

User Manual

Pressure Calibration System C and Hydraulic Pressure Pump Models T-620/T-620H

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About this manual....

- **The structure of the manual**

This user manual is aimed at users who are familiar with JOFRA Pressure Calibration Systems, as well as those who are not. The manual is divided into 9 chapters, which describe how to set up, operate, service and maintain the pressure calibration system. The technical specifications are described and accessories may be ordered from the list of accessories.

- **Safety symbols**

This manual contains a number of safety symbols designed to draw your attention to instructions, which must be followed when using the instrument, as well as any risks involved.



Warning

Events, which may compromise the safe use of the instrument and result in considerable personal or material damage.



Caution...

Events, which may compromise the safe use of the instrument and result in slight personal or material damage.



Note...

Special situations, which demand the user's attention.

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1.0 Introduction

Congratulations on your new JOFRA Pressure Calibration System!

With the JOFRA Pressure Calibration System, you have chosen an extremely effective pressure system, which we hope will live up to all your expectations. Over the past many years, we have acquired extensive knowledge of industrial precision pressure calibration. This expertise is reflected in our products, which are all designed for daily use in an industrial environment. Please note that we would be very interested in hearing from you if you have any ideas or suggestions for changes to our products.

This user manual applies to the following systems:

- **System C**
- **Hand pump, models T-620, T-620H**

Available instruments * :

- **DPC-500**
- **APC**
- **IPI**
- **APM-S/H**

(* See separate manuals for the instruments)

 **ISO-9001 certified**

AMETEK Denmark A/S was awarded the ISO-9001 certificate in September 1994 by - Bureau Veritas Certification Denmark.

 **Technical assistance**

Please contact the dealer from whom you acquired the pressure system if you require technical assistance.

 **Guarantee**

According to current terms of sale and delivery.

This guarantee only covers defects in manufacture and becomes void if the Pressure Calibration System has been subject to unauthorised intervention and/or misuse.

2.0 Safety instructions



Read this manual carefully before using the system!

Please follow the instructions and procedures described in this manual. They are designed so that you get the most out of your pressure system and avoid any personal injuries and/or damage to the system.



Warning.....

About the handling:

- **Avoid** knocking, bumping or dropping the pressure system. This can cause permanent damage to the system and loss of accuracy.

About the use:

- The pressure system **must not** be used for any purposes other than those described in this manual and for any application other than precision pressure calibration jobs.
- The pressure system should only be used by **TRAINED PERSONNEL**.
- **Never** subject the pressure gauges to overpressure. In case of overpressure the gauge should **not be used** for calibration purposes.
- None of our calibration systems are cleaned or prepared for **OXYGEN MEDIUMS** so **DO NOT USE** our systems for this purpose.
- **Do not** disconnect any parts from the system when pressurised.
- **Do not** connect any external pressure source to this system. This system is designed to test pressure measuring devices connected to the manifold only. Pressure from an external source can result in explosion of the liquid reservoir and possible personal injuries.



Note...

The product liability **only** applies if the pressure system is subject to a manufacturing defect. This liability becomes void if the user fails to follow the maintenance instructions set out in this manual or uses unauthorised spare parts.

3.0 Identifying your JOFRA Pressure Calibration System

3.1 Model description

The **T-620/T-620H** hydraulic pressure hand pumps are specially designed for high pressure applications. The pumps are compatible with petroleum-based oils or hydraulic fluids.

The T-620 pump generates up to 200 bar (3,000 psi) and the T-620H pump generates up to 350 bar (5,000 psi).

All pumps feature a 0.5 pint/200 cl built-in oil reservoir, vent valve and vernier valve for fine adjustment. The pumps have dual pressure output – one for the test object and one for the indicator. Easy connection between pump and indicator.

The System C can be used with one of the following instruments : DPC-500, APC, IPI, APM-S/H or together with either a T-620 or a T-620H hydraulic pressure hand pump depending on the chosen pressure range.

3.2 Receipt of the JOFRA Pressure Calibration System C

The Pressure Calibration System C is delivered complete assembled as standard in a carrying case and should always be placed in the carrying case after use.

When you receive the Pressure Calibration System C...

- Carefully unpack and check the pump, the instrument and the accessories.
- Check the parts off against the list shown below.
If any of the parts are missing or damaged, please contact the dealer from whom you acquired the Pressure Calibration System.

You should receive:

- 1 pump T-620/T-620H
- 1 hose 20"/0.5m with ¼" BSP and NPT female connector
- 1 roll of teflon tape
- 1 aluminium carrying case
- 1 calibration certificate
- 1 user manual for pump system

Additional for System C with DPC-500 calibrator:

- 1 extension cable 2 m between DPC-500 and DPC-J reference sensor
- 1 battery charger
- 1 test lead : red
- 1 test lead : black
- 1 connection cable for USB
- 1 DPC-CAL calibration software
- 1 JOFRACAL calibration software
- 1 DPC-J reference sensor
- 1 user manual for DPC-500

Additional for System C with APC calibrator:

- 1 9V battery
- 1 adapter to ¼" NPT female
- 1 adapter to ¼" BSP female
- 1 test lead : red
- 1 test lead : black
- 1 soft case and shoulder strap
- 1 user manual for APC

Additional for System C with IPI indicator:

- 3 AA batteries
- 1 protective boot
- 1 adapter to ¼" BSP male
- 1 user manual for IPI

4.0 Operating instructions



Warning.....

