

The **Penny+Giles ICT050 Contactless In-Cylinder Linear Transducer** has been specifically designed for small bore mobile and static hydro-pneumatic actuators.

Designed primarily for the off-highway markets, the ICT050 linear transducer provides reliable, fit-and-forget position sensing of the cylinder rod in actuators with strokes up to 500mm.

It is a robust, non-contact transducer suitable for the harsh conditions of lifting and steering position applications and hydro-pneumatic active suspension systems. It works on an inductive coil principle, with virtually infinite resolution and is capable of withstanding temperatures up to 200°C and working pressures up to 500Bar.



ICT050

IN-CYLINDER LINEAR TRANSDUCER

www.pennyandgiles.com

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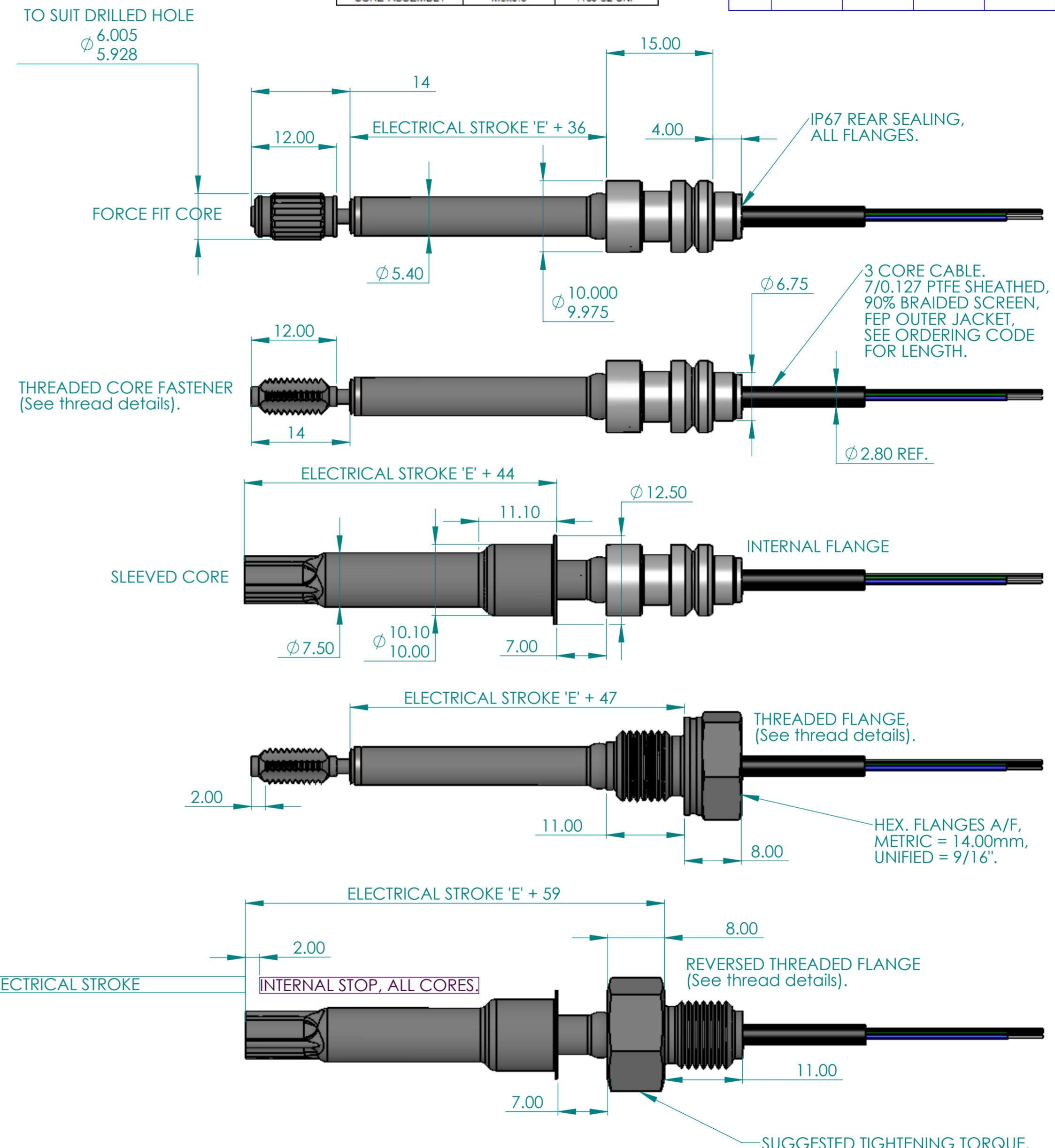
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METRIC IF IN DOUBT ASK		SPECIFICATION	
ELECTRICAL STROKE LENGTH 'E'	25mm TO 200mm (IN 5mm INCREMENTS) 210mm TO 500mm (IN 10mm INCREMENTS)		
TEMPERATURE RANGE (OPERATING)	SEE ORDERING CODE		
TEMPERATURE RANGE (STORAGE)	-55°C TO +200°C		
TEMPERATURE PERFORMANCE	< ± 100ppm OF ELECTRICAL STROKE/°C (+20°C TO +60°C) < ± 200ppm OF ELECTRICAL STROKE/°C (-20°C TO +100°C) < ± 300ppm OF ELECTRICAL STROKE/°C (-20°C TO +200°C)		
LEAST SQUARES LINEARITY	< ± 0.75% STROKE MAX		
RESOLUTION	INFINITE		
MAX. WORKING PRESSURE	500 BAR		
INSULATION RESISTANCE	YELLOW/ BLUE TO CASE >50MΩ @50Vdc SCREEN TO CASE >50MΩ @50Vdc		
GREEN WIRE BONDING RESISTANCE	< 1 + (0.21 × CABLE LENGTH IN METRES) Ω, e.g. 20M CABLE = 1 + (0.21 × 20) = 5.20 Ω		
NOTES			
1. STROKE LENGTH 'E' SPECIFIED BY CUSTOMER WITHIN RANGE 25mm TO 500mm.			
2. THESE SPECIFICATIONS APPLY ONLY WHEN THE ICT IS OPERATED IN CONJUNCTION WITH A Penny & Giles 'EICT' ELECTRONIC MODULE.			
3. ELECTRONIC MODULES ARE ORDERED SEPARATELY, SEE APPROPRIATE Penny & Giles DATA SHEET (S)			
PROGRAMMING MODULE			
EACH TRANSDUCER IS SUPPLIED WITH A SENSOR LENGTH MODULE CALIBRATED TO MATCH THE ELECTRICAL STROKE LENGTH 'E'. THE MODULE IS PLUGGED INTO THE REQUIRED 'EICT' ELECTRONIC MODULE VIA MATING CONNECTORS. IT IS IMPORTANT THE TRANSDUCER STROKE LENGTH AND THE SENSOR LENGTH MODULE STROKE LENGTH ARE MATCHED.			
E.G. SENSOR LENGTH MODULE	SA204323/200		
TRANSDUCER	ICT050/EM/T/200		
ORDERING CODE THREADED FLANGE			
ICT 050/___/___/___/___/___			
FLANGE OPTION			
EM	=EXTERNAL METRIC FLANGE		
EU	=EXTERNAL UNIFIED FLANGE		
RM	=REVERSED THREADED METRIC FLANGE		
RU	=REVERSED THREADED UNIFIED FLANGE		
CORE OPTION			
SC	= SLEEVED CORE		
TU	= THREADED CORE UNIFIED		
TM	= THREADED CORE METRIC		
FF	= FORCE FIT		
STROKE LENGTH 'E' IN mm			
TEMPERATURE RANGE (OPERATING)		CABLE OPTION	
H	= -20°C TO +200°C	P5	= 0.5m CABLE
L	= -55°C TO +120°C	01	= 1.0m CABLE
		06	= 6.0m CABLE
ORDERING CODE INTERNAL FLANGE			
ICT 050/___/___/___/___/___			
FLANGE OPTION			
IN	=INTERNAL FLANGE		
CORE OPTION			
SC	= SLEEVED CORE		
TM	= THREADED CORE METRIC		
TU	= THREADED CORE UNIFIED		
FF	= FORCE FIT		
STROKE LENGTH 'E' IN mm			
TEMPERATURE RANGE (OPERATING)		CABLE OPTION	
H	= -20°C TO +200°C	P5	= 0.5m CABLE
L	= -55°C TO +120°C	01	= 1.0m CABLE
		06	= 6.0m CABLE

