

TM320

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World Class
Customer Support

General Information

Service Manual - TM320

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Notes:



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Section 1 - General Information

Contents

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Introduction

About this Manual

Machine Model and Serial Number

This manual provides information for the following model(s) in the JCB machine range:

TM320 from machine serial number 2420601 to 2420800.

General

Before you start using the product, you must know how the product operates. Use this part of the manual to identify each control lever, switch, gauge, button and pedal. Do not guess, if there is anything you do not understand, ask your JCB dealer.

Name and Address of the Manufacturer

JCB Excavators Limited, Lakeside Works, Rocester, Uttoxeter, United Kingdom, ST145JP.

Using this Manual

T1-044

This manual is arranged to give you a good understanding of the machine and its safe operation. It also contains maintenance information and specification data. Read this manual from front to back before using the machine for the first time. Particular attention must be given to all the safety aspects of operating and maintaining the machine.

If there is anything you are not sure about, ask your JCB distributor or employer. Do not guess, you or others could be killed or seriously injured.

General warnings in this chapter are repeated throughout the book, as well as specific warnings. Read all the safety statements regularly, so you do not forget them. Remember that the best operators are the safest operators.

The illustrations in this manual are for guidance only. Where the machines differ, the text and or the illustration will specify.

This manual contains original instructions, verified by the manufacturer (or their authorised representative).

The manufacturer's policy is one of continuous improvement. The right to change the specification of the machine without notice is reserved. No responsibility will be accepted for discrepancies which may occur between specifications of the machine and the descriptions contained in this publication.

All optional equipment included in this manual may not be available in all territories.

Left Side, Right Side

In this manual, 'left' **A** and 'right' **B** mean your left and right when you are seated correctly in the machine.

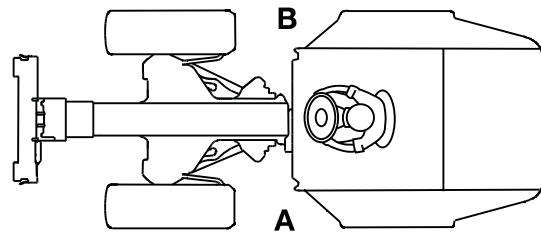


Fig 1.

C087420

Cross References

T1-004_2

In this publication, page cross references are made by presenting the subject title printed in bold, italic and underlined. It is preceded by the 'go to' symbol. The number of the page upon which the subject begins, is indicated within the brackets. For example: → **Cross References** (1-1).

Product Compliance

T1-055

Your JCB machine was designed to comply with the laws and regulations applicable at the time of its manufacture for the market in which it was first sold. In many markets, laws and regulations exist that require the owner to maintain the machine at a level of compliance relevant to the machine when first produced. Even in the absence of defined requirements for the machine owner, JCB



recommend that the machine compliance be maintained to ensure safety of the operator and exposed persons and to ensure the correct environmental performance. Your machine must not be altered in any way which could affect or invalidate any of these requirements. For advice consult your JCB dealer.

For its compliance as a new machine, your JCB and some of its components may bear approval numbers and marking's, and may have been supplied with a Declaration/Certificate of Conformity. These marking's and documents are relevant only for the country/region in which the machine was first sold to the extent that the laws and regulations required them.

Re-sales and import/export of machines across territories with different laws and regulations can cause new requirements to become relevant for which the machine was not originally designed or specified. In some cases, pre-owned machines irrespective of their age are considered new for the purposes of compliance and may be required to meet the latest requirements which could present an insurmountable barrier to their sale/use.

Despite the presence of any compliance related marking's on the machine and components, you should not assume that compliance in a new market will be possible. In many cases it is the person responsible for import of a pre-owned machine into a market that becomes responsible for compliance and who is also considered the manufacturer.

