MILTON ROY
An Ingersoll Rand Business

INSTRUCTION MANUAL

FOR INSTALLATION OPERATION, AND MAINTENANCE.

PRIMEROYAL® LIQUID END HIGH PERFORMANCE DIAPHRAGM

This manual should be made available to the person responsible for installation, operation and maintenance.

DATE : 7/1/2025 ***N : 57190*** ***REV : 03***

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1.1 UNPACKING AND STORAGE

UNPACKING

The packaging must be carefully examined on receipt in order to ensure that the contents have not sustained any obvious damage. Precautions must be taken when opening the packaging to avoid damaging accessories which may be secured inside the packaging. Examine the contents and check them off against the delivery note.

STORAGE PRECAUTIONS

Storage for less than six months:

Equipment shall preferably be stored in its original packaging and protected from adverse weather conditions.

Storage for more than six months:

- Grease all visible unpainted sections. Rubber parts (such as semi-flexible couplings) must be protected from sunlight and sudden temperature changes.
- Store the pump in its original packaging. In addition, packaging in heat-sealing plastic cover and desiccant bags must be provided for. The quantity of desiccant bags should be adapted to the storage period and to the packaging volume.
- Store protected from adverse weather conditions.

1.2 DESCRIPTION

The PRIMEROYAL Pump is a compact electro-mechanical metering pump, oil-lubricated with a sealed housing, allowing adjustment of its capacity when stopped or in operation. It is designed for industrial operation in continuous mode. It is made up of the following items:

- a driving device consisting of a motor
- a mechanical assembly
- a liquid end assembly

1.3 SAFETY AND HEALTH INSTRUCTIONS

The personnel responsible for installing, operating and maintaining this equipment must become acquainted with, assimilate and comply with the contents of this manual in order to:

- avoid any possible risk to themselves or to third parties
- ensure the reliability of the equipment
- avoid any error or pollution due to incorrect operation

Any servicing on this equipment must be carried out when it is stopped. Any accidental start-up must be prevented (either by locking the switch or removing the fuse on the power supply line). A notice must be attached to the location of the switch to warn that servicing is being carried out on the equipment.

During oil changing operations, the waste oil must be collected in a suitable receptacle. Any overflow of oil which may result must be removed using a degreasing agent suitable for the operating conditions.

Soiled cleaning cloths must be stored in suitable receptacles. The oil, degreasing agent and cleaning cloths must be stored in accordance with the rules on pollution.

Switch off the power supply as soon as any fault is detected during operation: abnormal heating or unusual noise.

Special care has to be taken for chemicals used in the process (acids, bases, oxidizing/reducing solutions, etc.)

2.1 HYDRAULIC INSTALLATION

GENERAL

- Piping layout
  - There must be no swan-necks or stagnant volumes which can trap air or gas
  - Stresses due to incorrect alignment of piping with respect to the centerline of valves must be avoided as far as possible
- Remove burrs and clean the piping before fitting
- It is advisable to provide for a calibrating chamber in order to calibrate the pump in service conditions

PIPING ON THE SUCTION CIRCUIT

- Provide for a filter with suitable mesh size upstream of the pump
- Check whether the diameter and length of pipe are compatible with the pump's maximum capacity

PIPING ON THE DISCHARGE CIRCUIT

- Provide for a safety valve on the discharge pipe, designed to protect the installation
- It is advisable to install a priming valve on the discharge circuit in order to make starting and maintenance of the pump easier

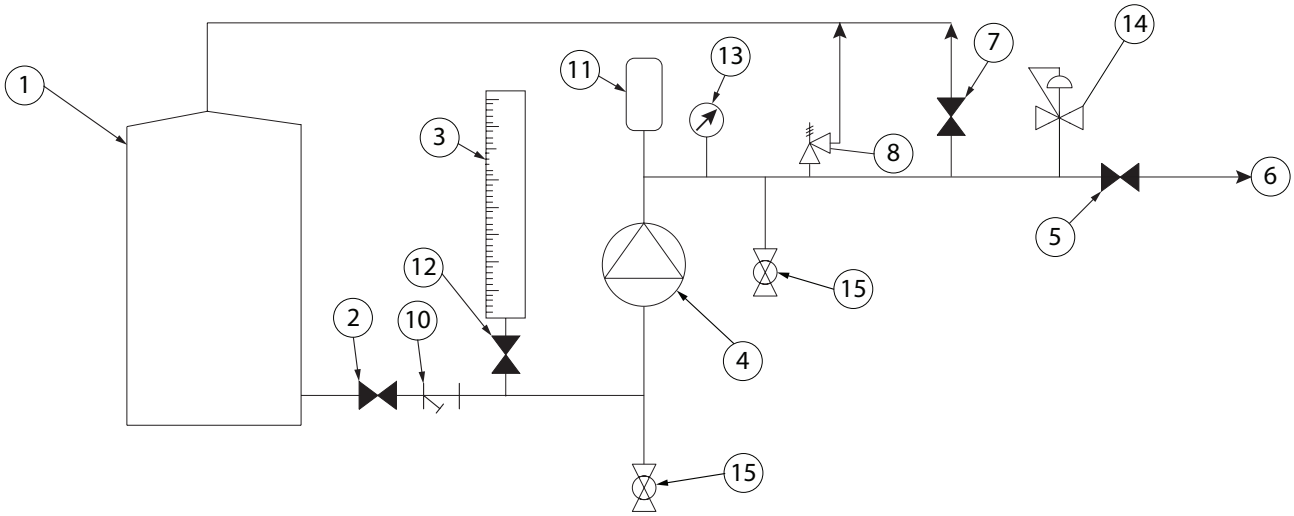


Figure 1. Installation example

1	Tank
2	Pump suction isolating valve
3	Calibrating column
4	Pump
5	Discharge circuit isolating valve
6	To process
7	Priming valve

8	Safety valve
10	Filter
11	Mandatory Pulsation dampener
12	Isolating valve
13	Pressure indicator
14	Back pressure valve (if required)
15	Drain Valve

2.2 DRIP COLLECTION

- It is recommended to install a drain system to collect the leakage and the drip, especially if the liquid pumped is harmful.

3.1 PROCEDURES BEFORE START UP

Special care has to be taken for chemicals product used in the process (acids, bases, oxidizing / reducing solutions, etc).

- Open pump suction line isolation valve. Do not open discharge line isolation valve. Slowly open discharge line priming valve. Verify process fluid is present to confirm pump is "primed". Close priming valve. If suction lift installation, leave priming valve open. Open discharge isolation valve. (caution to the liquid pumped). This procedure is to verify that there is liquid present (pump is installed in flooded suction), or to prime the pump (pump installed in suction lift).
- Check that the pump capacity is set to "0%" (hand-knob).

3.2 START UP

- Once all the checks and procedures described in the previous section have been carried out, start up the pump
- Check visually and by listening (check that there are no suspicious noises).
- Make sure that the hand-knob is unlocked.
- Adjust the pump capacity gradually from 0% to 100%, If in suction lift priming valve will be open. When liquid is present from outlet of priming valve, close priming valve.
- Once the priming is obtained, adjust the pump to the desired capacity.
- Lock the hand-knob with the locking screw.

3.3 FAILURE ON START UP

The flow rate is lower than desired

- The pump capacity is incorrectly adjusted:
  - Adjust the capacity to the desired value and lock the hand-knob.
- The effects of acceleration can starve pump (pipe cross-section too small or pipe too long):
  - o replace the pipe with ones that have a larger cross-section or install the pump in flooded suction or add properly sized accumulator.
- The leak-tightness of suction pipe is unsatisfactory.
- The viscosity of the liquid is incompatible with the pump's capabilities.

The capacity is greater than desired

- The stroke adjustment of the pump is incorrect.
  - Adjust the stroke adjustment to the wanted value.
- A syphoning phenomenon is observed:
  - Check if the suction pressure is not superior to the discharge pressure. If so, it is necessary to place a back-pressure valve on the discharge line.

The capacity is variable

- This problem may be due to particles from the piping which interfere with the operation of the valve assemblies.
  - Clean the piping and the valve assemblies (by checking the assembly sequence of different components.

3.4 SCHEDULE FOR CHECKS AND MAINTENANCE OPERATIONS

The program of checks and maintenance operations depends on the conditions in which the equipment is used. For this reason, the following frequencies are given as an example only. Individual users should adapt these frequencies to their own specific operating conditions.

When?	Check	Maintenance	Reference
After first 2000 hours		Change lubricating oil (mechanical and hydraulic oil)	Chapter IV-1
Every month	Check the oil level of the housing and the spacer -if incorrect ☛	Trace lubricating oil leak	
Every 3 months	Check the oil temperature if > 167°F (75°C) ☛	Verify -the date of the last oil change -the oil contamination -the equipment operating conditions	
Every 8 000 hours or 1 year		Change lubricating oil (mechanical and hydraulic) Change the filter	Chapter IV-1
Frequency to be defined according to process	Check conformity of capacity	Check the pump capacity	Chapter IV-2

MAINTENANCE SHEET

Pump Code:

Contract Number:

Liquid Pumped:

Intervention	Date	Functioning hours	Comments

4.1 OIL CHANGE

⚠ CAUTION **TO AVOID ANY RISK OF BURNING BY THE HOT OIL, PROTECTIVE GLOVES MUST BE USED.**

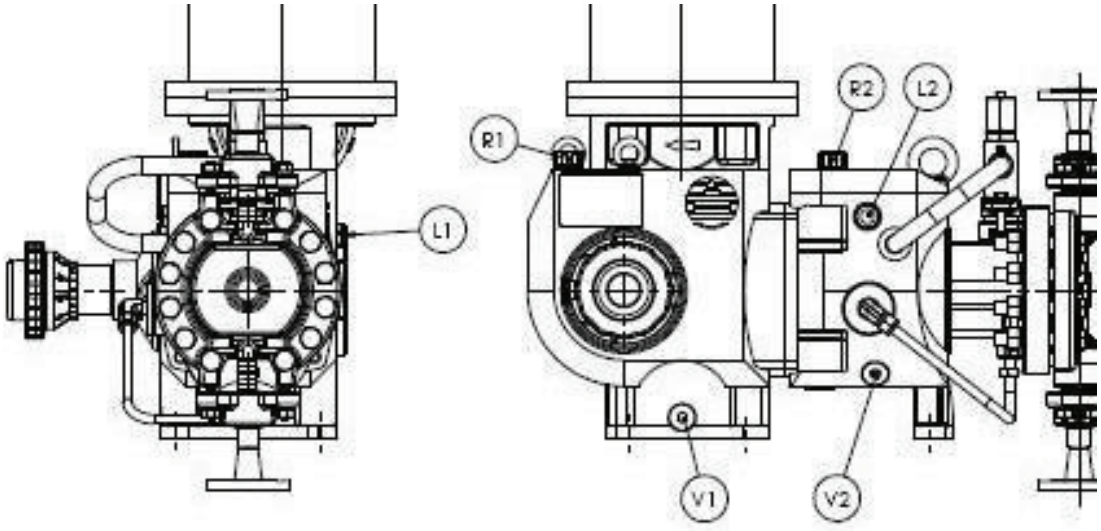
1. Perform the first oil change after 2000 hours of operation. Subsequent oil changes will be carried out every 8000 hours operation or every 1 year.
2. Disconnect the pump electrically, check that the equipment cannot be switched on accidentally. Put a notice at the location of the switch.