THREAD DETAILS		
THREADED & REVERSE	METRIC THREAD	UNIFIED THREAD
THREADED FLANGE	M10x1.0	3/8"-24 UNF
CORE ASSEMBLY	M5x0.8	.190-32 UNF

ISS	DATE	DRAWN	ECR No.	CHK	APP
9	08/02/11	S COLE	10426/22	M BENTLEY	M BENTLEY



FOR SUGGESTED FITTING PROFILES AND DIMENSIONS REFER TO AI203558 (H TEMP RANGE) OR AI208549 (L TEMP RANGE)

PENNY + GILES

A2

PART NUMBER:
ICT050

SHT 1
OF
1 SHTS

SCALE	IF CONTROL DIMENSIONS (Kc) ARE SPECIFIED THEY ARE TO BE SUBJECT TO 100% INSPECTION OR STATISTICAL PROCESS CONTROL.	D No.	MATERIAL
UNLESS STATED		REF.	FINISH CLEAN
	MASS (g)	VOL. (mm ³)	

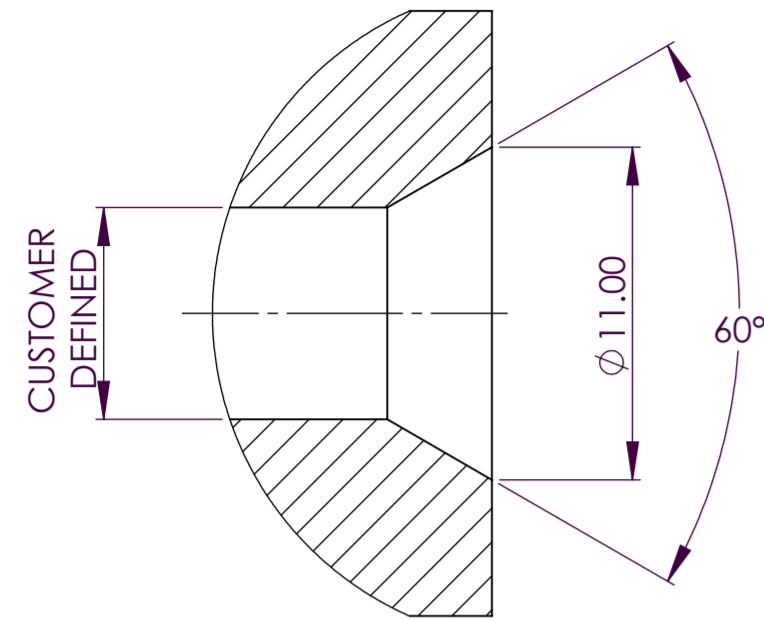
TOLERANCES: IN-LINE WITH PENNY & GILES STANDARDS 55-301			
SURFACE TEXTURE VALUES IN MICROMETRES (µm) TO BS1134:PT2. ALL MACHINED SURFACES TO BE 1.6			
ALL SCREW THREADS TO BS3643 PT.2:			
EXTERNAL CLASS:	6g	INTERNAL CLASS:	6H
ANGULAR	± 1°	LINEAR (MACHINING)	0.0mm +/-0.5mm 0.0mm +/-0.2mm 0.00mm +/-0.1mm 0.000mm +/-0.01mm
BREAK EDGE	0.05 - 0.15mm	FILLET RADS	0.1 - 0.3mm
UNLESS OTHERWISE STATED			

TITLE
IN CYLINDER TRANSDUCER

METRIC
IF IN DOUBT ASK

ISS	DATE	DRAWN	ECR No.	CHK	APP
2B	09/02/11	S COLE	10426/22	M BENTLEY	M BENTLEY

PISTON ROD END DETAIL TO ASSIST
BLIND LOADING OF LONGER STROKE
INTERNAL FLANGE OPTIONS



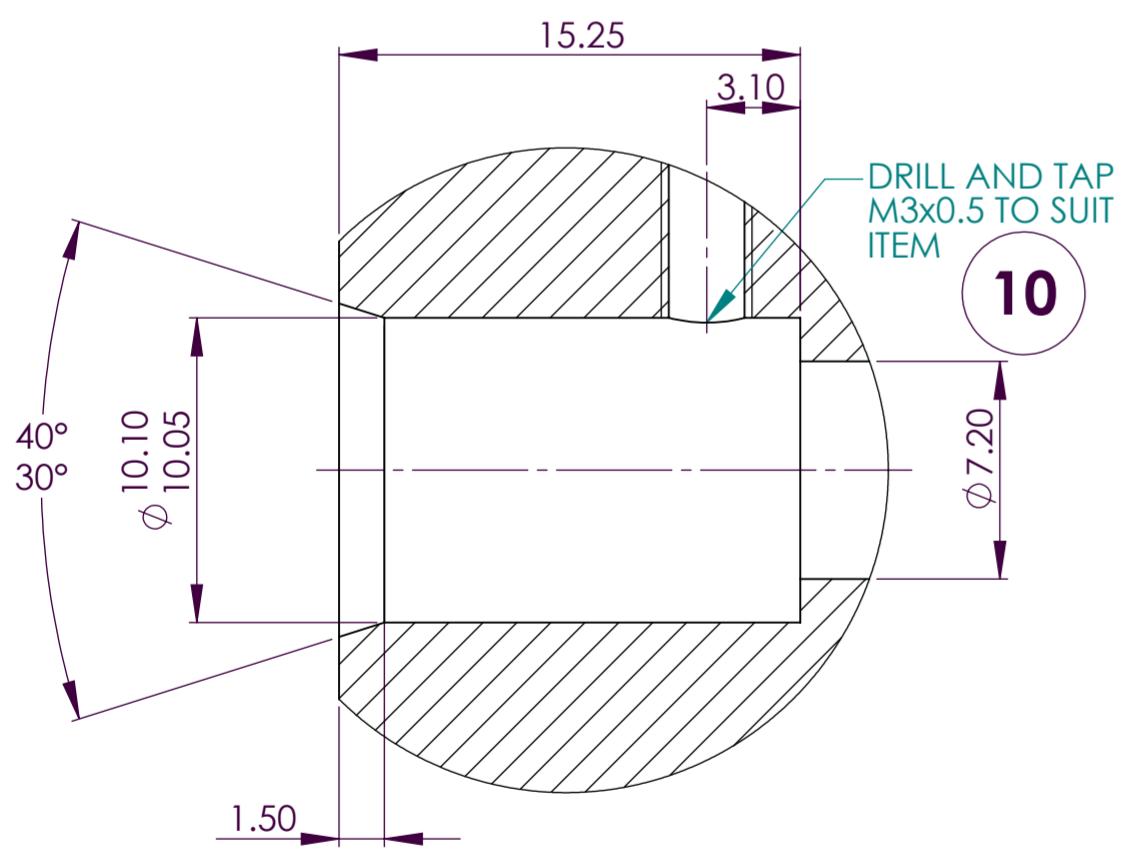
ITEM NO.	DESCRIPTION	P&G PART No.	QTY.
1	THIN NUT M5x0.8	X63-072-050	1
2	FULL NUT 0.190-32 UNF	X63-111-003	1
3	WAVEY WASHER - ELP2	X63-112-002	2
4	SHIM WASHER	P55044/3	1
5	CIRCLIP D1300-0130	X69-005-109	1
6	O'RING BROWN(7.65x1.63)	X64-194-114	1
7	O'RING (8.1x1.6)	X64-194-015	1
8	O'RING (7x2)	X64-194-016	1
9	ANTI EXTRUSION RING	X64-081-001	1
10	M3x0.5 CONICAL SET SCREW	X63-096-305	1
11	COPY OF AI203558	AI203558	1
12	LABEL (SUPPLIED LOOSE)	P200919	1
13	INSTALATION KIT LABEL	P204986	1
14	ALTERNATE CABLE GLAND SEAL	X61-213-202	1

ITEM 12, LABEL, IS SUPPLIED FOR THE CUSTOMER TO RECORD ICT ORDERING CODE AND TO BE FITTED IN VISIBLE LOCATION ADJACENT TO SENSOR FOR RE-ORDERING REFERENCE.
ITEM 14, ALTERNATE CABLE GLAND SEAL, IS SUPPLIED FOR CONNECTING ICT050 DIRECT TO EICTM.