JCB may be unable to support any product compliance related enquiry for a machine which has been moved out of the legislative country/region where it was first sold, and in particular where a machine specification change or additional certification would have been required in order for the machine to be in compliance

Identifying Your Machine

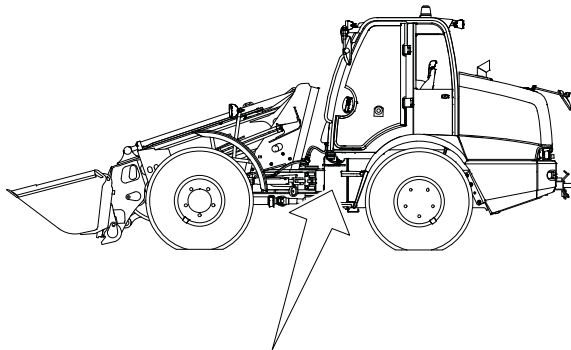
Machine Identification Plate

Your machine has an identification plate mounted as shown. The serial numbers of the machine and its major units are shown on the plate.

Note: The machine model and build specification is indicated by the PIN. Refer to **Typical Product Identification Number (PIN)**.

The serial number of each major unit is also shown on the unit itself. If a major unit is replaced by a new one, the serial number on the identification plate will be wrong. Either get a replacement identification plate from your JCB Dealer or simply remove the old number. This will prevent the wrong unit number being quoted when replacement parts are ordered.

The machine and engine serial numbers can help identify exactly the type of equipment you have.



MADE IN THE UK		J.C.B. EARTHMOVERS LIMITED LAKESHIRE WORKS, ROCKETT, UTTOXETER, UNITED KINGDOM, ST14 5JP	
Product Identification Number (PIN) BO10281	DESIGNATION		
WEIGHT kg BO 6016	YEAR OF MANUFACTURE	TYPE	ENGINE POWER kW @ 1700, BO 14006
HOMOLOGATION No.		ENGINE SERIAL NUMBER	
MAXIMUM MASS kg	TRANSMISSION SERIAL NUMBER		
MAX FRONT AXLE LOAD kg	FRONT AXLE SERIAL NUMBER		
MAX MIDDLE AXLE LOAD kg	MIDDLE AXLE SERIAL NUMBER		
MAX REAR AXLE LOAD kg	REAR AXLE SERIAL NUMBER		
			3308138

Fig 2.

Typical Product Identification Number

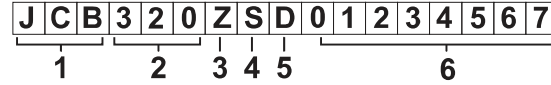


Fig 3.

T034220-3

- 1 World Manufacturer Identification (3 Digits)
- 2 Model Number (3 Digits)
- 3 Loader End Type (1 Digit)
- 4 Designation (1 Digit)
- 5 Check Letter (1 Digit)
- 6 Machine Serial Number (8 Digits)

S = Farmmaster
O = None Farmmaster

The Check Letter is used to verify the authenticity of the machine's PIN.

Each machine has a unique serial number.

Component Identification

Typical Engine Identification Number

The engine data labels **A** are located on the cylinder block at position **C** and rocker cover **D** (if fitted). The data label contains important engine information and includes the engine identification number **E**. The injector codes are on a label on the rocker cover **F**.

A typical engine identification number is:

S	J	320/40001	U	00001	12
1	2	3	4	5	6

1 Engine Displacement

S = 4.4 litre series

2 J = Electronic turbocharged and aftercooled (Tier 4-Final)

3 Engine part number

4 Country of manufacture

U = United Kingdom

5 Engine serial number

6 Year of manufacture

The last three parts of the engine identification number are stamped on the cylinder block at position **B**:

U 00001 12

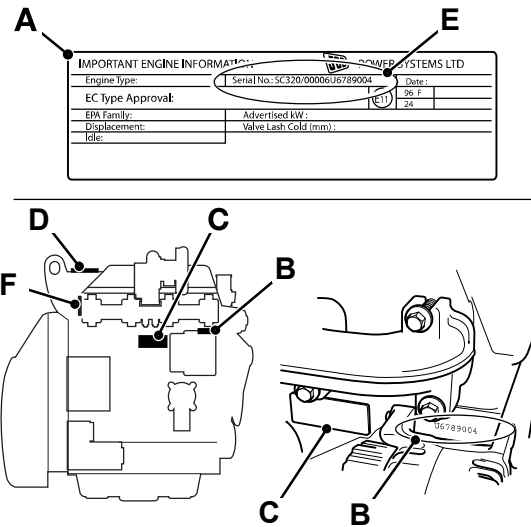


Fig 4. Engine

T062720

Transmission Identification Numbers

The transmission serial number is stamped on the plate **A** which is attached to the front face.

The drop box serial number is stamped on plate **B** attached to the drop box.

The axle serial number is stamped on plate **C** attached to the axle.

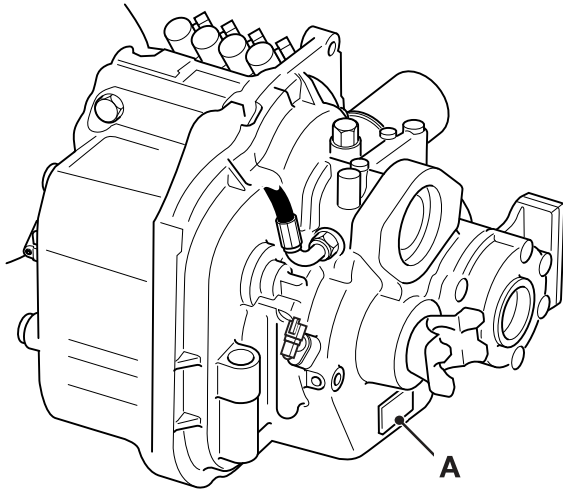


Fig 5.

A401030-C2

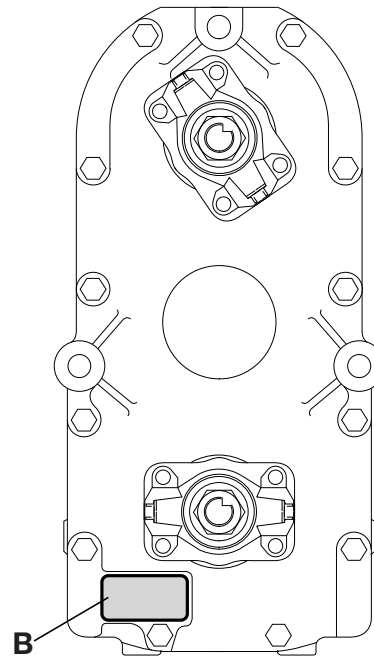


Fig 6.

C050630

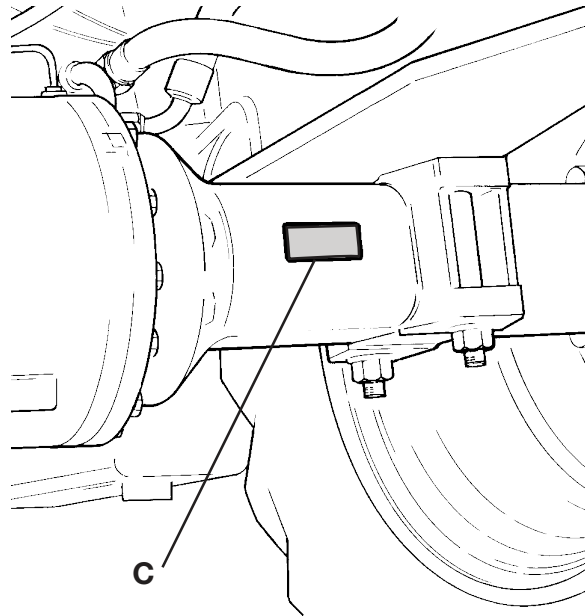


Fig 7.

C050640

FOPS Data Plate

WARNING

Do not use the machine if the falling objects protection level provided by the structure is not sufficient for the application. Falling objects can cause serious injury.