LIQUID END OIL CHANGE

1. Unscrew the plug [V2] and drain the oil into a tray.
2. Remove any overflow of oil immediately with a suitable degreasing agent for the operating conditions.
3. Replace the filter.
4. Degrease and replace the plug [V2].
5. Fill up the housing to the middle of the oil level indicator [L2] with a hydraulic oil. Fill up the displacement chamber to the safety valve hole.

⚠ CAUTION **USE HYDRAULIC OIL SUITABLE FOR DIAPHRAGM LIQUID END SERVICE CONDITIONS. QUANTITIES LISTED IN THE TABLE BELOW.**

PUMP MODEL	QUANTITY
PH	0.5 Gallons (2 Liters)
PK	0.8 Gallons (3 Liters)
PL	2.5 Gallons (9.5 Liters)
PN	5 Gallons (19 Liters)



R1	Mechanical oil level filling plug
R2	Hydraulic oil level filling plug
L3	Mechanical oil level
L2	Hydraulic oil level
V1	Mechanical oil drain plug
V2	Hydraulic oil drain plug

Figure 2. LIQUID END OIL CHANGE

4.2 OTHER MAINTENANCE OPERATIONS

CHECKING THE PUMP CAPACITY

This is a question of determining the straight line representing the pump's capacity according to its adjustment. Four measurements are sufficient (adjustment at 100%, 75%, 50% and 25%). There are two possible methods:

1. If the pump is installed in flooded suction

Measure the volume of pumped liquid in a calibrating chamber installed in suction piping between pump and suction tank for a given period. Do not use calibration cylinder with suction pressure greater than 10 psig.

2. If the pump is installed in suction lift

Measure the volume of discharged liquid.

The first method is recommended. In addition, this method avoids placing the operator in contact with the liquid, which is important if the pumped liquid is hazardous. For a precise check, it may be necessary to use an electromagnetic flow-meter.

4.3 TRACING CAUSES OF FAILURE

THE PUMP PRODUCES NO FLOW

- The pump capacity is adjusted to « 0 % »
  - Adjust the capacity to the desired value and lock the hand-knob.
- Check the leak-tightness of the piping safety valve
- The liquid end is not primed
  - Release the pressure on the discharge pipe and prime the liquid end, or check the leak-tightness of the suction circuit
- The balls of the valve assemblies are blocked by particles
  - Clean or replace the valve assemblies
    - First, check whether the presence of the particles in the valve assemblies is normal and take corrective action if necessary

If the problem is not solved check the mechanical assembly and liquid end functioning

THE PUMP DOES NOT PROVIDE THE REQUIRED FLOW RATE

- The pump capacity is incorrectly adjusted
  - Adjust the capacity to the desired value and lock the hand-knob
- The valve assemblies are blocked by particles
  - Clean or replace the valve assemblies
- Pump NPSH available may not be sufficient and the suction circuit leak-tightness is unsatisfactory

4.4 ORDERING SPARE PARTS

To make it easier to register your order for spare parts and ensure a quick delivery, please provide us the following details:

- Information on the pump: type and contract number. These two items of information are shown on the identification plate mounted on the pump
- Information on the spare part: reference, description and quantity. These items of information are specified in the spare parts list supplied with the pump

5.1 GENERALITIES

The preventive maintenance consists in replacing the wear parts included in a "spare parts kit". These kits are available on request from the spare part department

The corresponding action is detailed in the chapter VI: Servicing the liquid end assembly

5.2 LIQUID END ASSEMBLY PREVENTIVE MAINTENANCE

Renewal	Frequency* (hours)
Plunger and plunger connection	15,000
Diaphragm (for the diaphragm liquid end))	15,000
Check valves	8,000

* Approximate hours number when operating under max performances and normal using conditions.

5.3 HYDRAULIC OIL CHARACTERISTICS

PUMP MODEL	OIL TYPE	REFERENCE	QUANTITY	MOBIL OIL	TEMPERATURE MINIMUM	TEMPERATURE MAXIMUM	EQUIVALENCY
PH / PK	Standard	20040	1qt. (.95L)	SHC-524	-40°F (-40°C)	176°F (80°C)	AEROSHELL FLUID 41
PL / PN		56980	10qt. (9.5L)				
PH / PK	Food Grade	57876	1qt. (.95L)	SCH CIBUS 32			OPTILEB HY 32
PL/PN		57877	10qt. (9.5L)				

SECTION 6 - SERVICING THE LIQUID END ASSEMBLY

6.1 GENERAL

REMARKS

- By measure of simplification, the described procedures do not mention the washers fitted with fasteners (such as screws and nuts) and the magnet

⚠ CAUTION **DO NOT TO FORGET TO ASSEMBLE THE WASHERS BEHIND THE SCREW AND NUTS.**

- Some parts have been bonded during the workshop assembly. Clean the residual glue before a second assembly
- Replace the seal at each servicing

PRECAUTION

- Special care must be taken for chemicals used in the process
  - acids, bases, oxidizing/reducing solutions, etc.
- Provide for the rinsing of the liquid end, if necessary, and provide for appropriate protective equipment.
- Check that there is no pressure and the temperature of components before starting to dismantle. Before all servicing perform the following operations:
  - Adjust the pump capacity at « 0% ».
  - Disconnect the electrical power Any accidental start-up must be prevented. position a notice at the switch location to avoid start up.
  - Disconnect the pneumatic or hydraulic power if used.
- Drain the oil from the housing (refer to chapter IV-1 oil change).

6.2 PRINCIPLE OF THE LIQUID END

Liquid end with single diaphragm

During the suction phase, the displacement of the piston creates a partial vacuum in the displacement chamber. The diaphragm is hydraulically coupled to the piston and will suck a set volume (capacity) of fluid through the suction check valve and into the pump head. The discharge check valve seals off the discharge line.

The process is then inverted and the return phase begins. The piston compresses the hydraulic oil. The oil then exerts pressure on the diaphragm, thus forcing the liquid through the discharge check valve. The suction check valve seals off the suction line.

Liquid end with double diaphragm

During the suction phase, the displacement of the piston creates a partial vacuum in the displacement chamber. The first diaphragm is hydraulically coupled to the piston; the second diaphragm, being "bound" to the first, will suck a set volume (capacity) of fluid through the suction check valve and into the pump head. The discharge check valve seals off the discharge line.

The process is then inverted and the return phase begins. The piston compresses the hydraulic oil. The oil then exerts pressure on the diaphragm pair, thus forcing the liquid through the discharge check valve. The suction check valve seals off the suction line.

Operating principle of the diaphragm rupture detection:

- When one of the two diaphragms ruptures, pressure is exerted between the two diaphragms and is indicated on the detection system. Pressure would equal discharge pressure.

Safety valve: over pressure visualization

A translucent indicator allows the pump operator to check the pump internal pressure limiting and safety valve functionality when it exhaust over pressure.

6.3.1 DISPLACEMENT CHAMBER ASSEMBLY / DISASSEMBLY PH and PK Low Flow

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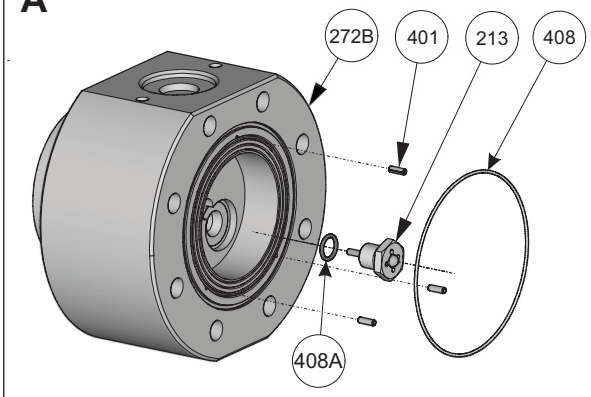
DISASSEMBLY	Labels	Tightening torques N.m.	Tools	Weight Kg
 Wear the personal protective equipment at your work environment.	[272B]			11 Kg (24.25 lbs)
	[245], [008], [405] , [432], [432A], [045]	Mechanical stop + turn ¼		
	[213]	25 N.m (18.43 ft-lbs)	Torque wrench + connector.	
	[405A]	25 N.m (18.43 ft-lbs)	Torque wrench + connector Allen.	

View	Disassembly	View	Assembly
H	1. Unscrew the part [045] then remove the O-ring [438A].		The parts to be assembled must be clean and free of burrs.
G	2. Loosen the nuts of the parts [432] and [432A] then remove the part [047].	A	1. Fit the O-ring [408A] onto the part [213].
G	3. Unscrew the parts [432] & [432A].	A	2. Screw the set [213] into the part [272B].
F	4. Unscrew the screws [405A] then remove the set [101].	A	3. Press the pins [401] into the part [272B] until mechanical stop.
E	5. Unscrew the part [008].	A	4. Place the O-ring [408] onto the part [272B].
E	6. Unscrew the screws [405] then remove the set [272B].	B	5. Insert and index the part [298] into the part [272B].
D	7. Remove the part [019].		The pin [GOU] must fit into the hole in the part [272B].
C	8. Remove the set [212].	B	6. Screw the part [245] into the part [272B].
B	9. Remove the seals [438] & [225].	B	7. Place the seal [225] onto the part [272B].
B	10. Unscrew the part [245].	B	8. Fit the O-ring [438] onto the part [272B].
B	11. Remove the part [298].	C	9. Insert the set [212] into the part [272B] with a bit of hydraulic oil.
A	12. Remove the O-ring [408] and the pins [401].	D	10. Insert the part [019] at the bottom of the part [COU].
A	13. Unscrew the set [213].	E	11. Fit the set [272B] onto the part [CAR] using the screws [405] without tightening them.
A	14. Remove the O-ring [408A].	E	12. Screw the part [008] into the part [COU].
		E	13. Tighten the screws [405].
		F	14. Fit the set [101] onto the part [272B] using the screws [405A].
			Pay attention to the orientation of the hole [T].
		G	15. Screw the part [432] onto the part [101].
		G	16. Screw the part [432A] onto the part [CAR].
		G	17. Insert the part [047] into the parts [432] & [432A].
		G	18. Fix the part [047] by tightening the nuts of the parts [432], [432A].
		H	19. Fit the O-ring [438A] onto the part [045].
		H	20. Screw the part [045] into the part [CRE].