BECAUSE OF THE MULTIPLICITY OF POTENTIAL APPLICATION, THE INSTALLATION DETAILS SHOWN ARE SUGGESTIONS ONLY. THE USER SHOULD ENSURE THAT THE DESIGN, METHOD OF ASSEMBLY AND MATERIALS USED ARE SATISFACTORY FOR THE INSTALLATION.

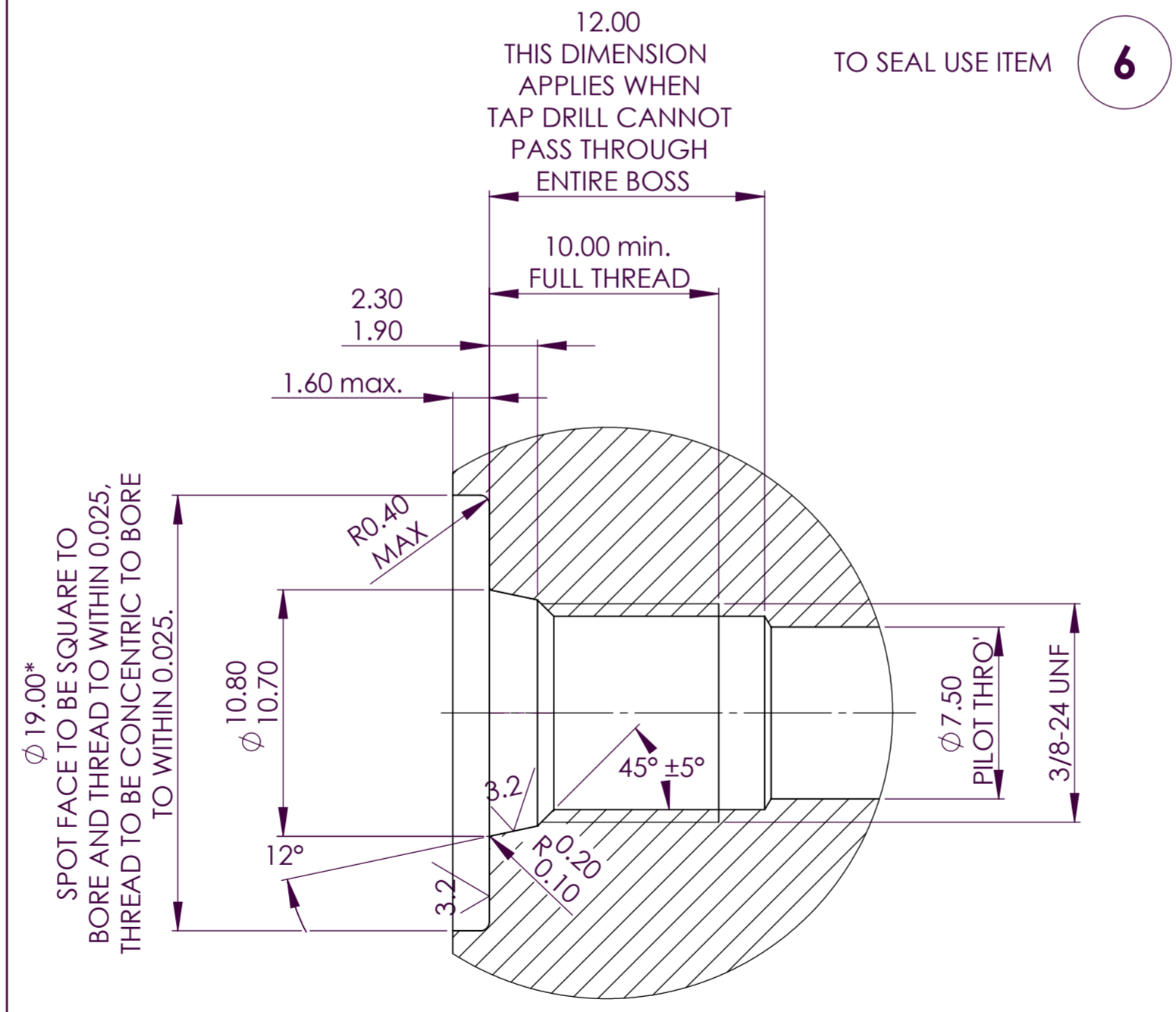
INTERNAL FLANGE
MACHINING DETAILS

TO SEAL USE ITEMS **8** & **9**



MACHINING DETAILS FOR UNIFIED FLANGE.
PORT CONFORMS TO SAE J1926/1, CONNECTIONS FOR FLUID POWER AND GENERAL USE - PORTS AND STUD ENDS WITH ISO 725 THREADS AND O'RING SEALING - PART 1: THREADED PORTS WITH O'RING SEAL IN TRUNCATED HOUSING

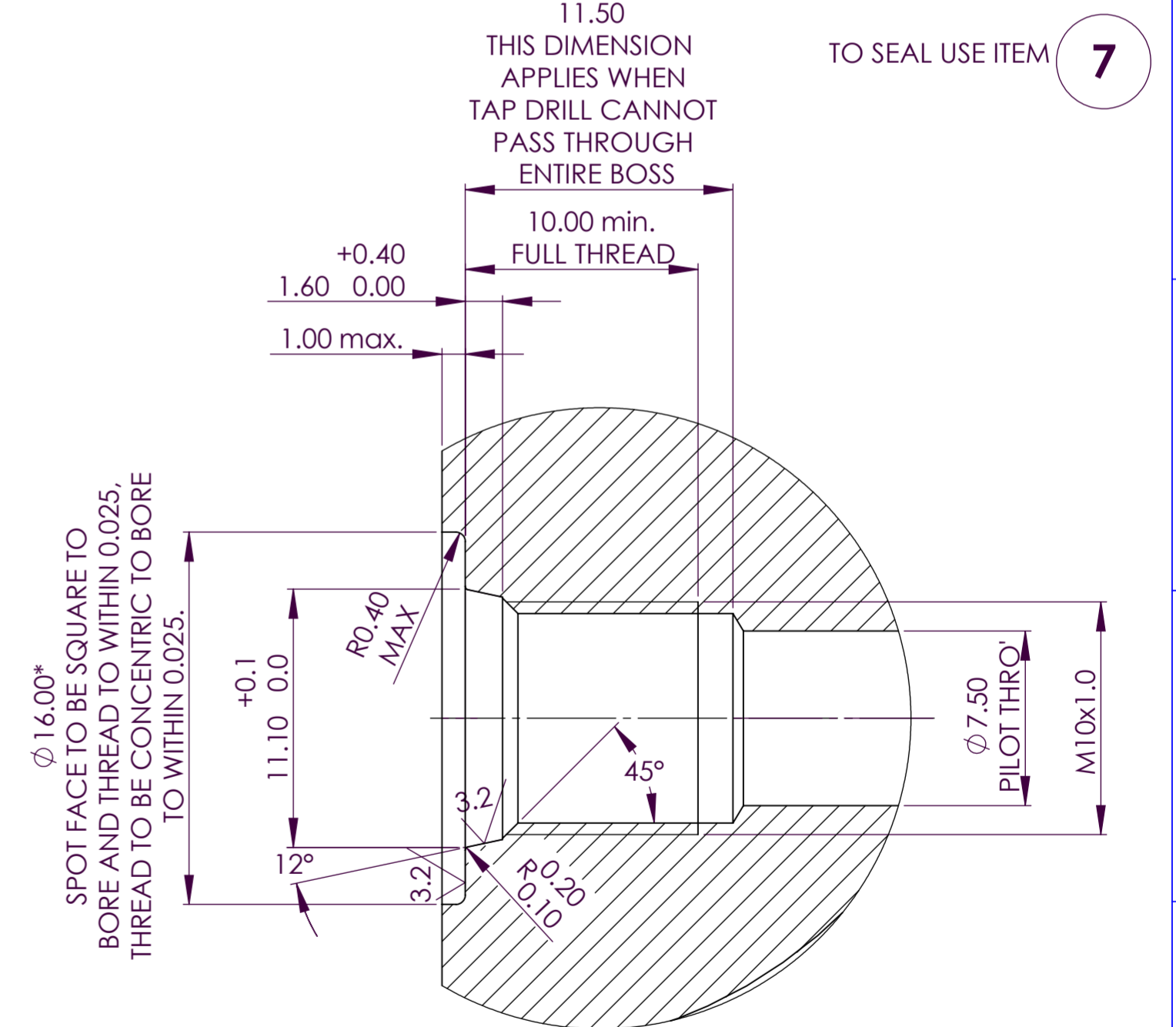
SUITABLE PORT CUTTERS ARE AVAILABLE FOR THESE DETAILS.....



