – increases spring pre compression/output force) (Anticlockwise – decreases spring pre compression/output force).
3. After adjustment, replace the locking nut & tighten. Replace the protective end cap.

(For coarse balance adjustment see “Loading arm balancing”)



- | | |
|-----------------------------|-----------------------------|
| 1. Cylinder mounting lugs | 5. Spring compression plate |
| 2. Spring housing | 6. M20 Adjusting nuts |
| 3. Spring compression shaft | 7. Spring retaining plate |
| 4. Compression springs | 8. End cap |

Maintenance

The spring cylinder contains pre energised (5 KN) compression springs, for this reason the cylinder is factory greased and sealed for life, no maintenance is required.

NOTE: The spring retaining plate (item 7) cannot be removed, do not attempt to remove it to extract the springs from the cylinder (Serious injury will occur)

7. BASE SWIVEL JOINT ASSEMBLY

ITEM NO.	QTY.	DESCRIPTION	MATERIAL
1	1	SWIVEL FLANGE	EN20 / 304/316
2	1	SWIVEL OUTER BODY	EN45/304/316
3	1	SWIVEL INNER BODY	304/316
4	2	SWIVEL O-RING	PTFE
5	78	BALL BEARING $\varnothing 9.5$	CHROME ALLOY STEEL GC15
6	1	DN100 ENERGISED PRODUCT SEAL	PTFE
7	12	M8 X 40 CAP SCREW	8.8 B7P
8	2	BALL RACE PLUG	AISI 304
9	1	LEAK DETECTION SCREW	NYLON

CONFIDENTIAL	DRAWN	P J L	IFC Inflow	IFC Inflow Limited
This information is confidential and its disclosure to any third party without the express written permission of IFC Inflow is prohibited.	DATE	03.08.12	Unit 7, Askew Farm Lane	Unit 7, Askew Farm Lane
	FINISH	PAINTED	Grays, Essex RM17 5XR	Grays, Essex RM17 5XR
	MATERIAL	AS STATED	DN100 3-PART SWIVEL JOINT	
			JOB No	SW
			DRAWING No	BSC-SW-101
			REV	B

8. ALUMINIUM AS100 APEX SWIVEL

General Description

The series AS100 apex swivel joint is an optional swivel that can be located outboard of the primary arm.

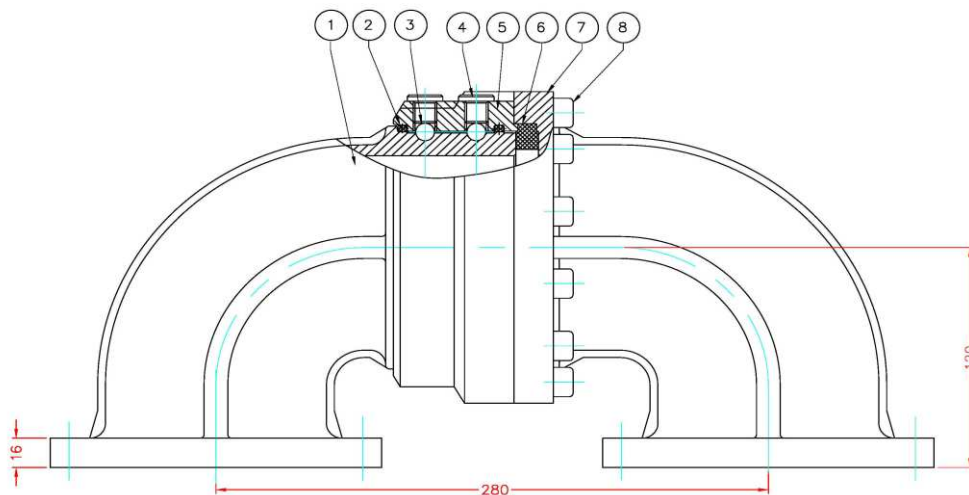
It comprises a three part swivel joint with two short radius TTMA flanged elbows. The flange item 8 can be removed to enable replacement of the product seal without disturbing the ball bearing raceways. Two rows of ball bearings provide integrity with high resistance to moment forces. Sealing is via a single energised PTFE seal with twin PTFE dust seals

Lubrication

Swivel joints are lubricated at the factory. They will need re-greasing at 12 monthly intervals (more frequently for arduous service conditions). As the bearing area is sealed between two 'O' rings, care should be taken to avoid over lubricating. Excess pressure will damage the seals. Use a commercial grade of molybdenum disulphide grease.

Product Seal Change

1. Remove cap head screws (item 8) & flange (item 7)
2. Remove the product seal (item 6)
3. Clean the sealing faces of the flange & inner body
4. Replace the product seal, re-grease, re-assemble and pressure test.