A



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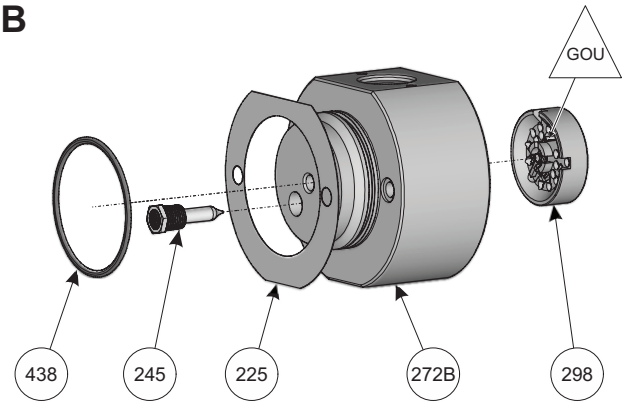

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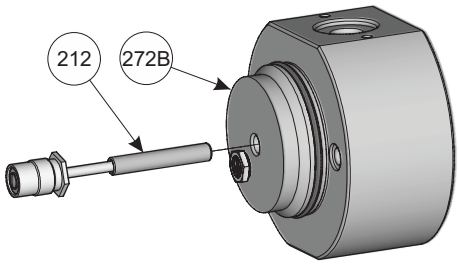

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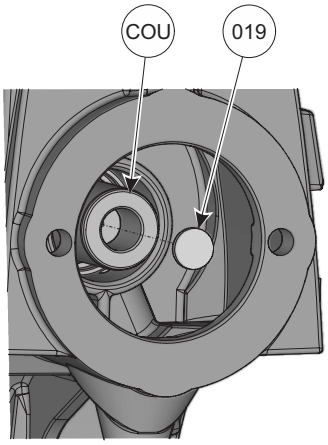

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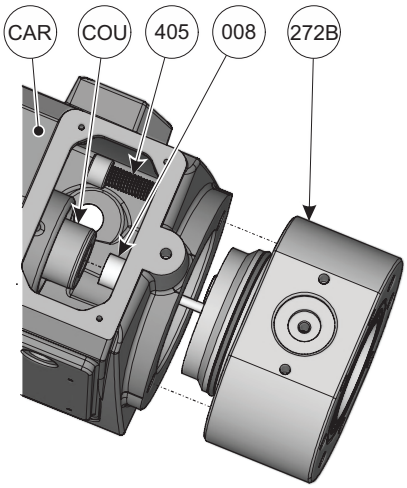

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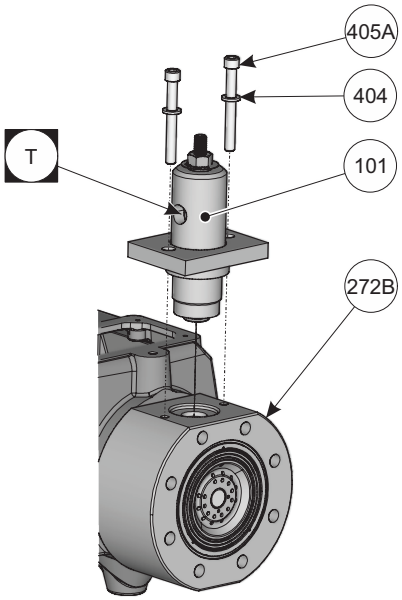

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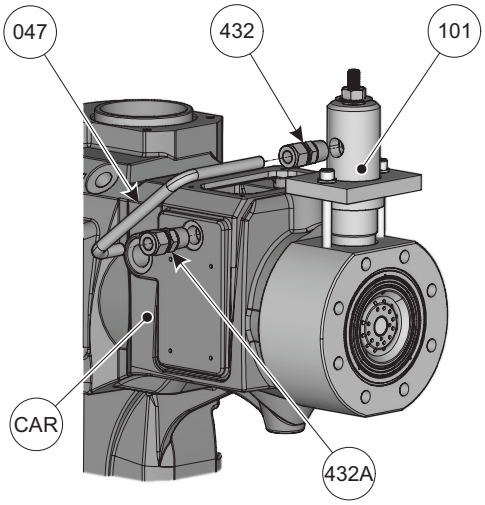

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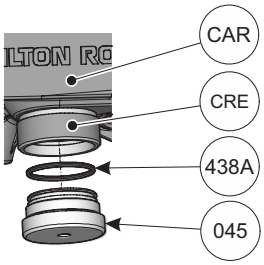

MILTON ROY

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3051638000F-X0 DISPLACEMENT CHAMBER LOW FLOW - 7/16”				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
272B	56110	DISPLACEMENT CHAMBER 7/16"	56110	1
405	4050031144	SOC HD SCR 1/2-13X1-1/2 STL	4050031XXY	2
298	30616	CONTOUR PLATE ASSY MIL-B LO FL	2980105000	1
245	2450021000	STRAINER FITTING BRASS	2450021XYY	1
404	4040040028	SPRING LOCK WASHER 5/16 Z PL		2
405A	4050028194	SOC HD SCR 5/16-18X2-3/4 ALY	4050028XXY	2
401	40006	PIN DOWEL 1/16 X 1/4LG	4010062023	3
045	0450428006N	STRAINER CAP	0450428006	1
438A	4380018061N	O-RING 42.52X2.6 NBR		1
408A	41303	O-RING, 3-905, 90 DURO VITON		1
225	58498	GASKET PH LOW FLOW-1/32" THICK	58498	1
408	4080109415	O-RING 2-044 VITON 70 DURO	4080109XXY	1
438	4380065151N	O-RING 88.5X3.53 NBR	4380065XXY	1
212A	20022	POPPET MARS CS	2120165000	1
280	20024	SPRING MARS CS	2800081041	1
219	20023	WASHER MARS CS	2190106006	1
213	20021	BODY MARS CS	2130019006	1
432	A1-0273	MCONN 10MMT X 3/8MNPT SS		1
047	04709290025N	TUBE RELIEF VALVE	0470929XYYY	1
432A	4320283053N	MALE UNION CONN R3/8"XØ10MM		1

3051638100F-X0 DISPLACEMENT CHAMBER LOW FLOW - 9/16”				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
272B	56322	DISPLACEMENT CHAMBER 9/16"	56322	1
405	4050031144	SOC HD SCR 1/2-13X1-1/2 STL	4050031XXY	2
298	30616	CONTOUR PLATE ASSY MIL-B LO FL	2980105000	1
245	2450021000	STRAINER FITTING BRASS	2450021XYY	1
404	4040040028	SPRING LOCK WASHER 5/16 Z PL		2
405A	4050028194	SOC HD SCR 5/16-18X2-3/4 ALY	4050028XXY	2
401	40006	PIN DOWEL 1/16 X 1/4LG	4010062023	3
045	0450428006N	STRAINER CAP	0450428006	1
438A	4380018061N	O-RING 42.52X2.6 NBR		1
408A	41303	O-RING, 3-905, 90 DURO VITON		1
225	58498	GASKET PH LOW FLOW-1/32" THICK	58498	1
408	4080109415	O-RING 2-044 VITON 70 DURO	4080109XXY	1
438	4380065151N	O-RING 88.5X3.53 NBR	4380065XXY	1
212A	20022	POPPET MARS CS	2120165000	1
280	20024	SPRING MARS CS	2800081041	1
219	20023	WASHER MARS CS	2190106006	1
213	20021	BODY MARS CS	2130019006	1
432	A1-0273	MCONN 10MMT X 3/8MNPT SS		1
047	04709290025N	TUBE RELIEF VALVE	0470929XYYY	1
432A	4320283053N	MALE UNION CONN R3/8"XØ10MM		1

3051638200F-X0 DISPLACEMENT CHAMBER LOWFLOW - 5/8”				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
272B	56325	DISPLACEMENT CHAMBER 5/8"	56325	1
405	4050031144	SOC HD SCR 1/2-13X1-1/2 STL	4050031XXY	2
298	30616	CONTOUR PLATE ASSY MIL-B LO FL	2980105000	1
245	2450021000	STRAINER FITTING BRASS	2450021XYY	1
404	4040040028	SPRING LOCK WASHER 5/16 Z PL		2
405A	4050028194	SOC HD SCR 5/16-18X2-3/4 ALY	4050028XXY	2
401	40006	PIN DOWEL 1/16 X 1/4LG	4010062023	3
045	0450428006N	STRAINER CAP	0450428006	1
438A	4380018061N	O-RING 42.52X2.6 NBR		1
408A	41303	O-RING, 3-905, 90 DURO VITON		1
225	58498	GASKET PH LOW FLOW-1/32" THICK	58498	1
408	4080109415	O-RING 2-044 VITON 70 DURO	4080109XXY	1
438	4380065151N	O-RING 88.5X3.53 NBR	4380065XXY	1
212A	20022	POPPET MARS CS	2120165000	1
280	20024	SPRING MARS CS	2800081041	1
219	20023	WASHER MARS CS	2190106006	1
213	20021	BODY MARS CS	2130019006	1
432	A1-0273	MCONN 10MMT X 3/8MNPT SS		1
047	04709290025N	TUBE RELIEF VALVE	0470929XYYY	1
432A	4320283053N	MALE UNION CONN R3/8"XØ10MM		1

3051625000F-X0 PISTON ASSEMBLY 7/16”				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
012A	01205730193N	LOWFLOW PLUNGER SUPPORT	01205730YYY	1
019	0190338006N	WASHER	01903380YY	1
008	0080121016N	PLUNGER HOOKING SCREW	0080121YYY	1
019A	0190337006N	WASHER	0190337006	1
268	56106	PLUNGER ROD 4140 ST	56106	1
212	56107	7/16" PLUNGER	56107	1

3051625100F-X0 PISTON ASSEMBLY 9/16”				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
012A	01205730193N	LOWFLOW PLUNGER SUPPORT	01205730YYY	1
019	0190338006N	WASHER	01903380YY	1
008	0080121016N	PLUNGER HOOKING SCREW	0080121YYY	1
019A	0190337006N	WASHER	0190337006	1
268	56106	PLUNGER ROD 4140 ST	56106	1
212	56289	PLUNGER 9/16"	56289	1

3051625200F-X0 PISTON ASSEMBLY 5/8”				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
012A	01205730193N	LOWFLOW PLUNGER SUPPORT	01205730YYY	1
019	0190338006N	WASHER	01903380YY	1
008	0080121016N	PLUNGER HOOKING SCREW	0080121YYY	1
019A	0190337006N	WASHER	0190337006	1
268	06802960193N	PLUNGER ROD LOWFLOW	06802960YYY	1
212	56320	PLUNGER 5/8"	56320	1

6.3.2 DISPLACEMENT CHAMBER ASSEMBLY / DISASSEMBLY PH and PK 106

DRAWING: 777000037

DISASSEMBLY	ASSEMBLY	
	Position	**Torque**
	[435E]	**60 N.m (44.2 ft-lbs)**
	[435G]	**30 N.m (22.1 ft-lbs)**
	[009]	**80 N.m (59.0 ft-lbs)**

Pilot

1. Remove the contour plate [098]. It is advisable to use a hook between the upper section of the pilot and the contour plate.
2. Remove the O-ring [438D] in order to replace it.
3. Remove the pilot [012] using the extractor.
4. Remove the seals [438] (if replacement is needed)

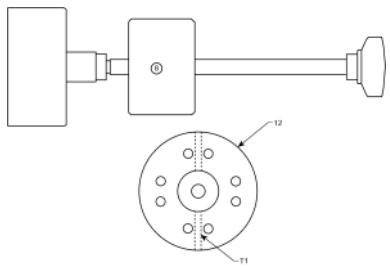
Chamber Assembly

1. Unscrew the plunger mounting screw [009] (liquid end/spacer junction)
2. From inside the spacer, unscrew the four screws [435E] (liquid end/spacer junction), and extract the displacement chamber assembly with the plunger.
3. If necessary, remove the O-Ring [438E] and the two seals [438K] in order to replace them.

Plunger Head

1. Remove the plunger cylinder [037] (marking the direction of fitting) and clean the displacement chamber.
2. Ø32mm: Unscrew the screw [435] and separate the plunger head [012A] from the plunger rod [068].
3. If necessary, remove the seal [438H] in order to replace it.