* IF FACE OF PORT IS MACHINED DIMENSIONS $\phi 19.00 \times 1.6 \text{ max}$ NEED NOT APPLY AS LONG AS R0.2/0.1 IS MAINTAINED TO AVOID DAMAGE TO O-RING DURING INSTALATION.

MACHINING DETAILS FOR METRIC FLANGE.
PORTS CONFORM TO ISO 6149-1:1993, CONNECTIONS FOR FLUID POWER AND GENERAL USE - PORTS AND STUD ENDS WITH ISO 261 THREADS AND O'RING SEALING - PART 1: PORTS WITH O'RING SEAL IN TRUNCATED HOUSING

SUITABLE PORT CUTTERS ARE AVAILABLE FOR THESE DETAILS.....



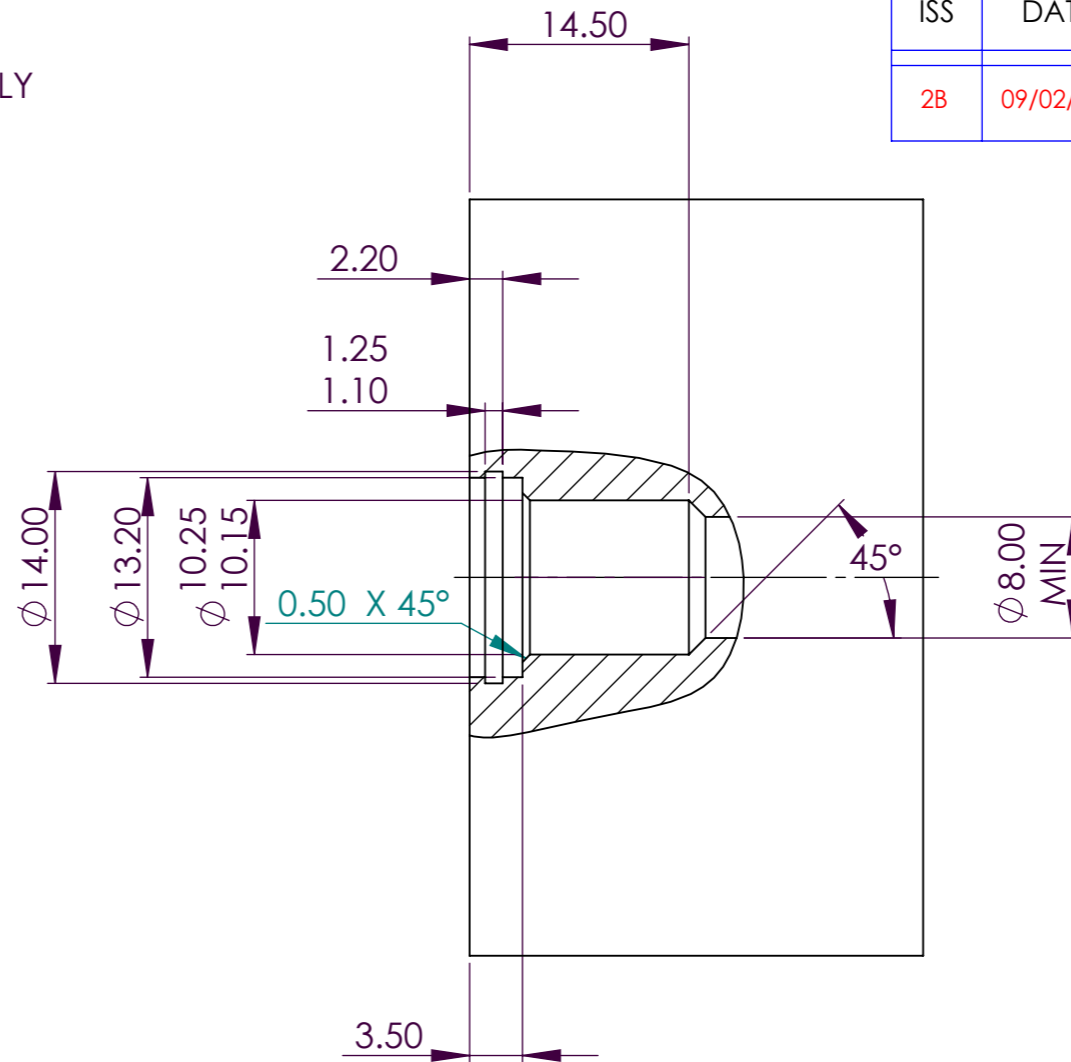
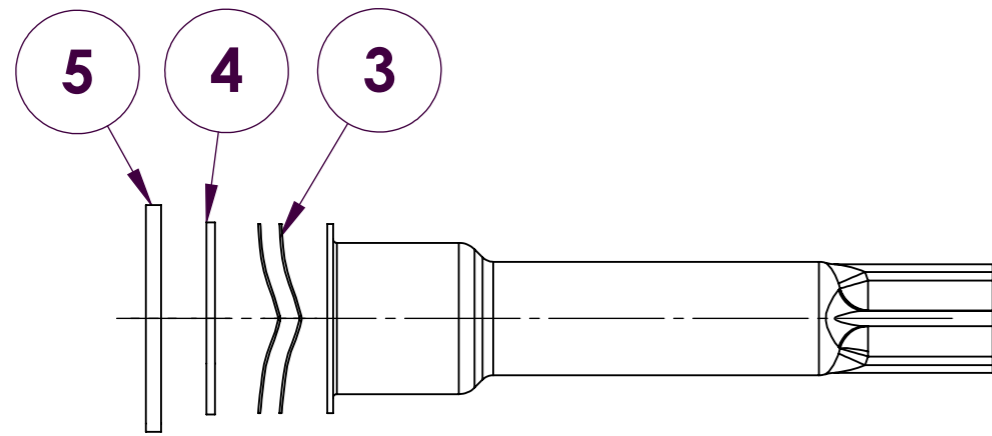
* IF FACE OF PORT IS MACHINED DIMENSIONS $\phi 16.00 \times 1.00 \text{ max}$ NEED NOT APPLY AS LONG AS R0.2/0.1 IS MAINTAINED TO AVOID DAMAGE TO O-RING DURING INSTALATION.

SCALE UNLESS STATED	IF CONTROL DIMENSIONS (Kc) ARE SPECIFIED THEY ARE TO BE SUBJECT TO 100% INSPECTION OR STATISTICAL PROCESS CONTROL.	D No. ICT050	MATERIAL	TOLERANCES: IN-LINE WITH PENNY & GILES STANDARDS 55-301 SURFACE TEXTURE VALUES IN MICROMETRES (μm) TO BS1134:PT2. ALL MACHINED SURFACES TO BE $1.6 \mu\text{m}$	TITLE SUGGESTED ICT050 INSTALLATION DETAILS AND INSTALLATION KIT 'H' TEMP RANGE	PENNY + GILES	A2
MASS (g)	VOL. (mm ³)	REF. AI56140	FINISH	ALL SCREW THREADS TO BS3643 PT.2: EXTERNAL CLASS: 6g INTERNAL CLASS: 6H ANGULAR: $\pm 1^\circ$ LINEAR: 0.0mm +/- 0.5mm, 0.0mm +/- 0.2mm, 0.00mm +/- 0.1mm, 0.000mm +/- 0.01mm (MACHINING) BREAK EDGE: 0.05 - 0.15mm, FILLET RADS: 0.1 - 0.3mm UNLESS OTHERWISE STATED	PART NUMBER: AI203558	SHT 1 OF 2 SHTS	