8-2-8-17

If the machine is used in any application where there is a risk of falling objects then a falling-objects protective structure (FOPS) must be installed. For further information contact your JCB Dealer

The falling objects protection structure (FOPS) is fitted with a dataplate. The dataplate indicates what level protection the structure provides.

There are two levels of FOPS:

- **Level I Impact Protection** - impact strength for protection from small falling objects (e.g. bricks, small concrete blocks, hand tools) encountered in operations such as highway maintenance, landscaping and other construction site services.
- **Level II Impact Protection** - impact strength for protection from heavy falling objects (e.g. trees, rocks) for machines involved in site clearing, overhead demolition or forestry.

⇒ [Fig 8. \(□ 1-7\)](#)

ROPS Data Plate

WARNING

You could be killed or seriously injured if you operate a machine with a damaged or missing ROPS/FOPS. If the Roll Over Protection Structure (ROPS)/Falling Objects Protection Structure (FOPS) has been in an accident, do not use the machine until the structure has been renewed. Modifications and repairs that are not approved by the manufacturer may be dangerous and will invalidate the ROPS/FOPS certification.

INT-2-1-9_6

WARNING

Seat Belts

The ROPS/FOPS is designed to give you protection in an accident. If you do not wear your seat belt, you could be thrown out of the machine and crushed. You must wear a seat belt when using the machine. Fasten the seat belt before starting the engine.

0153

Machines built to FOPS/ROPS standards have a data plate attached to the inside of the cab.

⇒ [Fig 8. \(□ 1-7\)](#)



Section 1 - General Information

Introduction

Identifying Your Machine

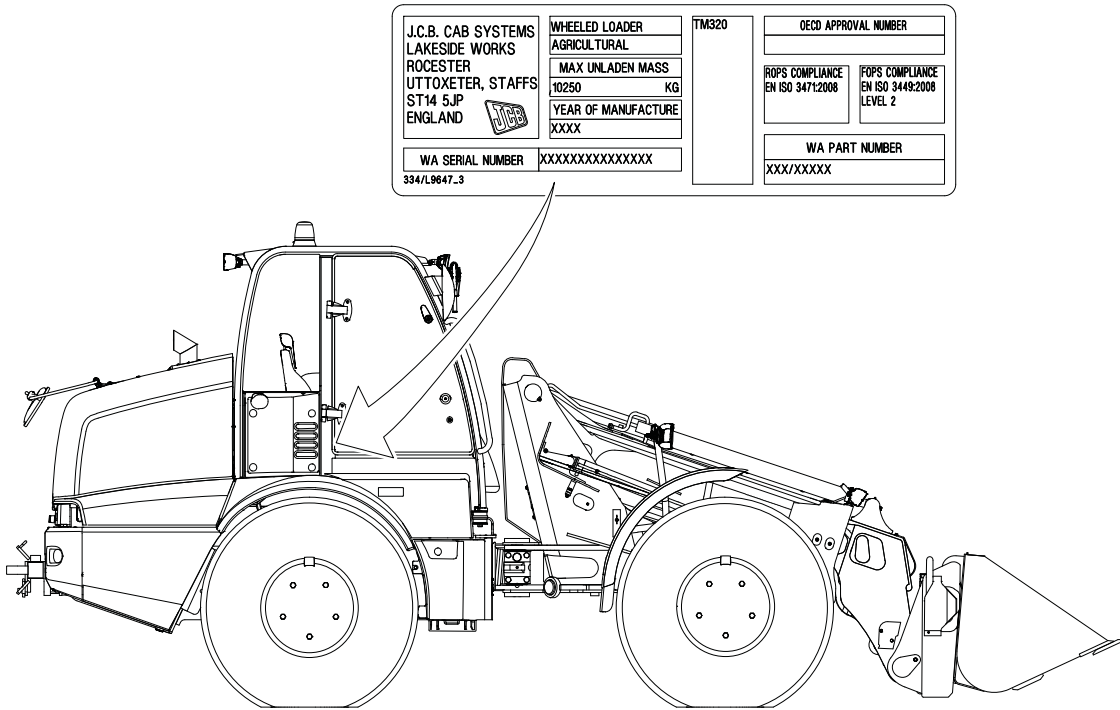


Fig 8.