Plunger Tool (fig 7.2d)



Plunger head

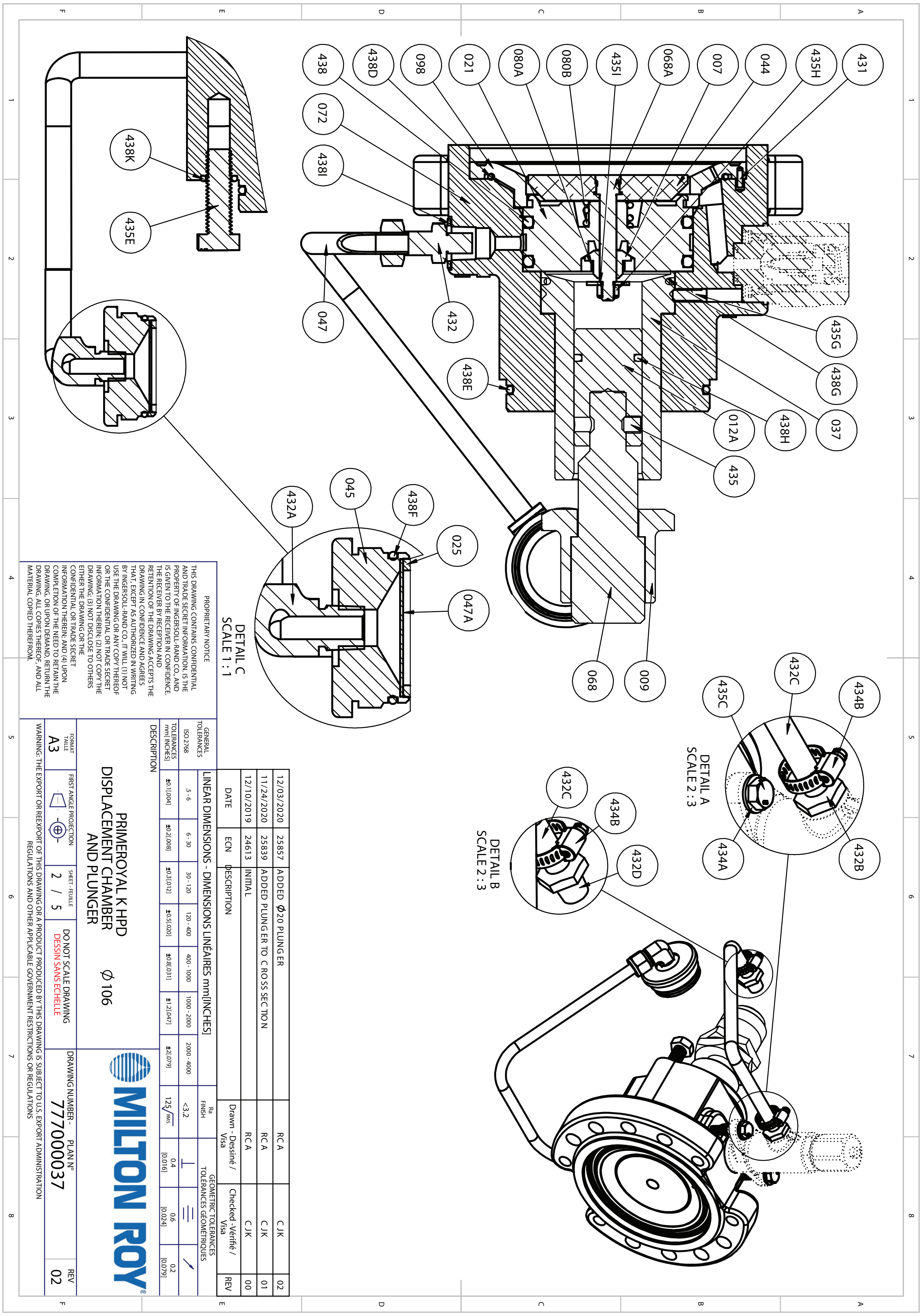
1. Fit the seal [438G] and [438H].
2. Fit the plunger head [012A] on the plunger rod [068].
3. Tighten the screws [435].
4. Engage the plunger in the cylinder [037].

Chamber assembly

1. Fit the O-ring [438E] and seals [438K].
2. Position the displacement chamber in the spacer and screw the plunger mounting screws [009] in the crosshead without torqueing.
3. Attach the displacement chamber assembly on the spacer with four screws [435E].
4. Lock the plunger mounting screw [009].

Pilot

1. Where applicable, fit the seals [438] on the pilot [012].
2. Apply hydraulic fluid on the seals and in the pilot recess.
3. Place the pilot in the extractor. Center the pilot in the displacement chamber [072]. It must be correctly positioned (see Figure 7.2d).
4. Fit the pilot in the displacement chamber by gently striking it with the counterweight of the tool.


431
435H
044
007
068A
435I
080B
080A
021
098
438D
438
072
438I
438K
435E
047
432
438E
435G
438G
037
438H
012A
435
045
438F
432A
025
047A
068
009
DETAIL C
SCALE 1 : 1
432C
434B
435C
DETAIL A
SCALE 2 : 3
434A
432B
DETAIL B
SCALE 2 : 3
432D
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12/03/2020 25857 ADDED Ø20 PLUNGER RCA CJK 02
11/24/2020 25839 ADDED PLUNGER TO CROSS SECTION RCA CJK 01
12/10/2019 24613 INITIAL RCA CJK 00
DATE ECN DESCRIPTION Drawn - Dessiné / Visa Checked - Vérifié / Visa REV
GENERAL TOLERANCES ISO 2768
LINEAR DIMENSIONS - DIMENSIONS LINÉAIRES mm[INCHES]
TOLERANCES mm [INCHES]
.5 - 6 ±0.1[.004]
6 - 30 ±0.2[.008]
30 - 120 ±0.3[.012]
120 - 400 ±0.5[.020]
400 - 1000 ±0.8[.031]
1000 - 2000 ±1.2[.047]
2000 - 4000 ±2[.079]
Ra FINISH <3.2 125 RMS
GEOMETRIC TOLERANCES TOLÉRANCES GÉOMÉTRIQUES
0.4 [0.016]
0.6 [0.024]
0.2 [0.079]
DESCRIPTION
PRIMEROYAL K HPD
DISPLACEMENT CHAMBER Ø 106
AND PLUNGER
MILTON ROY
FORMAT TAILLE A3
FIRST ANGLE PROJECTION
SHEET - FEUILLE 2 / 5
DO NOT SCALE DRAWING
DESSIN SANS ECHELLE
DRAWING NUMBER - PLAN N°
777000037
REV 02
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SECTION 6 - SERVICING THE LIQUID END ASSEMBLY

3O51240010F-X0

PRIMEROYAL K HPD DISPLACEMENT CHAMBER ∅106

Bubble#	Part #	Description	Drawing #	Qty	UM
007	0070055006N	PILOT VALVE	00700550YY	1	EA
021	0210765062N	CHECK VALVE BODY	02107650YY	1	EA
025	0250196075N	BUSH PTFE	02501960YY	1	EA
044	0440115062N	TRIGGER	04401150YY	1	EA
045	0450104006N	FOOT VALVE CONNECTION	0450104006	1	EA
047	04708240025N	PIPE	04708240YYY	1	EA
047A	0470396073N	FILTER CLOTH / (DM) D43 EP.1	0470396073	1	EA
068A	0680187006N	PILOT STEM	06801870YY	1	EA
072	0720389001N	DISPLACEMENT CHAMBER/ D.106	07203890YY	1	EA
080A	0800102006N	SPRING AISI 107 4	08001020YY	1	EA
080B	0800074006N	SPRING	0800074006	1	EA
098	0980138006N	CONTOUR PLATE	0980138006	1	EA
431	4310009285N	GROOVED PIN G05 2.5XS 316SS	4310009XXY	1	EA
432	4320357062N	CONNECTION 3/8" GAZ X D10 OD	4320357XXY	1	EA
432A	4320186022N	MALE ELBOW UNION	SP	1	EA
432B	4320297031N	CONNECTION	4320297XXY	1	EA
432C	4320298030N	FLEXIBLE PIPE TRICOCLAIR AL		50	CM
432D	4320297051N	CONNECTION	4320297XXY	1	EA
434A	4340005085N	M8 PLAIN FLAT WASHER 3 16 A4-70	4340005XXY	2	EA
434B	4340029000N	HOSE CLAMP I 4-22MM W-8MM 304SS		2	EA
435C	4350035577N	HEX HD SCREW M8X50		2	EA
435E	57105	ECOGUARD SERRFLANGEBOLT M 12X40		2	EA
435G	4350123081N	SET SCREW M6 X 16 CUP PT	4350123XXY	1	EA
435H	4350122020N	PREVAILING TORQUE HEXAGON NUT	4350122XXY	1	EA
438	4380006405N	O-RING 69.22 X 5.33		2	EA
435I	4340069002N	PLAIN WASHER/ 6.4X20X1.5		1	EA
438D	4380019141N	O-RING 11 0X3	4380019XXY	1	EA
438E	4380065151N	O-RING 88.5 X 3.53	4380065XXY	1	EA
438F	4380018061N	O-RING 42.52 X 2.6		1	EA
438I	4380022180N	WASHER 16.7 X 24 X 1,5	4380022XXY	1	EA
438K	4380006121N	O-RING 12.1 X 2.7		2	EA

∅20mm PISTON 3050990010F-X0					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
037	0370108106N	PLUNGER CYLINDER D.20	0370108XYY	1	EA
068	0680186162N	PLUNGER D.20	0680186XYY	1	EA
438H	4380233000N	D.20 PLUNGER RING	4380233XX0	1	EA
438G	4380019055N	O-RING 57X3	4380019XXY	1	EA

∅25mm PISTON 3050990020F-X0					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
037	0370108206N	SLEEVE D25	0370108XYY	1	EA
068	0370108206N	PLUNGER D.25	0680186XYY	1	EA
438H	4380233000N	D.25 PLUNGER RING	4380233XX0	1	EA
438G	4380019055N	O-RING 57X3	4380019XXY	1	EA

∅32mm PISTON 3050990030F-X0					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
037	0370108306N	PLUNGER CYlINDER D.32	0370108XYY	1	EA
068	0680188106N	PLUNGER ROD	0680188XYY	1	EA
012A	0120314062N	PLUNGER HEAD D.32	0120314XYY	1	EA
435	4350123091N	SET SCREW M8X8 CUP PT	4350123XXY	2	EA
438H	4380233030N	D.32 PLUNGER RING	4380233XX0	1	EA
438G	4380019055N	O-RING 57X3	4380019XXY	1	EA

6.3.3 DISPLACEMENT CHAMBER ASSEMBLY / DISASSEMBLY 106 HP

DRAWING: 777000038

DISASSEMBLY	ASSEMBLY	
	Position	**Torque**
	[435]	**40 N.m (29.5 ft-lbs)**
	[435E]	**120 N.m (88.5 ft-lbs**
	[009]	**80 N.m (59.0 ft-lbs)**
	[435F]	**Mechanical Stop**

Pilot

5. Remove the retaining ring [434B]
6. Remove the parts [119D], [080B]
7. Unscrew the nut [435F]
8. Remove the parts [119], [119A], [119E], [119C], [080A]
9. Remove the retaining ring [434E]
10. Remove the part [119B]

Chamber Assembly

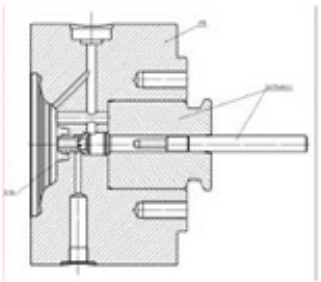
4. Unscrew the plunger mounting screw [009] (liquid end & crosshead)
5. Unscrew the screws [435E] (linking the liquid end and the spacer) from inside the spacer, and take out the displacement chamber assembly with the plunger.
6. Remove the seals [438H], [025]
7. Unscrew the parts [435D]
8. Remove the part [072B]

Plunger Head

4. Separate the plunger [068] from the cylinder [037]
5. Remove Plunger Mounting Screw [009]

Plunger Tool (fig 7.2d)

Tooling 3077040011



Plunger head

5. Engage the plunger mountings screw [009] on the plunger [068].
6. Engage the plunge in the cylinder [037] and in the part [068A].
7. Place the part [037] into the part [072].
8. Fit the part [072B].
9. Screw the screws [435D].