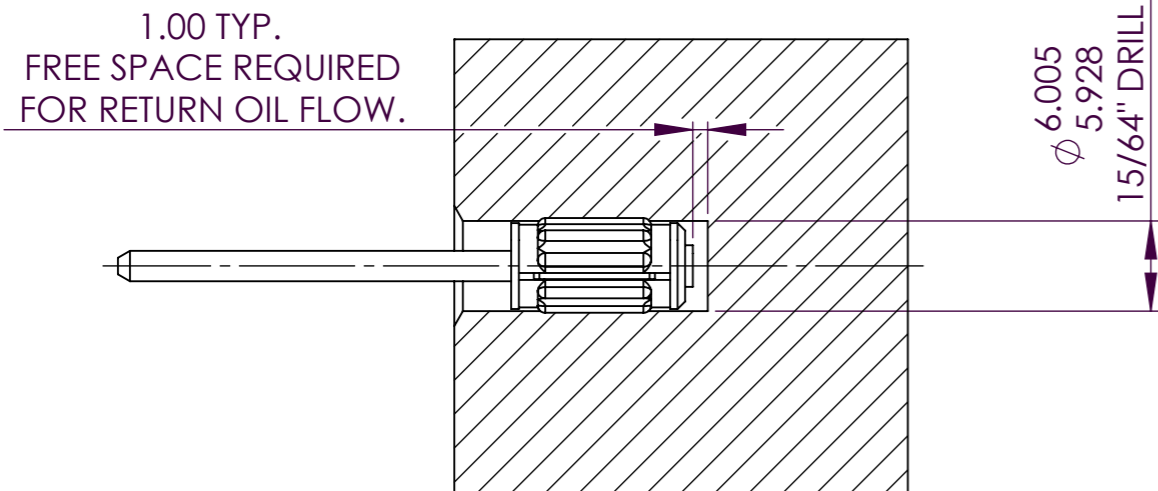
METRIC
IF IN DOUBT ASK

ISS	DATE	DRAWN	ECR No.	CHK	APP
2B	09/02/11	S COLE	10426/22	M BENTLEY	M BENTLEY

**SLEEVED CORE ASSEMBLY
MACHINING DETAILS**



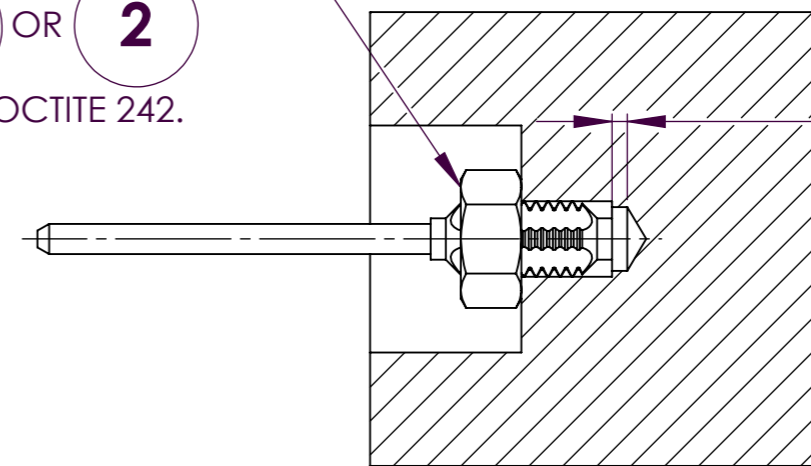
**FORCE FIT CORE
MACHINING DETAILS**



NOTE- INSTALLATION TOOL
REQUIRED SEE P&G DRAWING T56726

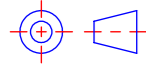
**THREADED CORE ASSEMBLY
M5 x 0.8 OR 0.190-32 UNF**

LOCK CORE ASSEMBLY
WITH NUT
1 OR **2**
AND LOCTITE 242.



SCALE

UNLESS STATED



IF CONTROL DIMENSIONS (Kc)
ARE SPECIFIED THEY ARE TO BE
SUBJECT TO 100% INSPECTION OR
STATISTICAL PROCESS CONTROL.

MASS (g) VOL. (mm³)

D No

ICT050

FIRST USED ON

REF.

AI56140

MATERIAL

FINISH

TOLERANCES: IN-LINE WITH PENNY & GILES STANDARDS 55-301
SURFACE TEXTURE VALUES IN MICROMETRES (µm)
TO BS1134:PT2. ALL MACHINED SURFACES TO BE 1.6

ALL SCREW THREADS TO BS3643 PT.2:
EXTERNAL CLASS: 6g INTERNAL CLASS: 6H

ANGULAR ± 1°	LINEAR 0. mm 0.0 mm 0.00mm 0.000mm	(MACHINING) +/- 0.5 mm +/- 0.2 mm +/- 0.1mm +/- 0.01mm	BREAK EDGE 0.05 - 0.15mm FILLET RADS 0.1 - 0.3mm
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UNLESS OTHERWISE STATED

TITLE

**SUGGESTED ICT050 INSTALLATION
DETAILS AND INSTALLATION KIT
'H' TEMP RANGE**

PENNY + GILES

PART NUMBER:

AI203558

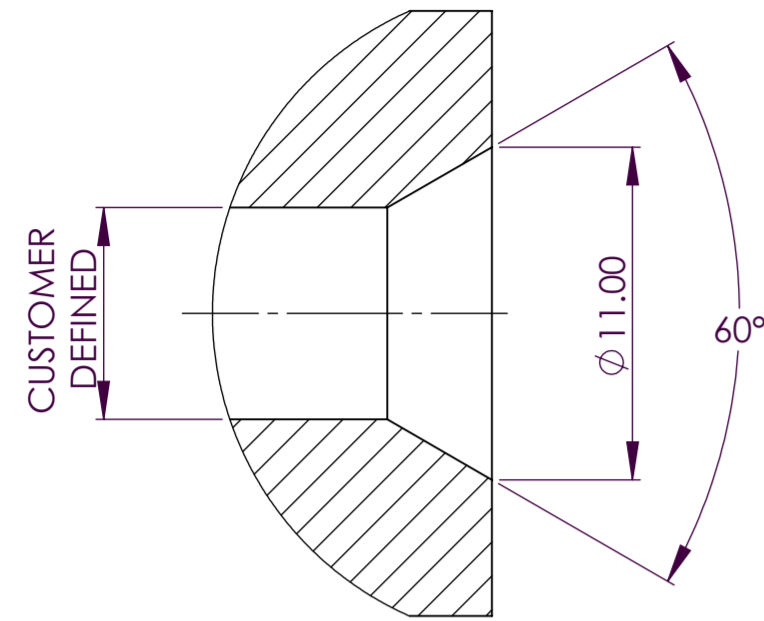
A3

SHT 2
OF
2 SHTS

METRIC
IF IN DOUBT ASK

ISS	DATE	DRAWN	ECR No.	CHK	APP
1	09/02/11	S COLE	10426/22	M BENTLEY	M BENTLEY

PISTON ROD END DETAIL TO ASSIST
BLIND LOADING OF LONGER STROKE
INTERNAL FLANGE OPTIONS



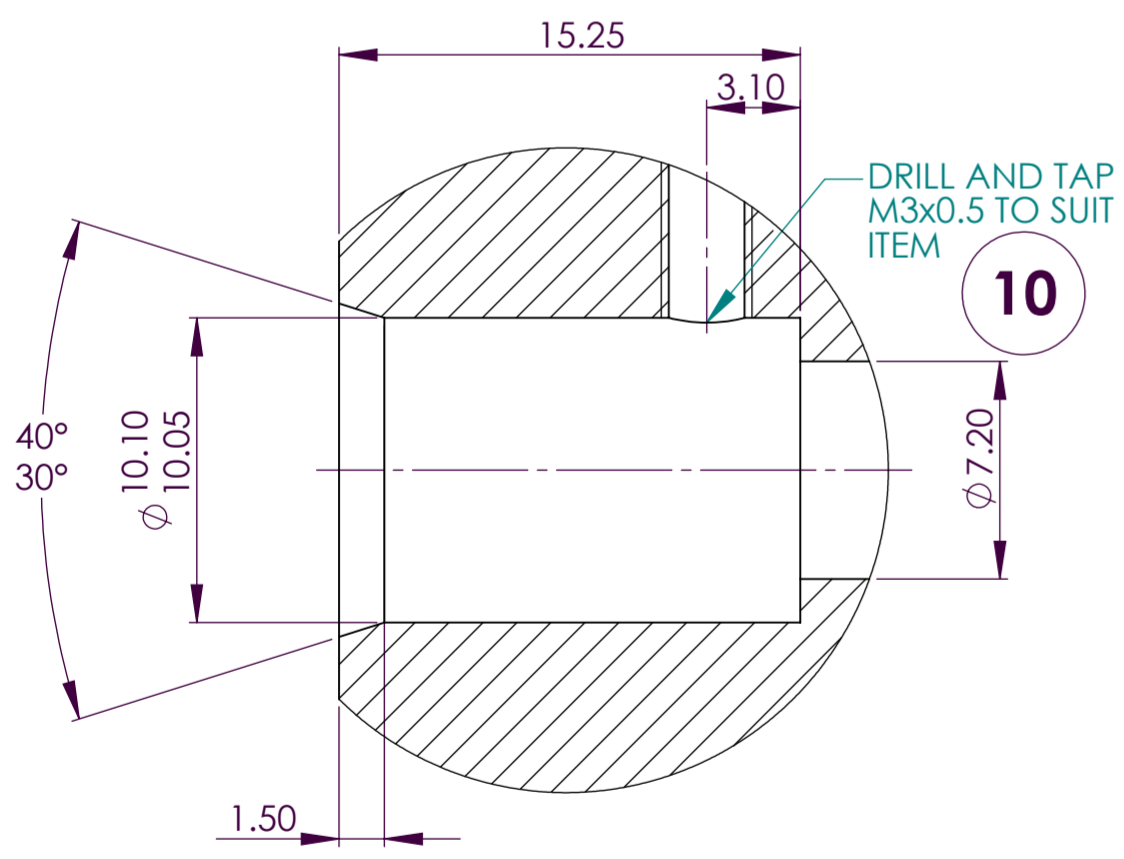
ITEM NO.	DESCRIPTION	P&G PART No.	QTY.
1	THIN NUT M5x0.8	X63-072-050	1
2	FULL NUT 0.190-32 UNF	X63-111-003	1
3	WAVEY WASHER - ELP2	X63-112-002	2
4	SHIM WASHER	P55044/3	1
5	CIRCLIP D1300-0130	X69-005-109	1
6	O'RING BROWN(7.65x1.63)	X64-213-014	1
7	O'RING (8.1x1.6)	X64-213-015	1
8	O'RING (7x2)	X64-213-016	1
9	ANTI EXTRUSION RING	X64-081-001	1
10	M3x0.5 CONICAL SET SCREW	X63-096-305	1
11	COPY OF AI208549	AI208549	1
12	LABEL (SUPPLIED LOOSE)	P200919	1
13	INSTALATION KIT LABEL	P208550	1
14	ALTERNATE CABLE GLAND SEAL	X61-213-202	1

ITEM 12, LABEL, IS SUPPLIED FOR THE CUSTOMER TO RECORD ICT ORDERING CODE AND TO BE FITTED IN VISIBLE LOCATION ADJACENT TO SENSOR FOR RE-ORDERING REFERENCE.
ITEM 14, ALTERNATE CABLE GLAND SEAL, IS SUPPLIED FOR CONNECTING ICT050 DIRECT TO EICTM.

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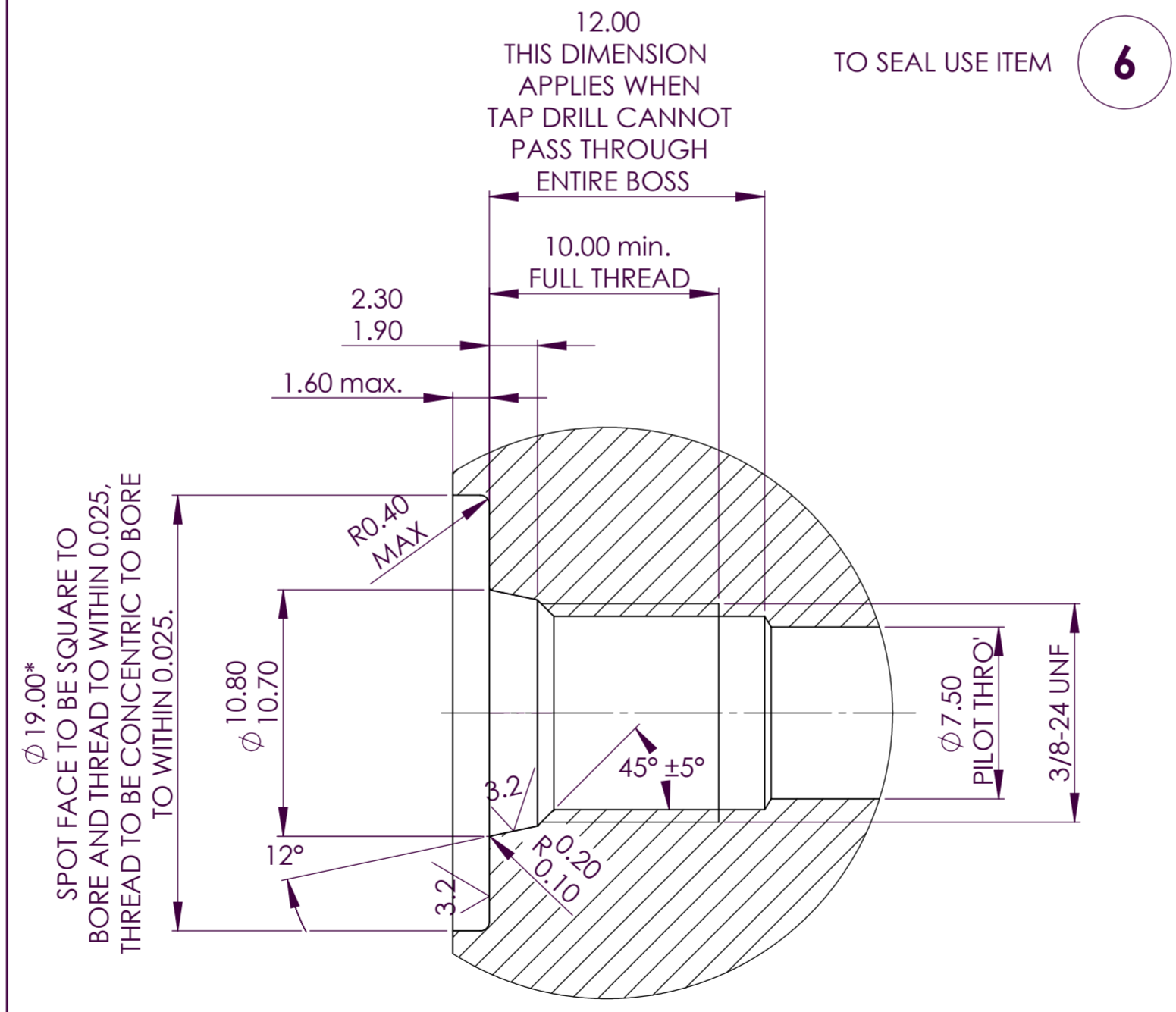
INTERNAL FLANGE
MACHINING DETAILS

TO SEAL USE ITEMS **8** & **9**



MACHINING DETAILS FOR UNIFIED FLANGE.
PORT CONFORMS TO SAE J1926/1, CONNECTIONS FOR FLUID POWER AND GENERAL USE - PORTS AND STUD ENDS WITH ISO 725 THREADS AND O'RING SEALING - PART 1: THREADED PORTS WITH O'RING SEAL IN TRUNCATED HOUSING

SUITABLE PORT CUTTERS ARE AVAILABLE FOR THESE DETAILS.....