About the handling:

- **Avoid** knocking, bumping or dropping the pressure system. This can cause permanent damage to the system and loss of accuracy.

About the use:

- Do not attach the pump to a high pressure source. Please notice that the pump comes in 2 different pressure ranges. Therefore it is very important to check the version of the pump to avoid over pressure of indicator.

Follow these instructions carefully to avoid damage to the system and/or personal injuries.

- The pressure system **must not** be used for any purposes other than those described in this manual and for any application other than precision pressure calibration jobs.
- **Never** subject the pressure gauges to overpressure. In case of overpressure the gauge should **not be used** for calibration purposes.
- The pressure system should only be used by TRAINED PERSONNEL.
- None of our calibration systems are cleaned or prepared for **OXYGEN MEDIUMS** so **DO NOT USE** our systems for this purpose.
- **Do not** disconnect any parts from the system when pressurised.
- **Do not** connect any external pressure source to this instrument. This unit is designed to test pressure measuring devices connected to the manifold only. Pressure from an external source can result in explosion of the liquid reservoir and possible personal injuries.

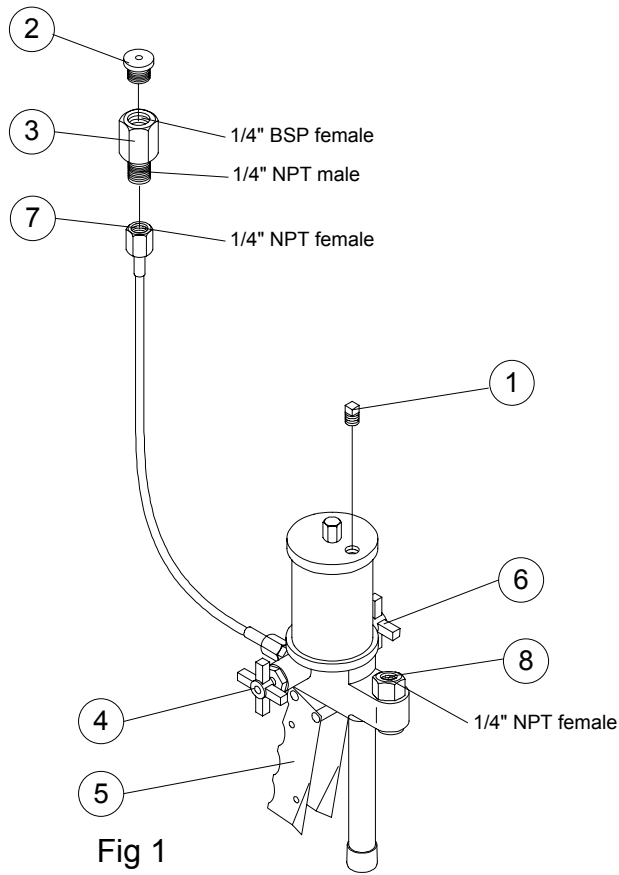


Fig 1

POS	DESCRIPTION
1	Fill plug
2	End plug
3	Fitting 1/4" NPT male til 1/4" BSP female
4	Needle valve
5	Moveable handle
6	Vernier valve
7	Pressure port
8	Pressure port

4.1 Operating the T-620/T-620H pump.



Warning

Do not attach the pump to a high pressure source. Follow these instructions carefully to avoid damage to the pump and/or personal injuries.

This routine must be followed in order to operate the system correctly (see fig. 1 accordingly).

1. If the pump has been ordered alone without system C, the reservoir will be empty. Remove the fill plug (ref. 1) on the top of cap and fill the reservoir approximately 2/3 full of fluid.



Caution...

Do not use solvents or synthetic fluids that will adversely affect the operation of the pump.

Connect and tighten fill plug.

Ordering system C the reservoir will be supplied with the fluid ordered from our factory.

2. Remove plug (ref. 2) and attach gauge or pressure device to be calibrated to the 1/4" BSP hose fitting (ref. 3). Tighten threads loosely.



Note...

After connection of all parts and before pressure is created, the air can be released from the system by loosening the connectors (pos. 3). It is now possible to pump out oil and air until no air is left in the oil.

3. Turn needle valve (ref. 4) on left side of the pump counter clockwise until fully open.
4. Pump the movable handle (ref. 5) until the test fluid is evident at the thread connection.

The hose may be pre-filled with test fluid on the initial start up to help speed the operation of the pump.

5. Tighten firmly the thread connection of the hose end and device to be tested.
6. Switch the indicator on (for operation see separate manual).
7. Continue to pump the movable handle until the air bubbling in the reservoir stops.
8. Secure that the pressure system is pressureless by opening the needle valve (ref. 4), and zero set the indicator (See manual for indicator systems).
9. Turn the needle valve (ref. 4) clockwise until it is tight by **hand only**.
10. Pump movable handle until the approximate desired pressure is obtained on the indicator.
11. Turn the vernier valve (ref. 6) on the right side of the pump until the exact calibration test pressure is obtained.

After calibration

1. Upon completion of calibration testing, turn the needle valve counter clockwise to release the pressure to 0 BAR.
2. Remove the test object.
3. Replace plug (ref. 2) in open end of hose to prevent fluid leakage.
4. Clean all parts and store in the carrying case.

4.2 Media's to be used

Recommended test fluids to be used are :

- Petroleum based oils
- Hydraulic fluids

The fluids are compatible with the aluminium, brass, stainless steel, Teflon, Lexan and Buna N wetted pump parts.