Chamber assembly

1. Fit the seals [438H], [025] on the displacement chamber [072A]
2. Position the displacement chamber assembly in the spacer and install the mounting screw [009] in the crosshead without torqueing
3. Attach the displacement chamber assembly onto the spacer with screws [435E].
4. Lock the mounting screw [009]

Pilot

5. Verify the cleanliness of the parts before starting assembly
6. Position the part [119B] into the displacement [072]
7. Push the part [119B] to mechanical stop with the tooling.

Do not damage the contact surface between the parts [119B] and [119C]

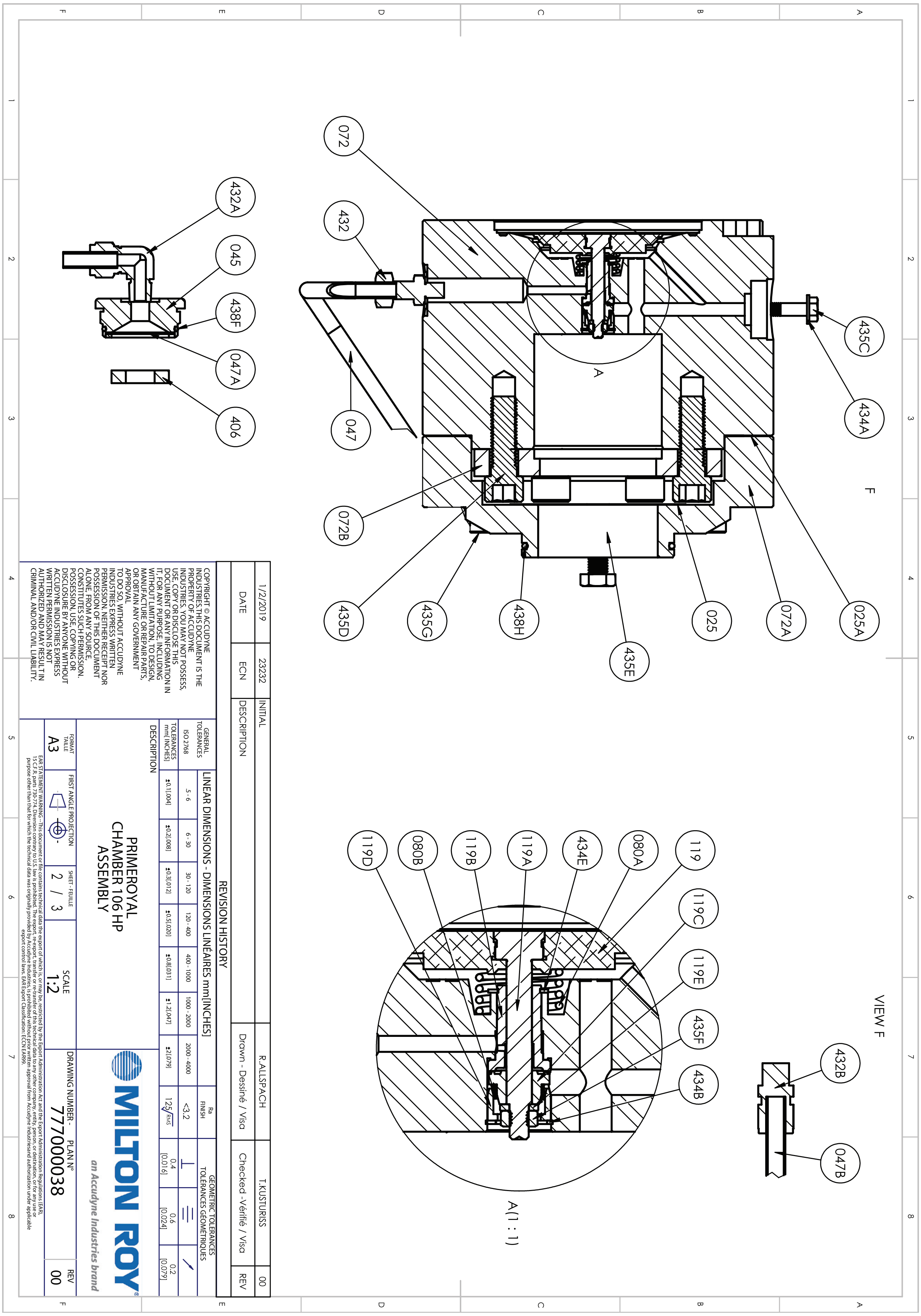
8. Fit the retaining ring [434E]
9. Position the spring [080A]
10. Insert the assembly [119], [119A]
11. Insert the part [119C]
12. Insert the part [119E]
13. Block in rotation the part [119] (use the drill bit [P] and the mark of the part [119]
14. Tighten the nut [435F]
15. Check the part [119] displacement. The value must be included between 2.7 and 3.7mm

If the displacement is not between the good value, check that the part is stop mechanical indeed or contact us

16. Insert the spring [080B] and the part [119D]
17. Insert the retaining ring [434B]

⚠ CAUTION CONSULT FACTORY FOR TORQUE SPEC.

OF ALL PRESSURE CONTAINING HARDWARE BEFORE OPERATING PUMP


072
432A
432
045
438F
047A
406
047
072B
435D
435G
438H
435E
025
072A
025A
434A
435C
F
A
VIEW F
432B
047B
119D
080B
119B
119A
434E
080A
119
119C
119E
435F
434B
A (1 : 1)
REVISION HISTORY
DATE
ECN
DESCRIPTION
1/2/2019
23232
INITIAL
Drawn - Dessiné / Visa
R.ALLSPACH
Checked -Vérifié / Visa
T.KUSTURISS
REV
00
PRIMEROYAL
CHAMBER 106 HP
ASSEMBLY
DESCRIPTION
MILTON ROY
an Accudyne Industries brand
DRAWING NUMBER - PLAN N°
777000038
SCALE
1:2
SHEET - FEUILLE
2 / 3
FIRST ANGLE PROJECTION
FORMAT TAILLE
A3
LINEAR DIMENSIONS - DIMENSIONS LINÉAIRES mm[INCHES]
GEOMETRIC TOLERANCES
TOLERANCES GÉOMETRIQUES

SECTION 6 - SERVICING THE LIQUID END ASSEMBLY

DISPLACEMENT CHAMBER					
BUBBLE#	PART#	DESCRIPTION	DRAWING#	QTY.	UM
025	0250108099N	O-RING DOSAPRO	02501080YY	1	EA
025A	0250111099N	SPACER GASKET	025011IXYY	1	EA
045	0450104006N	FOOT VALVE CONNECTION	0450104006	1	EA
047A	0470396073N	FILTER CLOTH / (DM) D43 EP.1	0470396073	1	EA
047	04708220025N	MAKE-UP PIPE	04708220YYY	1	EA
047B	04708230025N	VALVE RETURN PIPE 106	04708230YYY	1	EA
072	0720342006N	DISPLACEMENT CHAMBER	0720342006	1	EA
072A	1199957517N	ADAPTER PLATE 106	1199957517	1	EA
072B	1199960372N	LINER PLATE	1199960372	1	EA
080B	0800102006N	SPRING AISI 1074	08001020YY	1	EA
080A	08001830101N	COMPRESSION SPRING		1	EA
119	1199995306N	TRIGGER	1199995306	1	EA
119A	1199995308N	AXIS	1199995308	1	EA
119B	1199995309N	CANON BORING	1199995309	1	EA
119C	1199995310N	VALVE	1199995310	1	EA
119D	1199995311N	REARSTOP	1199995311	1	EA
119E	1199995313N	WASHER	1199995313	1	EA
434B	4340020201N	INTRETAINING RING D20XI	4340020XX1	1	EA
434E	4340052000N	RETAINING RING		1	EA
435F	4350076046N	ECROU FREIN M6 DIN985 NYLSTOP	SP	1	EA
406	4060227000N	MAGNET D.36X18 • LG8	4060227XXY	1	EA
432A	4320186022N	MALE ELBOW UNION 316SS	SP	1	EA
432	4320357062N	CONNECTION 3/8GAZ X D10 OD	4320357XXY	1	EA
432B	4320413003N	3/8 BSPTMALE CONNECTOR		1	EA
4320	4320413013N	1/2 BSPTMALE CONNECTOR		1	EA
434A	4340005085N	MB PLAIN FLATWASHER316 A4-70	4340005XXY	2	EA
435C	4350035557N	HEX HD SCREW M8X40 THREAD 22		2	EA
4350	4350048322N	ECO SHCSM 16X50 THRD 44	4350048XXY	6	EA
435G	4350048386N	SHCSM 16X80 ECOGUARD	SP	4	EA
438F	4380018061N	0-RING 42.52 X 2.6		1	EA
438	43800221BON	WASHER 16.7X24 X 15	4380022XXY	1	EA
438H	4380065151N	O-RING 88.5 X 3.53	4380065XXY	1	EA
025B	0250196075N	BUSH PTFE	02501960YY	1	EA
435E	57105	ECOGUARD SERRFLANGE BOLT M12X40		2	EA

∅20 mm PLUNGER					
BUBBLE#	PART#	DESCRIPTION	DRAWING#	QTY.	UM
009	0090006006N	PLUNG ER HOOKING SCREW	00900060YY	1	EA
037	03700921015N	PLUNGER LINE D.20	0370092X06	1	EA
019	1199957337N	CROSS-PIECE	1199957337	1	EA
068	11999 59885N	PLUNG ER DIA 20	1199959885	1	EA
438G	4380051022N	O -RING 66.34X2.62	4380051XXY	1	EA

6.3.4 DISPLACEMENT CHAMBER ASSEMBLY / DISASSEMBLY PL 106 HP

DRAWING: 777000040

DISASSEMBLY	ASSEMBLY	
	Position	**Torque**
	[435]	**60 N.m (44.2 ft-lbs)**
	435D]	**30 N.m (22.1 ft-lbs)**
	[009]	**80 N.m (59.0 ft-lbs)**
	[435F]	**Mechanical Stop**

Pilot

1. Remove the retaining ring [435B].
2. Remove the parts [119D], [080B].
3. Unscrew the nut [435F].
4. Remove the parts [119], [119A], [119E], [119C], [080A].
5. Remove the retaining ring [434E].
6. Remove the part [119B].

Chamber Assembly

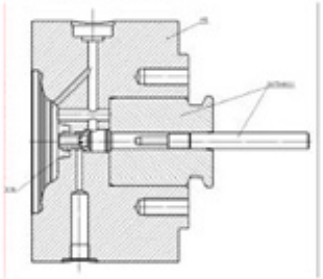
1. Unscrew the plunger mounting screw [009] (liquid end/crosshead).
2. Unscrew the four screws [435D] (link the liquid end and the spacer) from inside the spacer, and take out the displacement chamber assembly with the plunger.
3. Remove the seal [438H].