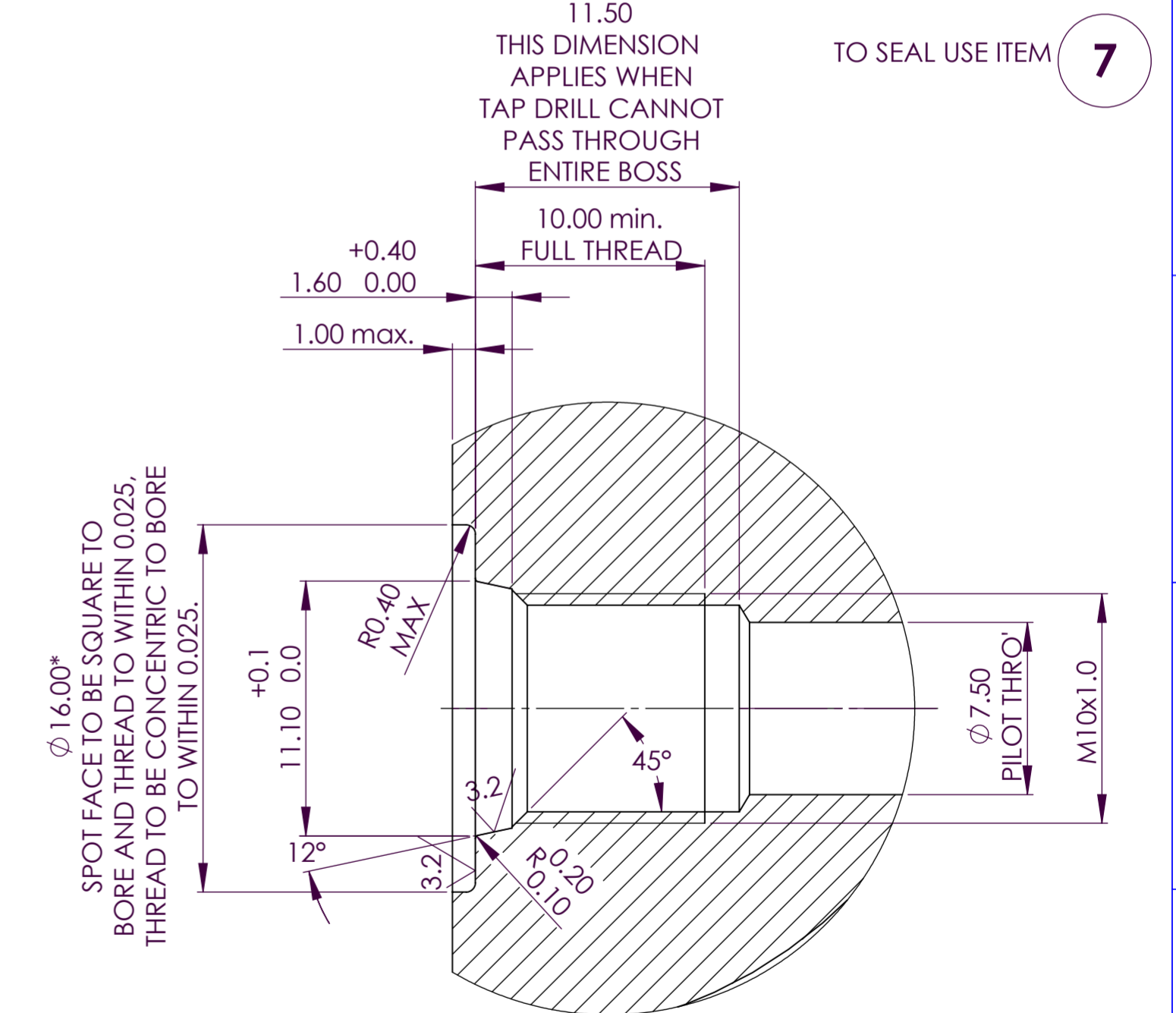


SPOT FACE TO BE SQUARE TO BORE AND THREAD TO WITHIN 0.025, THREAD TO BE CONCENTRIC TO BORE TO WITHIN 0.025.

* IF FACE OF PORT IS MACHINED DIMENSIONS $\phi 19.00 \times 1.6 \text{ max}$ NEED NOT APPLY AS LONG AS R0.2/0.1 IS MAINTAINED TO AVOID DAMAGE TO O-RING DURING INSTALLATION.

MACHINING DETAILS FOR METRIC FLANGE.
PORTS CONFORM TO ISO 6149-1:1993, CONNECTIONS FOR FLUID POWER AND GENERAL USE - PORTS AND STUD ENDS WITH ISO 261 THREADS AND O'RING SEALING - PART 1: PORTS WITH O'RING SEAL IN TRUNCATED HOUSING

SUITABLE PORT CUTTERS ARE AVAILABLE FOR THESE DETAILS.....



SPOT FACE TO BE SQUARE TO BORE AND THREAD TO WITHIN 0.025, THREAD TO BE CONCENTRIC TO BORE TO WITHIN 0.025.

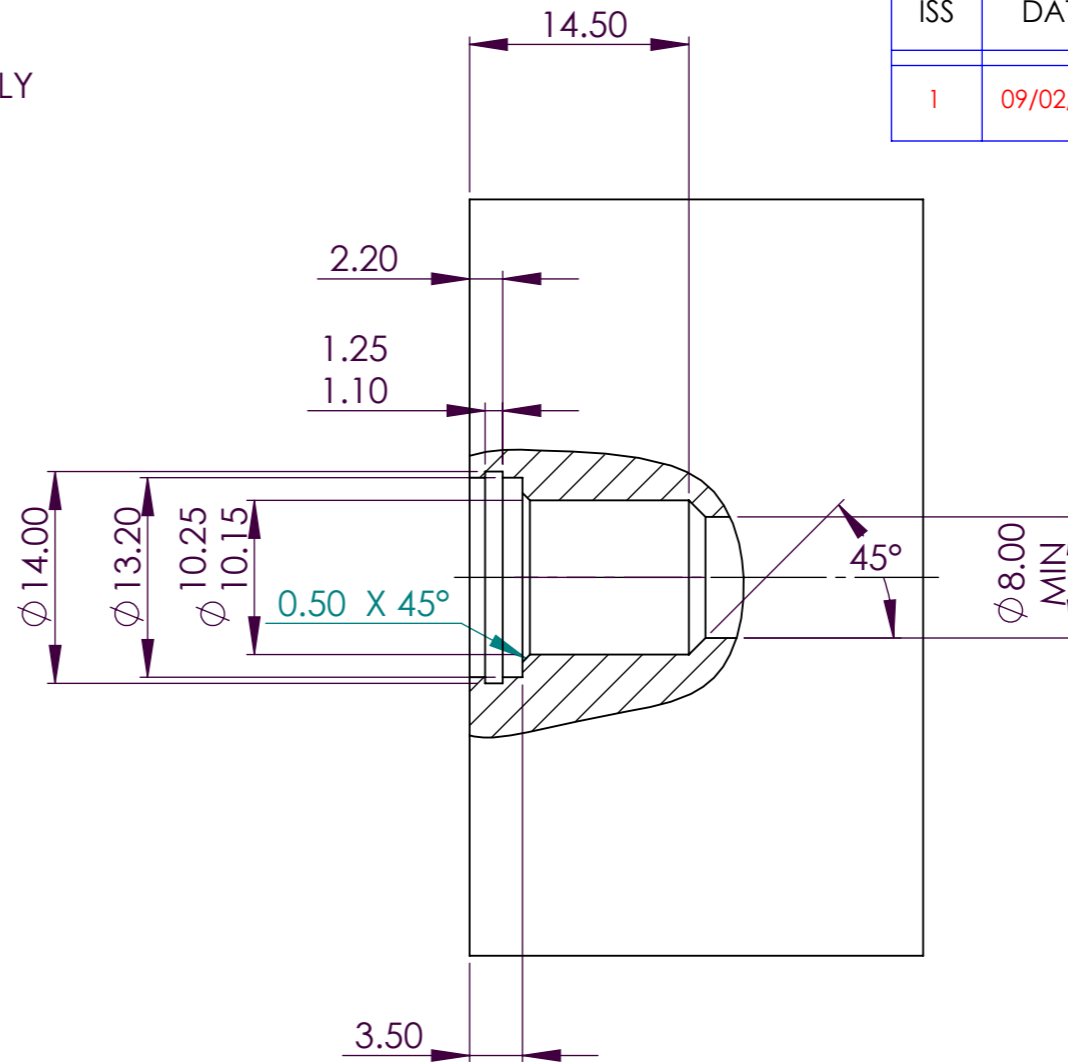
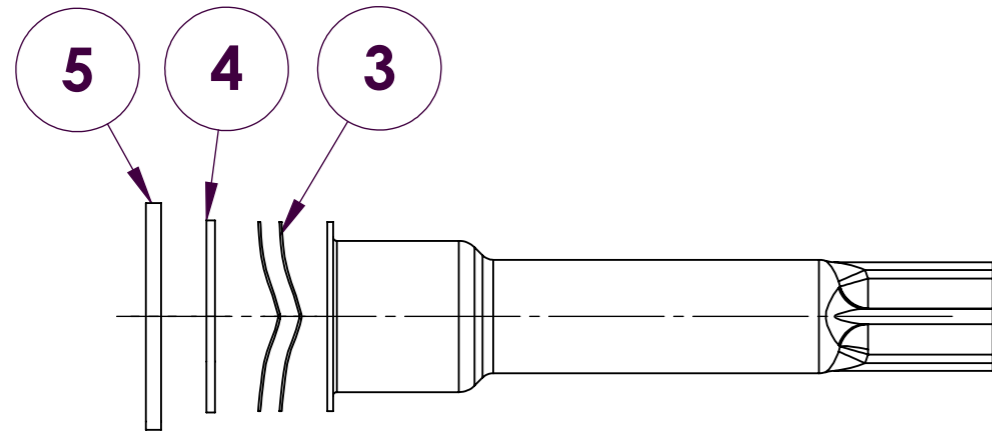
* IF FACE OF PORT IS MACHINED DIMENSIONS $\phi 16.00 \times 1.00 \text{ max}$ NEED NOT APPLY AS LONG AS R0.2/0.1 IS MAINTAINED TO AVOID DAMAGE TO O-RING DURING INSTALLATION.