Torque Settings

Zinc Plated Fasteners and Dacromet Fasteners

T11-002

Introduction

Some external fasteners on JCB machines are manufactured using an improved type of corrosion resistant finish. This type of finish is called Dacromet and replaces the original Zinc and Yellow Plating used on earlier machines.

The two types of fasteners can be readily identified by colour and part number suffix. → [Table 1. Fastener Types](#) (□ 1-8).

Table 1. Fastener Types

Fastener Type	Colour	Part No. Suffix
Zinc and Yellow	Golden finish	'Z' (e.g. 1315/3712Z)
Dacromet	Mottled silver finish	'D' (e.g. 1315/3712D)

Note: As the Dacromet fasteners have a lower torque setting than the Zinc and Yellow fasteners, the torque figures used must be relevant to the type of fastener.

Note: A Dacromet bolt should not be used in conjunction with a Zinc or Yellow plated nut, as this could change the torque characteristics of the torque setting further. For the same reason, a Dacromet nut should not be used with a Zinc or Yellow plated bolt.

Note: All bolts used on JCB machines are high tensile and must not be replaced by bolts of a lesser tensile specification.

Note: Dacromet bolts, due to their high corrosion resistance are used in areas where rust could occur. Dacromet bolts are only used for external applications. They are not used in applications such as gearbox or engine joint seams or internal applications.

Bolts and Screws

Use the following torque setting tables only where no torque setting is specified in the text.

Note: Dacromet fasteners are lubricated as part of the plating process, do not lubricate.

Torque settings are given for the following conditions:

Condition 1

- Un-lubricated fasteners
- Zinc fasteners
- Yellow plated fasteners

Condition 2

- Zinc flake (Dacromet) fasteners
- Lubricated zinc and yellow plated fasteners
- Where there is a natural lubrication. For example, cast iron components

Verbus Ripp Bolts

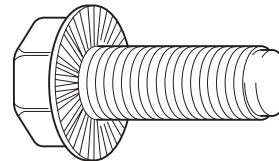


Fig 9.

Torque settings for these bolts are determined by the application. Refer to the relevant procedure for the required settings.



Section 1 - General Information Torque Settings

Zinc Plated Fasteners and Dacromet Fasteners

Table 2. Torque Settings - UNF Grade 'S' Fasteners

Bolt Size		Hexagon (A/F)	Condition 1			Condition 2		
in.	mm	in.	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft
1/4	6.3	7/16	11.2	1.1	8.3	10.0	1.0	7.4
5/16	7.9	1/2	22.3	2.3	16.4	20.0	2.0	14.7
3/8	9.5	9/16	40.0	4.1	29.5	36.0	3.7	26.5
7/16	11.1	5/8	64.0	6.5	47.2	57.0	5.8	42.0
1/2	12.7	3/4	98.00	10.0	72.3	88.0	9.0	64.9
9/16	14.3	13/16	140.0	14.3	103.2	126.0	12.8	92.9
5/8	15.9	15/16	196.0	20.0	144.6	177.0	18.0	130.5
3/4	19.0	1 1/8	343.0	35.0	253.0	309.0	31.5	227.9
7/8	22.2	1 15/16	547.0	55.8	403.4	492.0	50.2	362.9
1	25.4	1 1/2	814.0	83.0	600.4	732.0	74.6	539.9
1 1/8	31.7	1 7/8	1181.0	120.4	871.1	1063.0	108.4	784.0
1 1/4	38.1	2 1/4	1646.0	167.8	1214.0	1481.0	151.0	1092.3