Other fluids

Contact your local distributor if you want to use other fluids than those stated above.

5.0 Errors

Generally the JOFRA Pressure Calibration System is manufactured for field use and will normally cause no problems for the user.



Note...

AMETEK Denmark's liability ceases if:

- parts are replaced/repared using spare parts which are not identical to those recommended by the manufacturer.
- non-original parts are used in any way when operating the system.

AMETEK Denmark's liability is restricted to errors, which originated from the factory.

The questions and answers in the following schedule are based on the use of an indicator with a pump system.

FAILURE	CAUSE	ACTION
<p>The pressure is not stabilising.</p>	<ul style="list-style-type: none"> ● The system may be leaking. ○ The compression of media includes air. ▪ If you have a hose in the pressure loop - the hose will expand and give some movement. ➤ Adiabatic and thermodynamic effects are present within all pressure systems. 	<ul style="list-style-type: none"> ● Check all connections. ○ You may have to adjust the pressure a few times before the pressure is stable enough for calibration. Release air. (See Note page 13) ▪ The effect will disappear rapidly. ➤ The effect will disappear rapidly.
<p>The system fails to indicate a pressure increase after considerable pumping action of the handle.</p>	<ul style="list-style-type: none"> ● The threaded connection between the hose end and the attached instrument is not tight. ○ A pressure increase can still not be obtained. 	<ul style="list-style-type: none"> ● Check all connections. ○ The system is in need of service. Please contact your local distributor or AMETEK Denmark A/S for advice.



Note...

Always readjust the pressure after 5 – 10 minutes to allow time for settling of above effects.

When you operate with high pressure the sensitivity of the system is high with regard to temperature and movements.

6.0 Returning the JOFRA Pressure Calibration System for service

When in need of service please contact your local distributor for advice or return the system to the manufacturer.

For all pressure systems, the pump and the indicator are separate systems. Therefore, a replacement of the pump does not mean that the complete system has to be sent in for repair.

Recalibration of the unit can be performed locally with an accurate pressure reference : No need to send the unit back to the manufacturer for recalibration. If a factory calibration is required, the pump and indicator are independent and only the indicator needs to be returned.

When returning the Pressure Calibration System to the manufacturer for service, please enclose a fully completed service information form. Simply copy the form on the following page and fill in the required information.

The Pressure Calibration System should be returned in the original packing.

Service info

Customer data:

Date:

Customer name and address: _____

Attention and Dept.: _____

Fax no./Phone no.: _____

Your order no.: _____

Delivery address: _____

Distributor name: _____

Instrument data:

Model and Serial no.: _____

Warranty claimed Yes: ___ No: ___ Original invoice no.: _____

Temp.
calibration

Service request:

**This instrument is sent for
(please tick off):**

___ Calibration as left

___ Check

___ Calibration as found and as left

___ Service

___ Accredited calibration as left

___ Repair

___ Accredited calibration as found and as left.

Diagnosis data/cause for return:

Diagnosis/Fault description: _____

Special requests: _____

Safety precautions: if the product has been exposed to any hazardous substances, it must be thoroughly decontaminated before it is returned to AMETEK Denmark A/S. Details of the hazardous substances and any precautions to be taken must be enclosed.

7.0 Maintenance

7.1 Cleaning

Users should/must carry out the following cleaning procedures as and when required:

- **The exterior of the instrument** - Clean using water and a soft cloth.
The cloth should be wrung out hard to avoid any water penetrating the calibrator and causing damage.
The instrument may also be cleaned using isopropyl alcohol when heavily soiled.

8.0 Technical specifications

Functional specifications (pumps only)

Operating Pressure range :

- T-620 : 0 to 200 bar / 0 to 3,000 psi
- T-620H : 0 to 350 bar / 0 to 5,000 psi,

Wetted parts : Aluminium, brass, stainless steel,
Lexan

“O”-rings : Buna-N

Reservoir capacity : 200 cl / 0.5 pint

Connections to
test object : 0.5 m / 20 inch hose with ¼” BSP and NPT
female connector

Weight : 1.40 kg. / 3.0 lbs

Leakage : Max. 5% over 5 minutes

Shipping information – System C

With DPC-500 calibrator and 5 sensors :

Weight : 9.5 kg. / 20.9 lbs
Size : 640 x 210 x 420 mm / 25.2 x 8.3 x 16.5 inch

With APC calibrator :

Weight : 5.5 kg. / 12.13 lbs
Size : 188 x 350 x 560 mm / 7.4 x 13.8 x 22 inch

With IPI indicator :