SCALE UNLESS STATED	IF CONTROL DIMENSIONS (Kc) ARE SPECIFIED THEY ARE TO BE SUBJECT TO 100% INSPECTION OR STATISTICAL PROCESS CONTROL.	D No. ICT050	MATERIAL	TOLERANCES: IN-LINE WITH PENNY & GILES STANDARDS 55-301 SURFACE TEXTURE VALUES IN MICROMETRES (μm) TO BS1134:PT2. ALL MACHINED SURFACES TO BE $1.6 \mu\text{m}$	TITLE SUGGESTED ICT050 INSTALLATION DETAILS AND INSTALLATION KIT 'L' TEMP RANGE	PENNY + GILES	A2
THIRD ANGLE PROJECTION TO BS 8888	MASS (g)	REF. AI56140	FINISH	ALL SCREW THREADS TO BS3643 PT.2: EXTERNAL CLASS: 6g INTERNAL CLASS: 6H ANGULAR: $\pm 1^\circ$ LINEAR: 0.0mm +/- 0.5mm, 0.0mm +/- 0.2mm, 0.00mm +/- 0.1mm, 0.000mm +/- 0.01mm BREAK EDGE: 0.05 - 0.15mm FILLET RADS: 0.1 - 0.3mm UNLESS OTHERWISE STATED	PART NUMBER: AI208549	SHT 1 OF 2 SHTS	SolidWorks

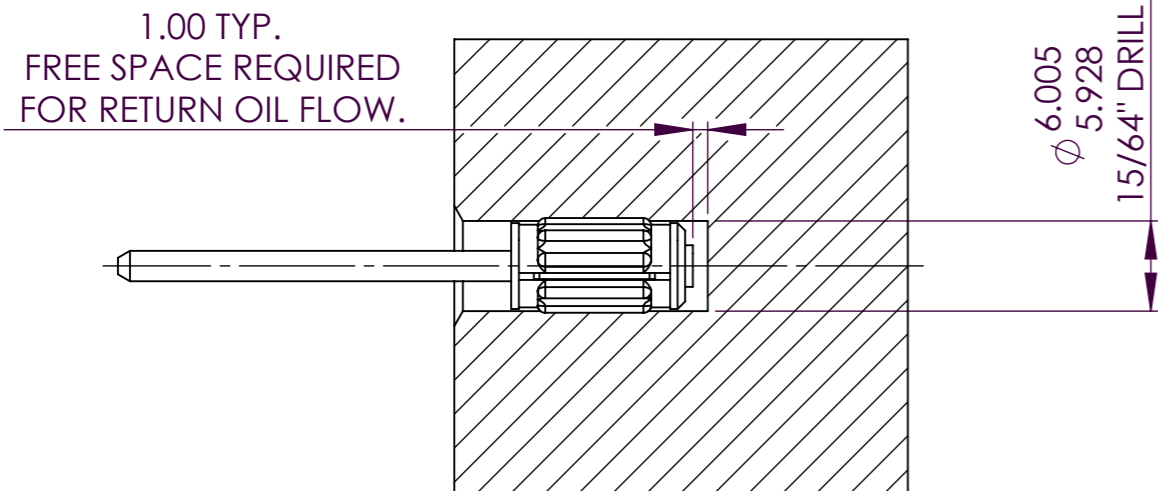
METRIC
IF IN DOUBT ASK

ISS	DATE	DRAWN	ECR No.	CHK	APP
1	09/02/11	S COLE	10426/22	M BENTLEY	M BENTLEY

**SLEEVED CORE ASSEMBLY
MACHINING DETAILS**



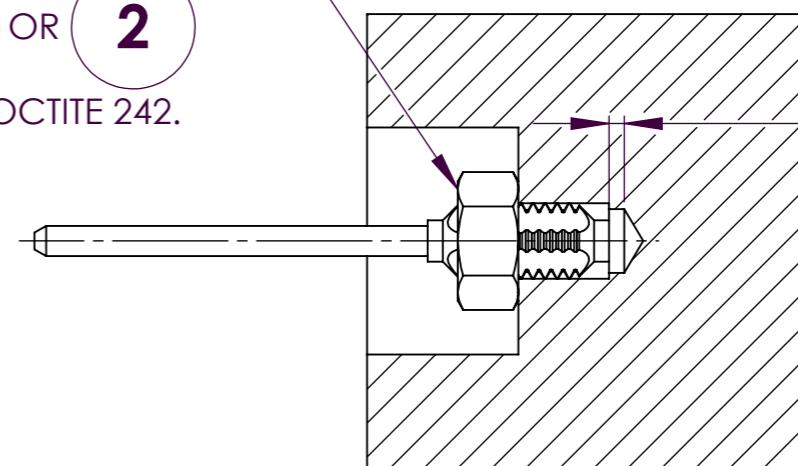
**FORCE FIT CORE
MACHINING DETAILS**



NOTE- INSTALLATION TOOL
REQUIRED SEE P&G DRAWING T56726

LOCK CORE ASSEMBLY
WITH NUT
1 OR **2**
AND LOCTITE 242.

THREADED CORE ASSEMBLY
M5 x 0.8 OR 0.190-32 UNF



SCALE	IF CONTROL DIMENSIONS (Kc) ARE SPECIFIED THEY ARE TO BE SUBJECT TO 100% INSPECTION OR STATISTICAL PROCESS CONTROL.	D No ICT050	MATERIAL
UNLESS STATED	MASS (g)	FIRST USED ON Al56140	FINISH
	VOL. (mm ³)	REF.	

TOLERANCES: IN-LINE WITH PENNY & GILES STANDARDS 55-301
SURFACE TEXTURE VALUES IN MICROMETRES (µm)
TO BS1134:PT2. ALL MACHINED SURFACES TO BE 1.6 ✓

ALL SCREW THREADS TO BS3643 PT.2:
EXTERNAL CLASS: 6g INTERNAL CLASS: 6H

ANGULAR ± 1°	LINEAR 0. mm 0.0 mm 0.00mm 0.000mm	(MACHINING) +/- 0.5 mm +/- 0.2 mm +/- 0.1mm +/- 0.01mm	BREAK EDGE 0.05 - 0.15mm FILLET RADS 0.1 - 0.3mm
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UNLESS OTHERWISE STATED

TITLE
**SUGGESTED ICT050 INSTALLATION
DETAILS AND INSTALLATION KIT
'L' TEMP RANGE**

PENNY + GILES	A3
PART NUMBER: AI208549	SHT 2 OF 2 SHTS