Table 3. Torque Settings - Metric Grade 8.8 Fasteners

Bolt Size		Hexagon (A/F)	Condition 1			Condition 2		
ISO Metric Thread	mm	mm	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft
M5	5	8	5.8	0.6	4.3	5.2	0.5	3.8
M6	6	10	9.9	1.0	7.3	9.0	0.9	6.6
M8	8	13	24.0	2.4	17.7	22.0	2.2	16.2
M10	10	17	47.0	4.8	34.7	43.0	4.4	31.7
M12	12	19	83.0	8.5	61.2	74.0	7.5	54.6
M16	16	24	205.0	20.9	151.2	184.0	18.8	135.7
M20	20	30	400.0	40.8	295.0	360.0	36.7	265.5
M24	24	36	690.0	70.4	508.9	621.0	63.3	458.0
M30	30	46	1372.0	139.9	1011.9	1235.0	125.9	910.9
M36	36	55	2399.0	244.6	1769.4	2159.0	220.0	1592.4



Section 1 - General Information

Torque Settings

Zinc Plated Fasteners and Dacromet Fasteners

Table 4. Metric Grade 10.9 Fasteners

Bolt Size		Hexagon (A/F)	Condition 1			Condition 2		
ISO Metric Thread	mm	mm	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft
M5	5	8	8.1	0.8	6.0	7.3	0.7	5.4
M6	6	10	13.9	1.4	10.2	12.5	1.3	9.2
M8	8	13	34.0	3.5	25.0	30.0	3.0	22.1
M10	10	17	67.0	6.8	49.4	60.0	6.1	44.2
M12	12	19	116.0	11.8	85.5	104.0	10.6	76.7
M16	16	24	288.0	29.4	212.4	259.0	26.4	191.0
M20	20	30	562.0	57.3	414.5	506.0	51.6	373.2
M24	24	36	971.0	99.0	716.9	874.0	89.1	644.6
M30	30	46	1930.0	196.8	1423.5	1737.0	177.1	1281.1
M36	36	55	3374.0	344.0	2488.5	3036.0	309.6	2239.2

Table 5. Metric Grade 12.9 Fasteners

Bolt Size		Hexagon (A/F)	Condition 1			Condition 2		
ISO Metric Thread	mm	mm	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft
M5	5	8	9.8	1.0	7.2	8.8	0.9	6.5
M6	6	10	16.6	1.7	12.2	15.0	1.5	11.1
M8	8	13	40.0	4.1	29.5	36.0	3.7	26.5
M10	10	17	80.0	8.1	59.0	72.0	7.3	53.1
M12	12	19	139.0	14.2	102.5	125.0	12.7	92.2
M16	16	24	345.0	35.2	254.4	311.0	31.7	229.4
M20	20	30	674.0	68.7	497.1	607.0	61.9	447.7
M24	24	36	1165.0	118.8	859.2	1048.0	106.9	773.0
M30	30	46	2316.0	236.2	1708.2	2084.0	212.5	1537.1
M36	36	55	4049.0	412.9	2986.4	3644.0	371.6	2687.7



Section 1 - General Information Torque Settings

Zinc Plated Fasteners and Dacromet Fasteners

Table 6. Torque Settings - Rivet Nut Bolts/Screws

Bolt Size		Nm	kgf m	lbf ft
ISO Metric Thread	mm			
M3	3	1.2	0.1	0.9
M4	4	3.0	0.3	2.0
M5	5	6.0	0.6	4.5
M6	6	10.0	1.0	7.5
M8	8	24.0	2.5	18.0
M10	10	48.0	4.9	35.5
M12	12	82.0	8.4	60.5

Table 7. Torque Settings - Internal Hexagon Headed Cap Screws (Zinc)

Bolt Size		Nm	kgf m	lbf ft
ISO Metric Thread				
M3		2.0	0.2	1.5
M4		6.0	0.6	4.5
M5		11.0	1.1	8.0
M6		19.0	1.9	14.0
M8		46.0	4.7	34.0
M10		91.0	9.3	67.0
M12		159.0	16.2	117.0
M16		395.0	40.0	292.0
M18		550.0	56.0	406.0
M20		770.0	79.0	568.0
M24		1332.0	136.0	983.0

Hydraulic Connections

T11-003

'O' Ring Face Seal System

Adaptors Screwed into Valve Blocks

Adaptor screwed into valve blocks, seal onto an 'O' ring which is compressed into a 45° seat machined into the face of the tapped port.