Weight : 5.5 kg. / 12.13 lbs
Size : 188 x 350 x 560 mm / 7.4 x 13.8 x 22 inch

9.0 List of accessories and spare parts

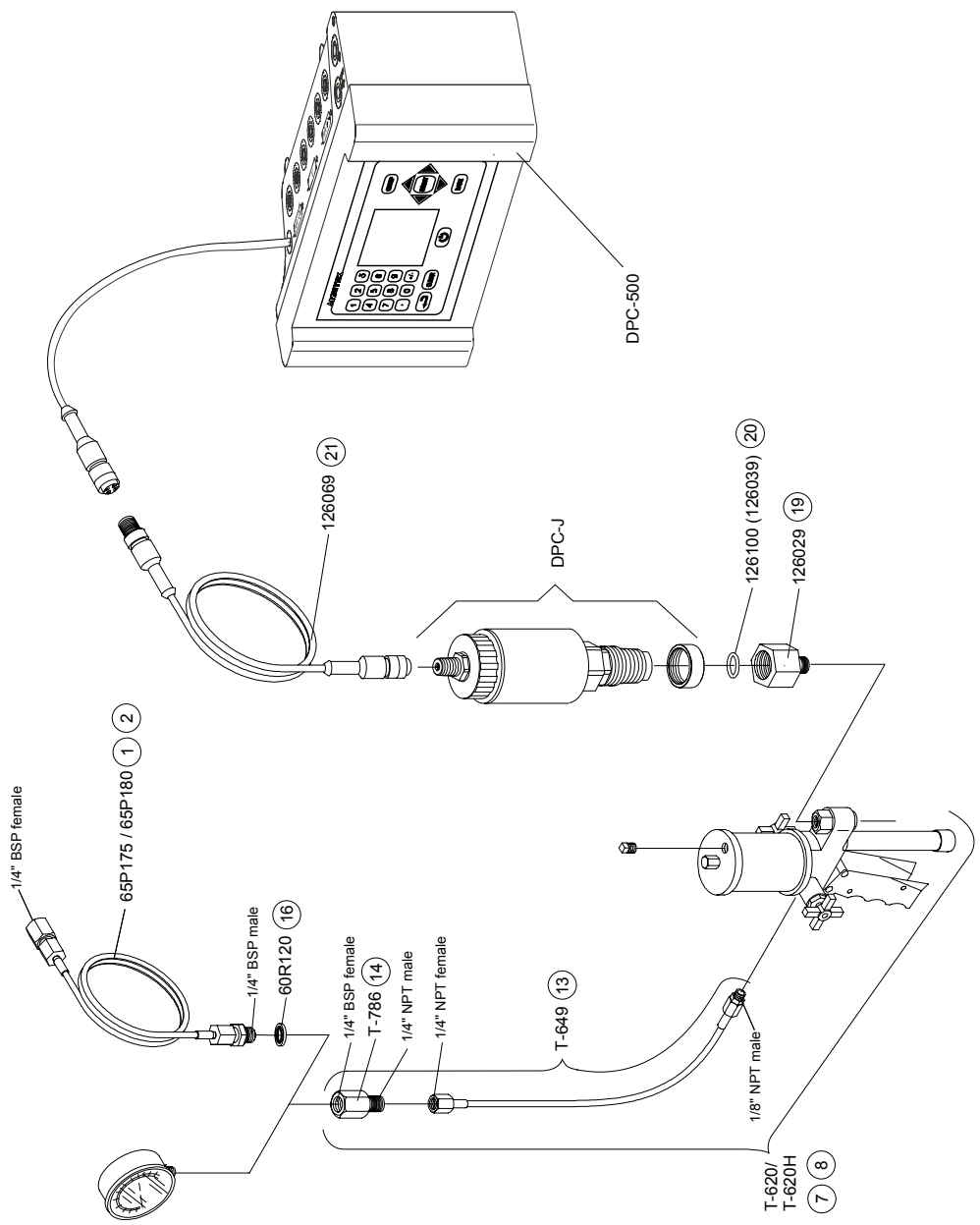
All parts listed in the list of accessories and spare parts can be obtained from the factory through our dealers.

Please contact your dealer for assistance if you require parts, which do not appear on the list.

9.1 System C with DPC-500 calibrator

Item	Parts No.	Description
(Compare exploded view page 24)		
1	65P175	1 meter, Pressure hose, (Max. 350 bar / 5.000 psi) 1/4" BSP female to 1/4" BSP male
2	65P180	2 meter, Pressure hose, (Max. 350 bar / 5.000 psi) 1/4" BSP female to 1/4" BSP male
3	T-656	Service kit for T-620 and T-620H pumps
4	126112	Aluminum carrying case – System C with DPC-500
5	126023	User manual for DPC series
6	60I104	Role of Teflon tape
7	T-620	Hand pump: 0 to 200 bar / 3.000 psi Handpump are delivered without oil
8	T-620H	Hand pump: 0 to 350 bar / 5.000 psi Handpump are delivered without oil
9	MGAAA/QT	Oil for T-620 & T-1 pump AAA OIL in 1-QUART CAN
10	MGAAA/GL	Oil for T-620 & T-1 pump AAA OIL in 1-GALLON CAN
11	126086	Cable for RS232, DPC-500
12	126087	Cable for USB, DPC-500
13	T-649	Pressure hose for T-620/T-620H pumps
14	T-786	Fitting 1/4" NPT male to 1/4" BSP female
15	101549	Bonded seal 1/2" BSP
16	60R120	Bonded seal 1/4" BSP
17	60R122	Bonded seal 1/8" BSP
18	104203	Test leads; 1x black and 1x red
19	126029	Fitting 1/4" NTP male to DPCJ Sensor
20	126100	Set of 5 pcs of O-rings for DPCJ sensor
21	126069	Connecting cable 2 meters for DPCJ and DPC-500
22	126346	Screw Collar for DPC-J reference sensor