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|------------------------------|-----------------|------------------------|
| 1. Inner body (flanged TTMA) | 4. Race Plug | 7. Flange |
| 2. Race seal | 5. Outer body | 8. Cap HD screw M10x40 |
| 3. Ball bearings | 6. Product seal | |

9. ALUMINIUM BHS100 HOSE END SWIVEL

General Description

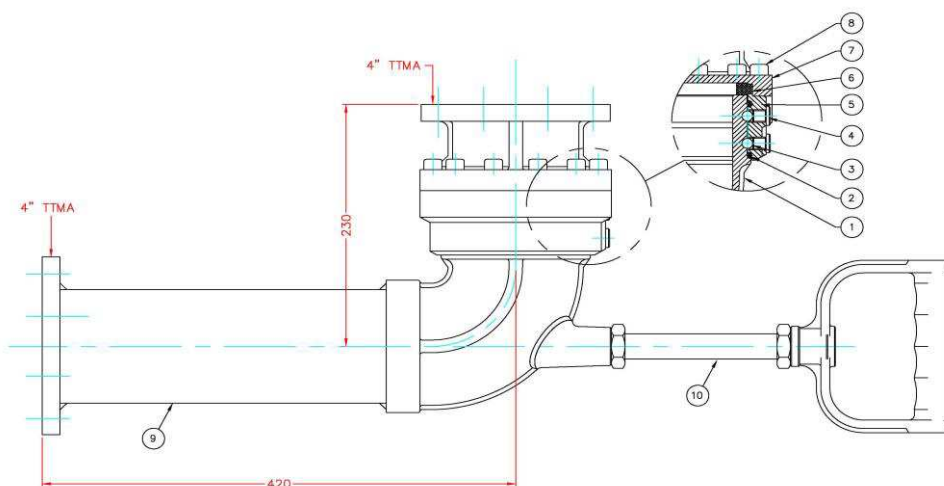
The BHS100 swivel joint is located at the hose end of the loading arm. It comprises a two part swivel joint, long radius flanged elbow and control handle for manoeuvrability. The inner body and outer body are retained via two rows of ball bearings allowing the flanged elbow to swivel. Sealing is via two Viton 'O' rings to prevent ingress of water or dust.

Lubrication

Swivel joints are lubricated at the factory. They will need re-greasing at 12 monthly intervals (more frequently for arduous service conditions). As the bearing area is sealed between two 'O' rings, care should be taken to avoid over lubricating. Excess pressure will damage the seals. Use a commercial grade of molybdenum disulphide grease.

Product Seal Change

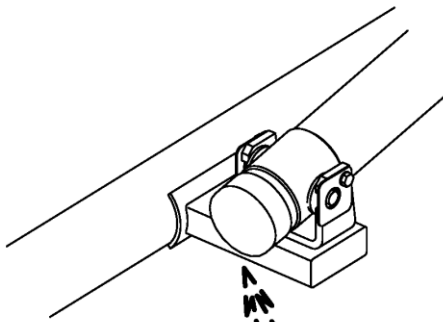
1. Remove cap head screws (item 8) and flange (item 7)
2. Remove the product seal (item 6)
3. Clean the sealing surface of the flange and inner body (item 1)
4. Replace product seal, re-assemble and pressure test.



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|------------------------------|-----------------------------|
| 1. Inner body (flanged TTMA) | 6. Product seal |
| 2. Race seal | 7. Flange |
| 3. all bearing | 8. Cap head screw M10x40 |
| 4. Race plug | 9. Spool (flanged 4in TTMA) |
| 5. Outer body | 10. Control handle |

10. NAME PLATE

Serial No: As per ID plate
 Type: 445 API Bottom Loading Arm
 Date: See name plate
 DN: 100mm
 Fluid Group: Group 1
 Max Pressure: 10 BAR
 Design Temp: 90° C
 PED category: SEP



Sales & Service by	
IFC Industrial Flow Control Ltd.	
Unit 1, Askews Farm Lane Off London Road Grays, Essex RM17 5XR Tel: 01375 387155 Fax: 01375 387420	
SERIAL NO:	FLUID GROUP:
TYPE:	MAX PRESSURE:
DATE:	DESIGN TEMP:
DN:	CATEGORY:

ITEM 10 – Identification Plate

11. EC DECLARATION OF CONFORMITY

Industrial Flow Control Ltd T/A IFC Inflow
3 Ryder way
Basildon
Essex
SS13 1QH

Declare that:

Product: 4inch 445 Bottom Loading Arm

Reference: See name plate serial number

In accordance with the Pressure Equipment Directive 97/23/EC has been designed and manufactured to API RP1004

IFC Inflow hereby declares that in compliance with the above directive the equipment named has been designed and manufactured to comply with Module A of the directive. The equipment complies with all the Essential Safety Requirements of the Directive.