Table 8. Torque Settings - BSP Adaptors

BSP Adaptor Size	Hexagon (A/F)	Nm	kgf m	lbf ft
	in.			
1/4	19.0	18.0	1.8	13.0
3/8	22.0	31.0	3.2	23.0
1/2	27.0	49.0	5.0	36.0
5/8	30.0	60.0	6.1	44.0
3/4	32.0	81.0	8.2	60.0
1	38.0	129.0	13.1	95.0
1 1/4	50.0	206.0	21.0	152.0

Table 9. Torque Settings - SAE Connections

SAE Tube Size	SAE Port Thread Size	Hexagon (A/F)	Nm	kgf m	lbf ft
		mm			
4	7/16 - 20	15.9	20.0 - 28.0	2.0 - 2.8	16.5 - 18.5
6	9/16 - 18	19.1	46.0 - 54.0	4.7 - 5.5	34.0 - 40.0
8	3/4 - 16	22.2	95.0 - 105.0	9.7 - 10.7	69.0 - 77.0
10	7/8 - 14	27.0	130.0 - 140.0	13.2 - 14.3	96.0 - 104.0
12	1 1/16 - 12	31.8	190.0 - 210.0	19.4 - 21.4	141.0 - 155.0
16	1 5/16 - 12	38.1	290.0 - 310.0	29.6 - 31.6	216.0 - 230.0
20	1 5/8	47.6	280.0 - 380.0	28.5 - 38.7	210.0 - 280.0

Hoses Screwed into Adaptors

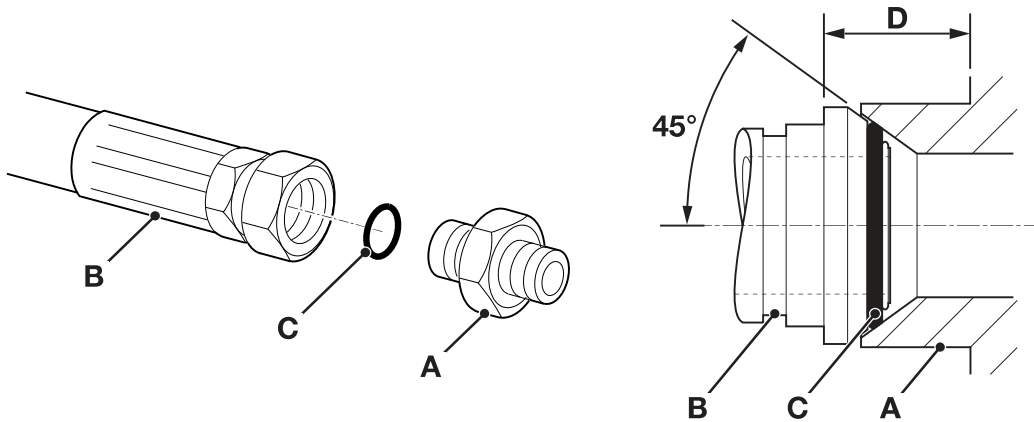


Fig 10.

Hoses **10-B** screwed into adaptors **10-A** seal onto an 'O' ring **10-C** which is compressed into a 45° seat machined into the face of the adaptor port.

Note: Dimension 10-D will vary depending upon the torque applied.