9.1.1 Exploded view – System C with DPC-500 calibrator



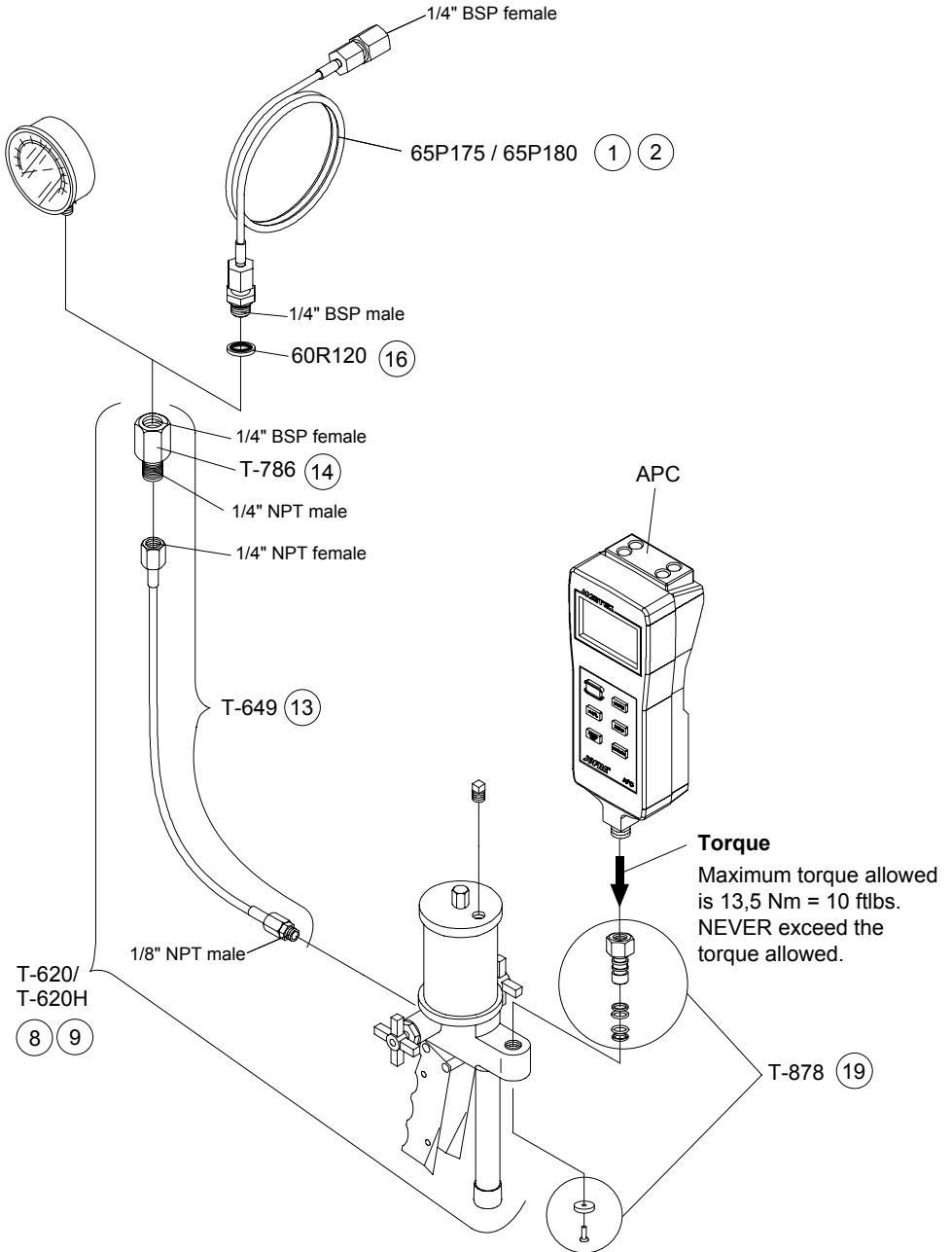
9.2 System C with APC calibrator

Item	Parts No.	Description
(Compare exploded view page 27)		
1	65P175	1 meter, Pressure hose, (Max. 350 bar / 5.000 psi) 1/4" BSP female to 1/4" BSP male
2	65P180	2 meter, Pressure hose, (Max. 350 bar / 5.000 psi) 1/4" BSP female to 1/4" BSP male
3	T-656	Service kit for T-620 and T-620H pumps
4	124299	Aluminum carrying case – System C with APC
5	SPK-APC-001	User manual for APC series
6	60I104	Role of Teflon tape
7	SPK-HHC-002	Soft Carrying Case
8	T-620	Hand pump: 0 to 200 bar / 3.000 psi Handpump are delivered without oil
9	T-620H	Hand pump: 0 to 350 bar / 5.000 psi Handpump are delivered without oil
10	MGAAA/QT	Oil for T-620 & T-1 pump AAA OIL in 1-QUART CAN
11	MGAAA/GL	Oil for T-620 & T-1 pump AAA OIL in 1-GALLON CAN
12	123958	RS232 cable with stereo Jack connector, 2m / 6ft
13	T-649	Pressure hose for T-620/T-620H pumps
14	T-786	Fitting 1/4" NPT male to 1/4" BSP female
15	101549	Bonded seal 1/2" BSP
16	60R120	Bonded seal 1/4" BSP
17	60R122	Bonded seal 1/8" BSP
18	104203	Test leads; 1x black and 1x red
19	T-878	Swivel fitting with 1/8" NPT female for T-620 pump
20	11-90111	Fitting 1/8" NPT female to 1/4" NPT female
21	11-90110	Fitting 1/8" NPT female to 1/4" BSP female
22	11-90067	Fitting 1/8" NPT male to 1/4" NPT male Fitting for APM-S pressure module with system C
23	12-90135	Fitting 1/8" NPT male to 1/8" NPT male Fitting for APM-H pressure module with system C
24	11-90067	Fitting 1/8" NPT male to 1/4" NPT male Fitting for APM-S pressure module with T-620 pump alone
25	12-90136	Fitting 1/4" NPT male to 1/4" NPT male Fitting for APM-H pressure module with T-620 pump alone