Plunger Head

1. Separate the plunger [068] from the cylinder [037].
2. Remove the plunger mounting screw [009].

Plunger Tool (fig 7.2d)

Tooling 3077040011



Plunger head

1. Verify the cleanliness of the parts before starting assembly.
2. Position the part [119B] into the displacement [072].
3. Push the part [119B] to mechanical stop with the tooling 3077040011.

Do not damage the contact surface between the parts [119B] and [119C]

4. Fit the retaining ring [434E].
5. Position the spring [080A].
6. Insert the assembly [119],[119A].
7. Insert the part [119C].
8. Insert the part [119E].
9. Block in rotation the part[119] (use the drilling [P] and the mark of the part [119]).
10. Tighten the nut [435F].

Check the part [119] displacement. The value must be included between 2.7 and 3.7 mm

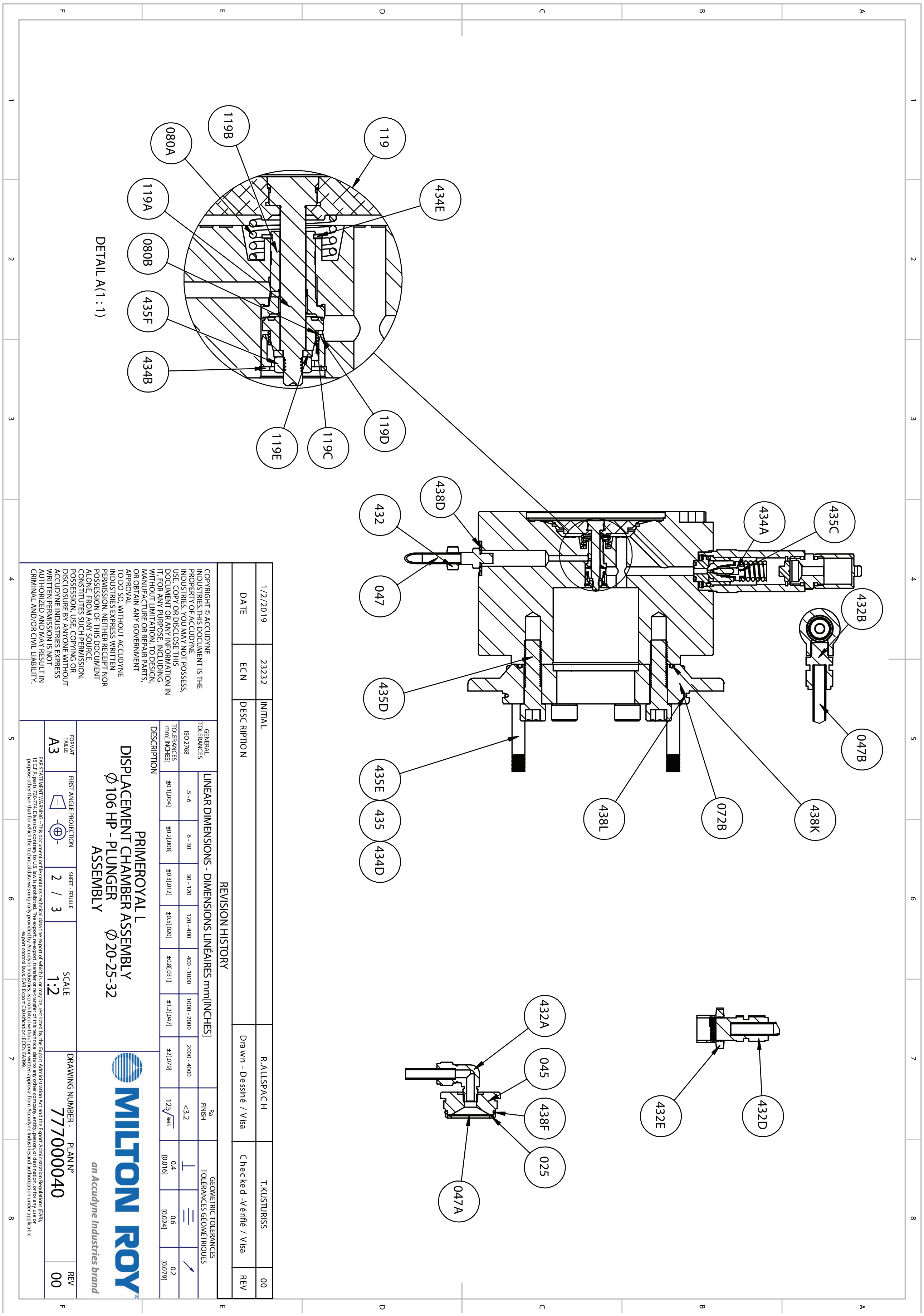
11. Insert the spring [080B] and the pat [119D].
12. Insert the retaining ring [434B].

Plunger

1. Engage the plunger mounting screw [009] on the plunger [068].
2. Engage the plunger in the cylinder [037].

Chamber assembly

1. Fit the seal [438H] on the displacement chamber [072].
2. Position the displacement chamber assembly in the spacer and install the mounting screw [009] in the crosshead without torqueing.
3. Attach the displacement chamber assembly onto the spacer with four screws [435D].
4. Lock the mounting screw [009].



DETAIL A (1 : 1)
119
119B
080A
119A
080B
435F
434B
434E
119D
119C
119E
438D
432
047
434A
435C
432B
047B
435D
435E
435
434D
438L
072B
438K
432A
045
438F
025
047A
432E
432D
REVISION HISTORY
DATE 1/2/2019
ECN 23232
DESCRIPTION INITIAL
Drawn - Dessiné / Visa R.ALLSPACH
Checked - Vérifié / Visa T.KUSTURISS
REV 00
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LINEAR DIMENSIONS - DIMENSIONS LINÉAIRES mm[INCHES]
GENERAL TOLERANCES ISO 2768
5 - 6 | 6 - 30 | 30 - 120 | 120 - 400 | 400 - 1000 | 1000 - 2000 | 2000 - 4000
TOLERANCES mm[INCHES]
±0.1[.004] | ±0.2[.008] | ±0.3[.012] | ±0.5[.020] | ±0.8[.031] | ±1.2[.047] | ±2[.079]
Ra FINISH <3.2 125 RMS
GEOMETRIC TOLERANCES TOLERANCES GEOMETRIQUES
0.4 [0.016] | 0.6 [0.024] | 0.2 [0.079]
DESCRIPTION
PRIMEROYAL L
DISPLACEMENT CHAMBER ASSEMBLY
Ø106 HP - PLUNGER Ø20-25-32
ASSEMBLY
MILTON ROY
an Accudyne Industries brand
FORMAT TAILLE A3
FIRST ANGLE PROJECTION
SHEET - FEUILLE 2 / 3
SCALE 1:2
DRAWING NUMBER - PLAN N° 777000040
REV 00

3050926441F-X0 DISPLACEMENT C HAMBER ASSEMBLY 106 PL HP					
BUBBLE#	PART#	DESCRIPTION	DRAWING#	QTY.	UM
045	0450104006N	FOOT VALVE CONNECTION	0450104006	1	EA
047B	04707840001N	TUBE	04707840YYY	1	EA
047	04707850001N	PIPE	04707850YYY	1	EA
072	0720342006N	DISPLACEMENTCHAMBER	0720342006	1	EA
072B	07204780011N	ADAPTATOR	07204780YYY	1	EA
080B	0800102006N	SPRING AISI I 07 4	08001020YY	1	EA
080A	08001830101N	COMPRESSION SPRING		1	EA
119	1199995306N	TRIGGER	1199995306	1	EA
119A	119999530BN	AXIS	1199995308	1	EA
119B	1199995309N	CANON BORING	1199995309	1	EA
119C	1199995310N	VALVE	1199995310	1	EA
1190	119999531IN	REAR STOP	1199995311	1	EA
119E	1199995313N	WASHER	1199995313	1	EA
434B	434002020I N	INTRETAINING RING 020X1	4340020XXI	1	EA
434E	4340052000N	RETAINING RING		1	EA
435F	4350076046N	ECROU FREIN M6 DIN985 NYLSTOP	SP	1	EA
406	4060227000N	MAGNET D.36 X 18 • LG8	4060227XXY	1	EA
432E	432005924IN	REDUCERSERIES 3000	4320059XXY	1	EA
432A	4320186022N	MALE ELBOW UNION 316SS	SP	1	EA
432	4320357062N	CONNECTION 3/BGAZ X 010 OD	4320357XXY	1	EA
432B	4320413003N	3/8 BSPT MALE CONNECTOR		1	EA
4320	4320413013N	1 /2 BSPT MALE CONNECTOR		1	EA
434A	4340005085N	MB PLAIN FLAT WASHER 316 A4-70	4340005XXY	2	EA
4340	4340009095N	SPRING LOCKWASHER 0.12		4	EA
435	4350000082N	ECO HEX NUTM 12		4	EA
435C	4350035S57N	HEX HD SCREW M8 X 40 THREAD 22		2	EA
4350	435004B342N	SHCSM 16 X 60 THRD 38	4350048XXY	6	EA
435E	4350109082N	ECO STUD M12 X 90•30 J=15		4	EA
025	0250196075N	BUSH PTFE	02501960YY	1	EA
047A	0470396073N	FILTER CLOTH/ (DM) 043 EP.1	0470396073	1	EA
43BF	438001B061N	O-RING 42.52 X 2.6		1	EA
43BL	4380019391N	O-RING 164.5 X 3		1	EA
438K	4380065311N	O-RING 139 X 3.53		1	EA
438D	4380022180N	WASHER 16,7 X 24 X 1,5	4380022XXY	1	EA

3050435280F-XO PLUNGER SLEEVE ASSY 020					
BUBBLE#	PART#	DESCRIPTION	DRAWING#	QTY.	UM
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
068	0120258800N	PLUNGER LINE D.20	0120258XX0	1	EA
037	03700921015N	PLUNGER LINE 0.20	0370092X06	1	EA
19	1199957337N	CROSS-PIECE	1199957337	1	EA
438G	4380051022N	O -RING 66.34 X 2.62	4380051XXY	1	EA

3051172000F-XO PLUNGER SLEEVE ASSY 025 106H P					
BUBBLE#	PART#	DESCRIPTION	DRAWING#	QTY.	UM
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
037	0370092006N	PLUNGER CYLINDER 0 25	0370092X06	1	EA
068	0680189152N	PLUNGER 0.25 L 240	0680 189XYY	1	EA
438G	43802330 I ON	0.25 PLUNGER RING	4380233XX0	1	EA
438	4380051022N	O-RING 66.34 X 2.62	4380051XXY	1	EA

3051172010F-XO PISTON SLEEVE ASM 032					
BUBBLE#	PART#	DESCRIPTION	DRAWING#	QTY.	UM
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
037	03700922015N	SLEEVE 0 32	0370092X06	1	EA
068	0680188706N	TIGE DE PISTON L=220	0680188XYY	1	EA
012A	0120314062N	PLUNGER HEAD 0.32	0120314XYY	1	EA
435	4350123091N	SET SC REW M8X8 CUP PT	4350123XXY	2	EA
438H	4380233030N	0.32 PLUNGER RING	4380233XX0	1	EA
438G	4380051022N	O-RING 66.34 X 2.62	4380051XXY	1	EA

6.3.5 DISPLACEMENT CHAMBER ASSEMBLY / DISASSEMBLY PL 106

DRAWING: 777000045

DISASSEMBLY	ASSEMBLY	
	Position	**Torque**
	[435E]	**60 N.m (44.2 ft-lbs)**
	[435G]	**30 N.m (22.1 ft-lbs)**
	[009]	**80 N.m (59.0 ft-lbs)**

Pilot

1. Remove the contour plate [098]. It is advisable to use a hook between the upper section of the pilot and the contour plate.
2. Remove the O-ring [438D] in order to replace it.
3. Remove the pilot [012] using the extractor.
4. Remove the seals [438] (if replacement is needed)

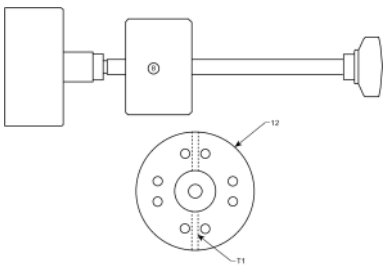
Chamber Assembly

1. Unscrew the plunger mounting screw [009] (liquid end/spacer junction)
2. From inside the spacer, unscrew the four screws [435E] (liquid end/spacer junction), and extract the displacement chamber assembly with the plunger.
3. If necessary, remove the O-Ring [438E] and the two seals [438K] in order to replace them.