Table 10. BSP Hose - Torque Settings

BSP Hose Size	Hexagon (A/F)		Nm	kgf m	lbf ft
	in.	mm			
1/8		14.0	14.0 - 16.00	1.4 - 1.6	10.3 - 11.8
1/4		19.0	24.0 - 27.0	2.4 - 2.7	17.7 - 19.9
3/8		22.0	33.0 - 40.0	3.4 - 4.1	24.3 - 29.5
1/2		27.0	44.0 - 50.0	4.5 - 5.1	32.4 - 36.9
5/8		30.0	58.0 - 65.0	5.9 - 6.6	42.8 - 47.9
3/4		32.0	84.0 - 92.0	8.6 - 9.4	61.9 - 67.8
1		38.0	115.0 - 126.0	11.7 - 12.8	84.8 - 92.9
1 1/4		50.0	189.0 - 200.0	19.3 - 20.4	139.4 - 147.5
1 1/2		55.0	244.0 - 260.0	24.9 - 26.5	180.0 - 191.8



Section 1 - General Information Torque Settings

Hydraulic Connections

Adaptors into Component Connections with Bonded Washers

Table 11. BSP Adaptors with Bonded Washers - Torque Settings

BSP Size	Nm	kgf m	lbf ft
in.			
1/8	20.0	2.1	15.0
1/4	34.0	3.4	25.0
3/8	75.0	7.6	55.0
1/2	102.0	10.3	75.0
5/8	122.0	12.4	90.0
3/4	183.0	18.7	135.0
1	203.0	20.7	150.0
1 1/4	305.0	31.0	225.0
1 1/2	305.0	31.0	225.0

'Torque Stop' Hose System

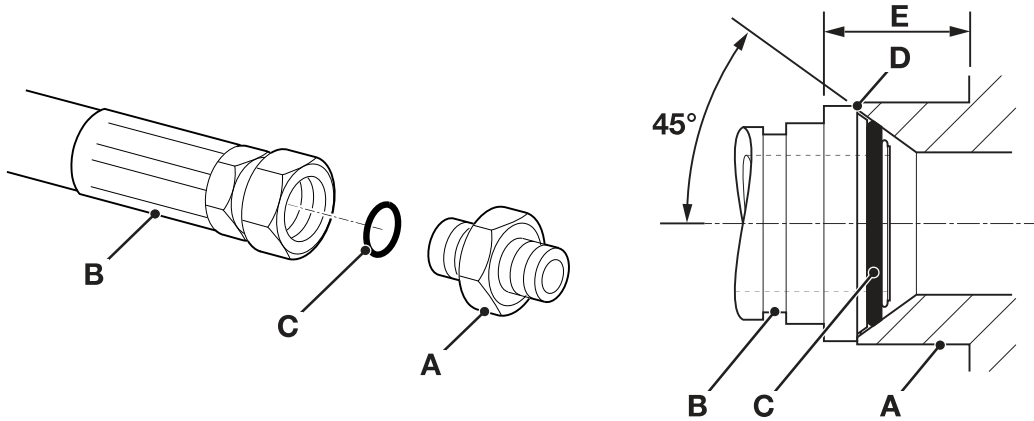


Fig 11.

'Torque Stop' Hoses **11-B** screwed into adaptors **11-A** seal onto an 'O' ring **11-C** which is compressed into a 45° seat machined in the face of the adaptor port. To prevent the 'O' ring being damaged as a result of over tightening, 'Torque

Stop' Hoses have an additional shoulder **11-D**, which acts as a physical stop.

Note: Minimum dimension **11-E** fixed by shoulder **11-D**.

Table 12. BSP 'Torque Stop' Hose - Torque Settings

BSP Hose Size	Hexagon (A/F)		Nm	kgf m	lbf ft
	in.	mm			
1/8		14.0	14.0	1.4	10.0
1/4		19.0	27.0	2.7	20.0
3/8		22.0	40.0	4.1	30.0
1/2		27.0	55.0	5.6	40.0
5/8		30.0	65.0	6.6	48.0
3/4		32.0	95.0	9.7	70.0
1		38.0	120.0	12.2	89.0
1 1/4		50.0	189.0	19.3	140.0
1 1/2		55.0	244.0	24.9	180.0