System C with APC calibrator - continued

Item	Parts No.	Description
26	124717	1 x 9 Volt rechargeable battery
27	124718	Charger for rechargeable batteries - 115/230 VAC

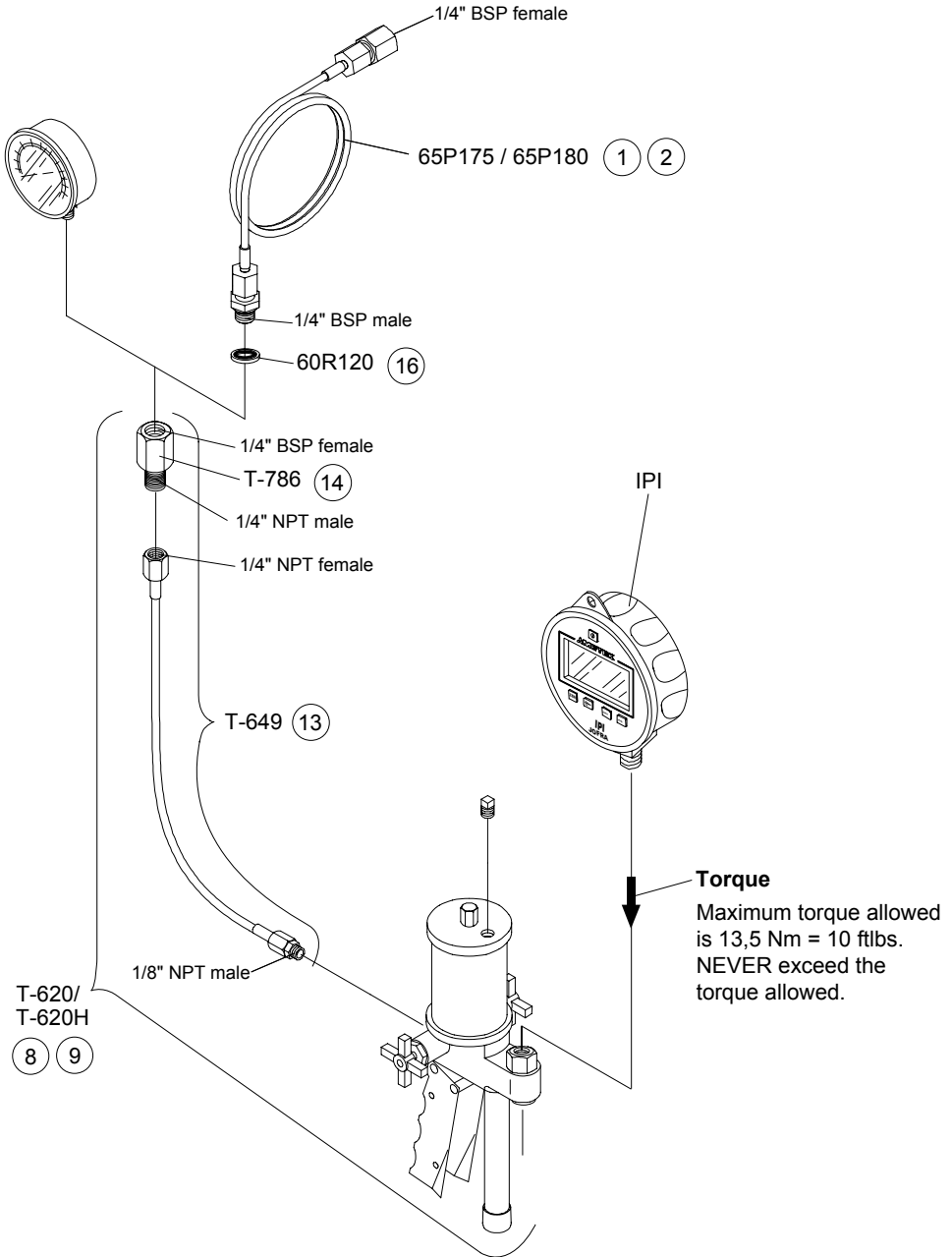
9.2.1 Exploded view – System C with APC calibrator



9.3 System C with IPI indicator

Item	Parts No.	Description
(Compare exploded view page 29)		
1	65P175	1 meter, Pressure hose, (Max. 350 bar / 5.000 psi) 1/4" BSP female to 1/4" BSP male
2	65P180	2 meter, Pressure hose, (Max. 350 bar / 5.000 psi) 1/4" BSP female to 1/4" BSP male
3	T-656	Service kit for T-620 and T-620H pumps
4	125255	Aluminum carrying case – System C with IPI
5	SPK-IPI-001	User manual for IPI series
6	60I104	Role of Teflon tape
7	SPK-IPI-003	Protective boot for IPI series
8	T-620	Hand pump: 0 to 200 bar / 3.000 psi Handpump are delivered without oil
9	T-620H	Hand pump: 0 to 350 bar / 5.000 psi Handpump are delivered without oil
10	MGAAA/QT	Oil for T-620 & T-1 pump AAA OIL in 1-QUART CAN
11	MGAAA/GL	Oil for T-620 & T-1 pump AAA OIL in 1-GALLON CAN
12	123958	RS232 cable with stereo Jack connector, 2m / 6ft
13	T-649	Pressure hose for T-620/T-620H pumps
14	T-786	Fitting 1/4" NPT male to 1/4" BSP female
15	101549	Bonded seal 1/2" BSP
16	60R120	Bonded seal 1/4" BSP
17	60R122	Bonded seal 1/8" BSP
18	124716	4 x 1,5 Volt rechargeable batteries
19	124718	Charger for rechargeable batteries - 115/230 VAC