Plunger Head

1. Remove the plunger cylinder [037] (marking the direction of fitting) and clean the displacement chamber
2. Ø32mm: Unscrew the screw [435] and separate the plunger head [012A] from the plunger rod [068].
3. If necessary, remove the seal [438H] in order to replace it

Plunger Tool (fig 7.2d)



Plunger head

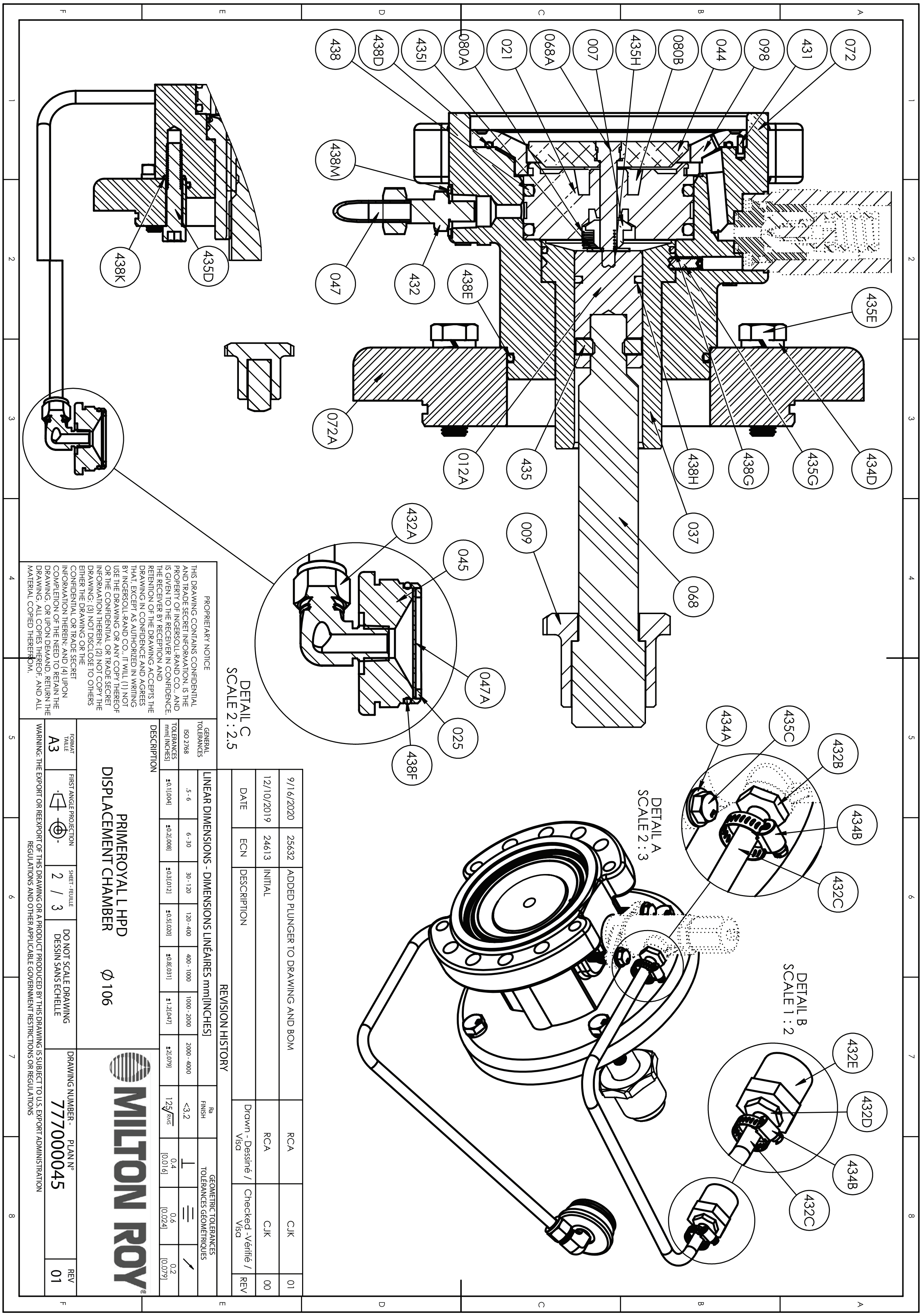
1. Fit the seal [438G] and [438H]
2. Fit the plunger head [012A] on the plunger rod [068]
3. Tighten the screws [435]
4. Engage the plunger in the cylinder [037]

Chamber assembly

1. Fit the O-ring [438E] and seals [438K]
2. Position the displacement chamber in the spacer and screw the plunger mounting screws [009] in the crosshead without torqueing.
3. Attach the displacement chamber assembly on the spacer with four screws [435E]
4. Lock the plunger mounting screw [009]

Pilot

1. Where applicable, fit the seals [438] on the pilot [012].
2. Apply hydraulic fluid on the seals and in the pilot recess.
3. Place the pilot in the extractor. Center the pilot in the displacement chamber [072]. It must be correctly positioned (see Figure 7.2d).
4. Fit the pilot in the displacement chamber by gently striking it with the counterweight of the tool


438
438D
435I
080A
021
068A
007
435H
080B
044
098
431
072
438M
047
432
438E
435E
438K
435D
072A
012A
435
438H
438G
435G
434D
432A
045
009
037
068
047A
025
438F
DETAIL C
SCALE 2 : 2.5
DETAIL A
SCALE 2 : 3
DETAIL B
SCALE 1 : 2
434A
435C
432B
434B
432C
432E
432D
PROPRIETARY NOTICE
REVISION HISTORY
DATE
ECN
DESCRIPTION
9/16/2020
25632
ADDED PLUNGER TO DRAWING AND BOM
12/10/2019
2461
INITIAL
RCA
CJK
01
00
Drawn - Dessiné / Visa
Checked - Vérifié / Visa
REV
PRIMEROYAL L HPD
DISPLACEMENT CHAMBER Ø106
DO NOT SCALE DRAWING
DESSIN SANS ECHELLE
FIRST ANGLE PROJECTION
2 / 3
A3
DRAWING NUMBER - PLAN N°
777000045
MILTON ROY

3050926401F-X0 PRIMEROY AL L HPD DISPLACEMENT CHAMBER ∅106					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
007	0070055006N	PILOT VALVE	00700550YY	1	EA
021	0210765062N	CHECK VALVE BODY	02107650YY	1	EA
025	0250196075N	BUSH PTFE	02501960YY	1	EA
044	0440115062N	TRIGGER	04401150YY	1	EA
045	0450104006N	FOOT VALVE CONNECTION	0450104006	1	EA
047	04708240025N	MAKE-UP PIPE	04708240YYY	1	EA
047A	0470396073N	FILTER CLOTH / (DM) D43 EP.1	0470396073	1	EA
068A	0680187006N	PILOT STEM	06801870YY	1	EA
072	0720389001N	DISPLACEMENT CHAMBER/ D.106	07203890YY	1	EA
072A	07204680011N	SPACER	07204680YYY		
080A	0800102006N	SPRING AISI 107 4	08001020YY	1	EA
080B	0800074006N	SPRING	0800074006	1	EA
098	0980138006N	CONTOUR PLATE	0980138006	1	EA
431	4310009285N	GROOVED PIN G05 2.5 X 5 316SS	4310009XXY	1	EA
432	4320357062N	CONNECTION 3/8" GAZ X D10 OD	4320357XXY	1	EA
432A	4320186022N	MALE ELBOW UNION	SP	1	EA
432B	4320297031N	CONNECTION	4320297XXY	1	EA
432C	4320298030N	FLEXIBLE PIPE TRICOCLAIR AL		50	CM
432D	4320297051N	CONNECTION	4320297XXY	1	EA
432E	4320059241N	REDUCER SERIES 3000	4320059XXY	1	EA
434A	4340005085N	M8 PLAIN FLAT WASHER 3 16 A4-70	4340005XXY	2	EA
434B	4340029000N	HOSE CLAMP 14-22MM W-8MM 304SS		2	EA
434D	4340009095N	SPRING IOCKWASHER D.12		4	EA
435C	4350035577N	HEX HD SCREW M8 X 50		2	EA
435D	4350047944N	ECO SHCS M 12 X 65 THRD 30	4350047XXY	2	EA
435E	4350035902N	HEX HD SCREW M 12X45 ECO		4	EA
435G	4350123081N	SET SCREW M6 X 16 CUP PT	4350123XXY	1	EA
435H	4350122020N	PREVAILING TORQUE HEXAGON NUT	4350122XXY	1	EA
435I	4340069002N	PLAIN WASHER/ 6.4 X 20 X 1.5		1	EA
438	4380006405N	O-RING 69.22 X 5.33		2	EA
438D	4380019141N	O-RING 110 X 3	4380019XXY	1	EA
438E	4380065151N	O-RING 88.5 X 3.53	4380065XXY	1	EA
438F	4380018061N	O-RING 42.52 X 2.6		1	EA
438K	4380006121N	O-RING 12.1 X 2.7		2	EA
438L	4380019391N	O-RING 164.5 X 3		1	EA
438M	43800221180N	WASHER 16,7 X 24 X 1,5	4380022XXY	1	EA

3050990220F-X0 PISTON SLEEVE ASM D20 PL					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
037	0370108106N	PLUNGER CYLINDER D.20	0370108XYY	1	EA
068	06802250085N	PISTON D20 PL	06802250YYY	1	EA
438H	4380233000N	D.20 PLUNGER RING	4380233XX0	1	EA
438G	4380019055N	O-RING 57 X 3	4380019XXY	1	EA

3050990225F-X0 PISTON SLEEVE ASM D25 PL PN					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
037	0370108206N	SLEEVE D25	0370108XYY	1	EA
068	0680189052N	PLUNGER D.25	0680189XYY	1	EA
438H	4380233010N	D.25 PLUNGER RING	4380233XX0	1	EA
438G	4380019055N	O-RING 57 X 3	4380019XXY	1	EA

3050990230F-X0 PISTON SLEEVE ASM D32 PL					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
037	0370108306N	PLUNGER CYlINDER D.32	0370108XYY	1	EA
068	0680188206N	PLUNGER ROD	0680188XYY	1	EA
012A	0120314062N	PLUNGER HEAD D.32	0120314XYY	1	EA
435	4350123091N	SET SCREW M8X8 CUP PT	4350123XXY	2	EA
438H	4380233030N	D.32 PLUNGER RING	4380233XX0	1	EA
438G	4380019055N	O-RING 57 X 3	4380019XXY	1	EA

6.3.6 DISPLACEMENT CHAMBER ASSEMBLY / DISASSEMBLY PL 166

DRAWING: 777000043

DISASSEMBLY	ASSEMBLY	
	Position	**Torque**
	[435]	**30 N.m (22.1 ft-lbs)**
	[435D]	**60 N.m (44.2 ft-lbs)**
	[435E]	**80 N.m (59.0 ft-lbs)**
	[009]	**80 N.m (59.0 ft-lbs)**

Pilot

1. Remove the contour plate [098]. It is advisable to use a hook between the upper section of the pilot and the contour plate.
2. Remove the O-ring [438D] in order to replace it.
3. Remove the pilot [012], [044],[068A] using the extractor.
4. Remove the seals [438] (if replacement is needed)

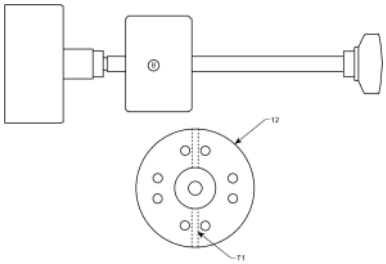
Chamber Assembly

1. Unscrew the plunger mounting screw [009] (liquid end/spacer junction).
2. From inside the spacer, unscrew the four screws [435D] (liquid end/spacer junction), and extract the displacement chamber assembly with the plunger.