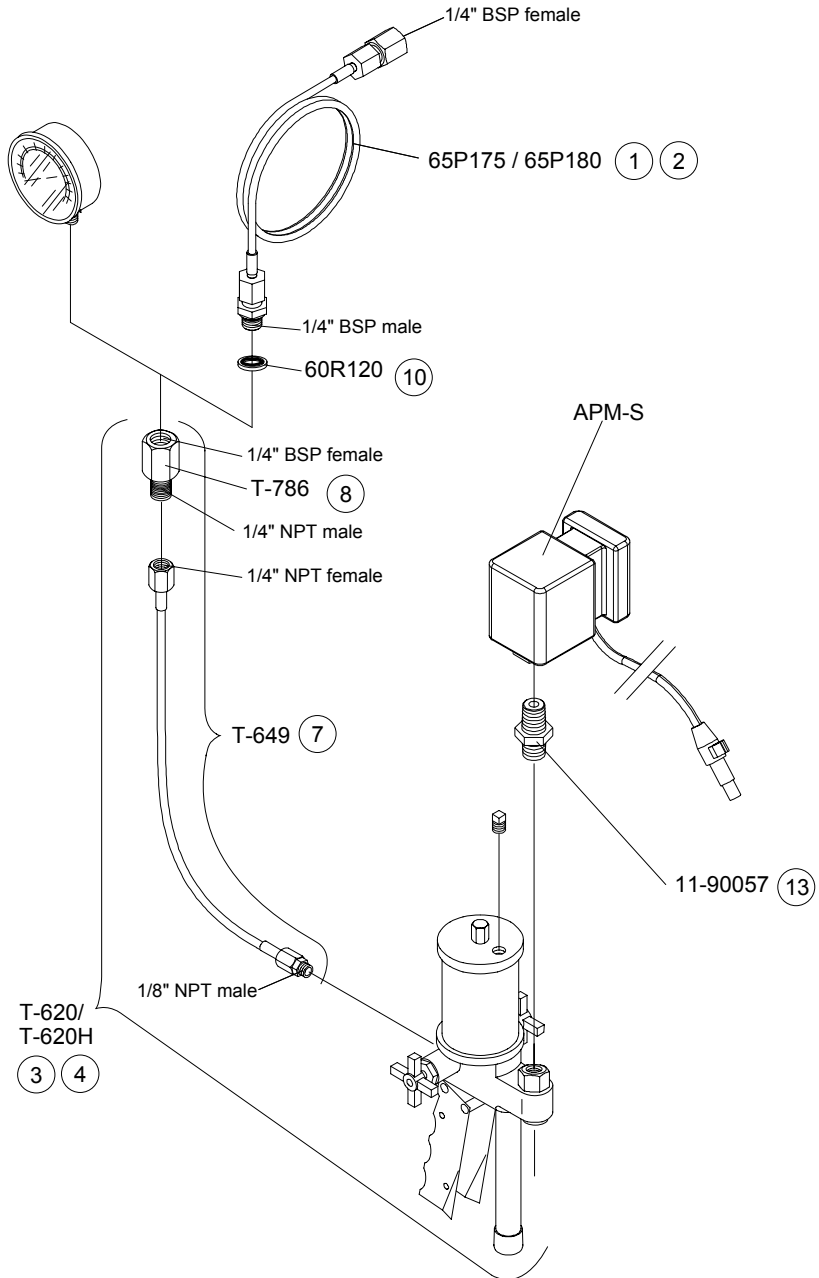
9.3.1 Exploded view – System C with IPI indicator



9.4 System C with APM-S pressure module

Item	Parts No.	Description
(Compare exploded view page 31)		
1	65P175	1 meter, Pressure hose, (Max. 350 bar / 5.000 psi) 1/4" BSP female to 1/4" BSP male
2	65P180	2 meter, Pressure hose, (Max. 350 bar / 5.000 psi) 1/4" BSP female to 1/4" BSP male
3	T-620	Hand pump: 0 to 200 bar / 3.000 psi Handpump are delivered without oil
4	T-620H	Hand pump: 0 to 350 bar / 5.000 psi Handpump are delivered without oil
5	MGAAA/QT	Oil for T-620 & T-1 pump AAA OIL in 1-QUART CAN
6	MGAAA/GL	Oil for T-620 & T-1 pump AAA OIL in 1-GALLON CAN
7	T-649	Pressure hose for T-620/T-620H pumps
8	T-786	Fitting 1/4" NPT male to 1/4" BSP female
9	101549	Bonded seal 1/2" BSP
10	60R120	Bonded seal 1/4" BSP
11	60R122	Bonded seal 1/8" BSP Dimensions 188 x 440 x 560 mm / 7.4 x 13.8 x 22 in
12	11-90067	Fitting 1/8" NPT male to 1/4" NPT male Fitting for APM-S pressure module with system C
13	11-90057	Fitting 1/4" NPT male to 1/4" NPT male Fitting for APM-S pressure module with T-620 pump alone

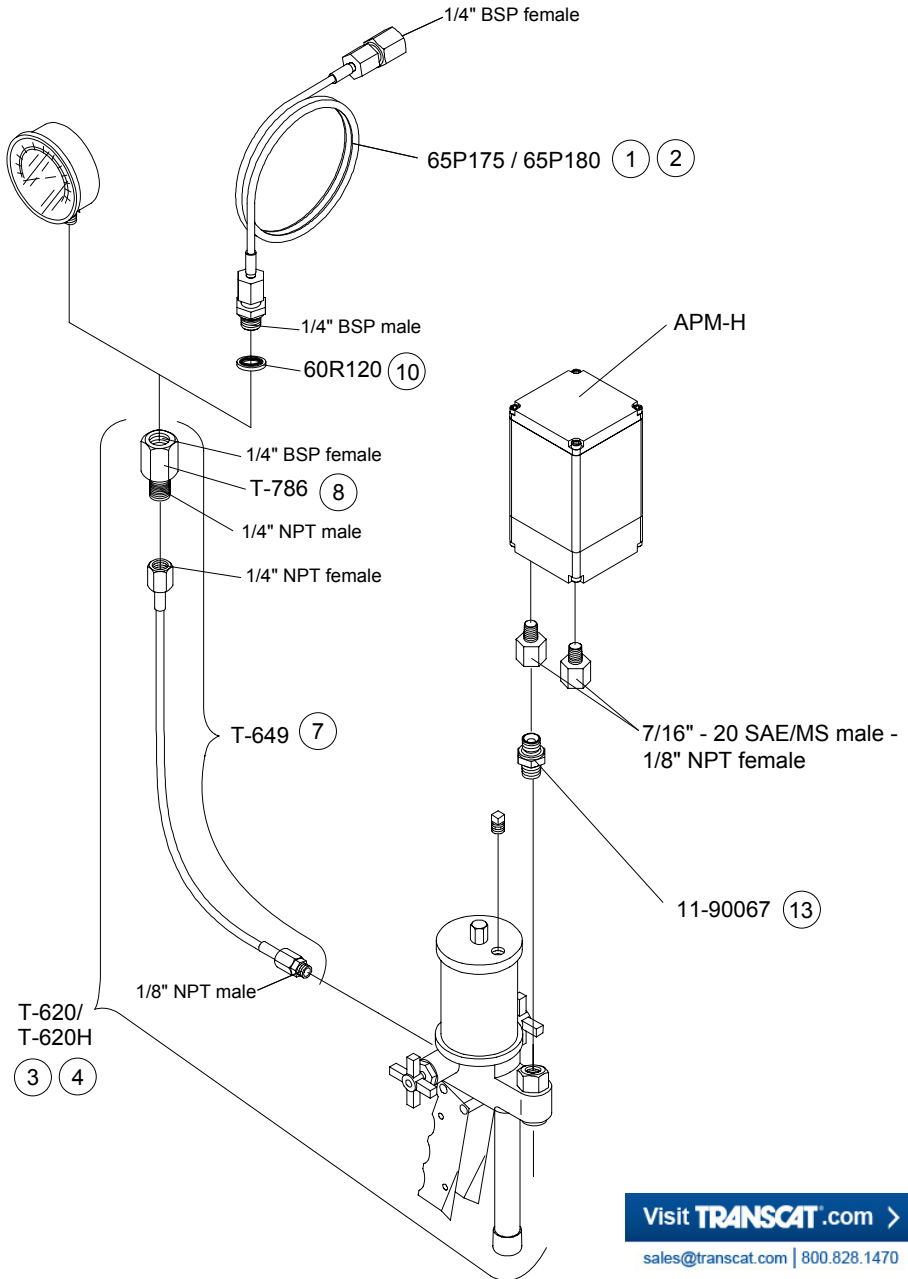
9.4.1 Exploded view – System C with APM-S pressure module



9.5 System C with APM-H pressure module

Item	Parts No.	Description
(Compare exploded view page 33)		
1	65P175	1 meter, Pressure hose, (Max. 350 bar / 5.000 psi) 1/4" BSP female to 1/4" BSP male
2	65P180	2 meter, Pressure hose, (Max. 350 bar / 5.000 psi) 1/4" BSP female to 1/4" BSP male
3	T-620	Hand pump: 0 to 200 bar / 3.000 psi Handpump are delivered without oil
4	T-620H	Hand pump: 0 to 350 bar / 5.000 psi Handpump are delivered without oil
5	MGAAA/QT	Oil for T-620 & T-1 pump AAA OIL in 1-QUART CAN
6	MGAAA/GL	Oil for T-620 & T-1 pump AAA OIL in 1-GALLON CAN
7	T-649	Pressure hose for T-620/T-620H pumps
8	T-786	Fitting 1/4" NPT male to 1/4" BSP female
9	101549	Bonded seal 1/2" BSP
10	60R120	Bonded seal 1/4" BSP
11	60R122	Bonded seal 1/8" BSP Dimensions 188 x 440 x 560 mm / 7.4 x 13.8 x 22 in
12	12-90135	Fitting 1/8" NPT male to 1/8" NPT male Fitting for APM-H pressure module with system C
13	11-90067	Fitting 1/8" NPT male to 1/4" NPT male Fitting for APM-H pressure module with T-620 pump alone

9.5.1 Exploded view – System C with APM-H pressure module



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