Plunger Head

1. Separate the plunger from the cylinder [037].
2. Unscrew the two screws [435] and separate the plunger head [012A] from the plunger rod [068]

Plunger Tool (fig 7.2d)



Plunger head

1. Fit the plunger head [012A] on the plunger rod [068] with two screws [435].
2. Engage the plunger in the cylinder [037].

Displacement chamber

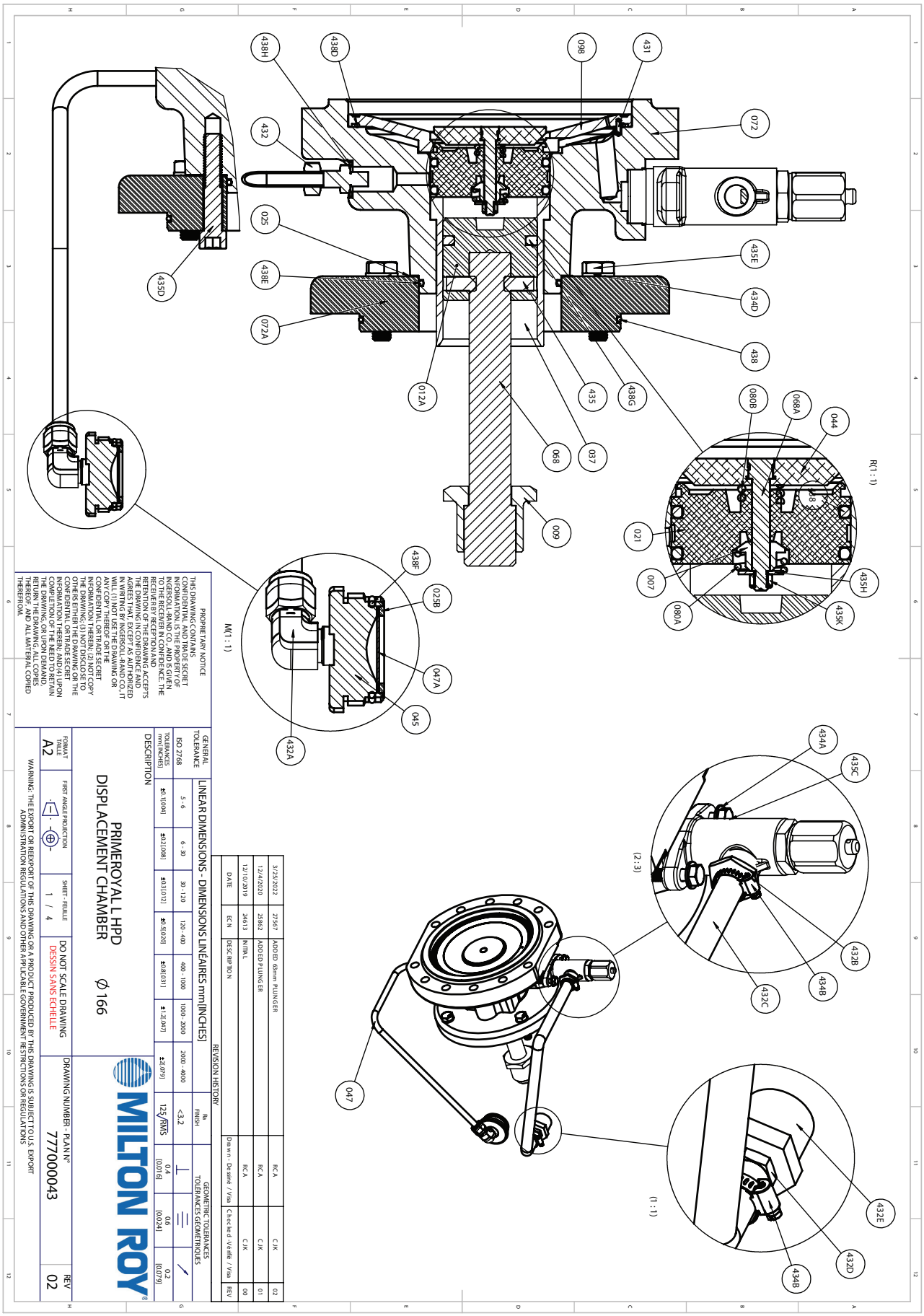
1. Fit the adaptor piece [072A] on the displacement chamber. Tighten the screws [435E].
2. Position the displacement chamber assembly in the spacer and screw the plunger mounting screws [009] in the crosshead without torquing.
3. Attach the displacement chamber on the spacer with the screws [435D].
4. Lock the plunger mounting screw [009].

Pilot

1. Where applicable, fit the seals [438] on the pilot [044,021,068A].
2. Apply hydraulic fluid on the seals and in the pilot recess.

3 Place the pilot in the extractor. Centre the pilot in the displacement chamber [072]. It must, mandatory, be correctly positioned (see tooling figure).

4. Fit the pilot in the displacement chamber by gently striking it with the counterweight of the tool.



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GENERAL TOLERANCE ISO 2768

LINEAR DIMENSIONS - DIMENSIONS LINÉAIRES mm[INCHES]

TOLERANCES mm[INCHES]	5 - 6	6 - 30	30 - 120	120 - 400	400 - 1000	1000 - 2000	2000 - 4000
±0.1[.004]	±0.2[.008]	±0.3[.012]	±0.5[.020]	±0.8[.031]	±1.2[.047]	±2[.079]

DESCRIPTION

REVISION HISTORY

REV	DESC RIP TION	DATE	Drawn - Dessiné / Visa
00	INITIAL	12/10/2019	RC A
01	ADDED PLUNGER	12/4/2020	RC A
02	ADDED 68mm PLUNGER	3/25/2022	RC A

FINISH Ra	GEOMETRIC TOLERANCES TOLERANCES GÉOMÉTRIQUES			
<3.2	⊥	0.4 [.016]	C JK	
125 √RMS	=	0.6 [.024]	C JK	
	/	0.2 [.079]	C JK	

Checked - Vérifié / Visa

MILTON ROY®

PRIMEROYAL L HPD
DISPLACEMENT CHAMBER ∅166

FORMAT TAILLE	FIRST ANGLE PROJECTION	SHEET - FEUILLE	DO NOT SCALE DRAWING DESSIN SANS ECHELLE
A2		1 / 4	

DRAWING NUMBER - PLAN N° 777000043

REV 02

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3050926411F-X0 PRIMEROYAL L HPD DISPLACEMENT CHAMBER ∅166					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
007	0070055006N	PILOT VALVE	00700550YY	I	EA
021	0210766062N	CHECK VALVEBODY	02107660YY	1	EA
025	0250111099N	SPACER GASKET	0250111XYY	1	EA
025B	0250196075N	BUSH PTFE	02501960YY	1	EA
044	0440115062N	TRIGGER	044011S0YY	1	EA
045	0450104006N	FOOT VALVE CONNECTION	0450104006	1	EA
047	04707820001N	PIPE	04707820YYY	1	EA
047A	0470396073N	FILTERCLOTH/ (DM) D43 EP.1	0470396073	1	EA
068A	0680187006N	PILOT STEM	06801870YY	1	EA
072	0720164001N	DISPLACEMENT CHAMBER	07201640YY	1	EA
072A	0720468001IN	SPACER	07204680YYY	1	EA
080A	0800074006N	SPRING	0800074006	1	EA
0808	0800102006N	SPRING AISI 1074	08001020YY	1	EA
098	0980139006N	CONTOUR PLATE	0980139006	1	EA
431	4310009285N	GROOVED PIN G05 2.5 X 8 316SS	4310009XXY	1	EA
432	4320357062N	CONNECTION 3/8"GAZX D10 OD	4320357XXY	1	EA
432A	4320186022N	MALE ELBOW UNION	SP	1	EA
4328	4320297031N	CONNECTION	4320297XXY	1	EA
432C	4320298030N	FLEXIBLE PIPE TRICOCLAIRAL		50	CM
432D	4320297051N	CONNECTION	4320297XXY	1	EA
432E	4320059241N	REDUCER SERIES 3000	4320059XXY	1	EA
434A	4340005085N	M8 PLAIN FLATWASHER316 A4-70	4340005XXY	2	EA
4348	4340029000N	HOSECLAMP 14-22MM W-8MM 304SS		2	EA
434D	4340009095N	SPRING LOCK WASHER D.12		4	EA
435C	4350035557N	HEX HD SCREW M8 X 40 THREAD 22		2	EA
435D	4350047944N	ECO SHCS M12 X 65 THRD 30	4350047XXY	2	EA
435E	4350035902N	HEX HD SCREW M12 X 45 ECO		4	EA
435H	4340069002N	PLAIN WASHER / 6.4X20X1.5		1	EA
435K	4350122020N	PREVAILING TORQUE HEXAGON NUT	4350122XXY	1	EA
438	4380006405N	O-RING 69.22 X 5.33		2	EA
438D	4380019311N	O-RING 178X3	4380019XXY	1	EA
438E	4380065151N	O-RING 88.SX3.53	4380065XXY	1	EA
438F	4380018061N	O-RING 42.52 X 2.6		1	EA
438H	4380022180N	WASHER 16.7 X 24X1,5	4380022XXY	1	EA
438L	4380019391N	O-RING 164.5 X 3		1	EA

3050990240F-X0 PISTON SLEEVE ASM D40 PL					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
037	0370032006N	PLUNGER CYlINDER	0370032X06	1	EA
068	0680188206N	PLUNGER ROD	0680188XYY	1	EA
012A	0120314062N	PLUNGER HEAD D.40	0120314XYY	1	EA
435	4350123091N	SET SCREW M8 X 8 CUP PT	4350123XXY	2	EA
438G	4380233040N	D.40 PLUNGER RING	4380233XX0	1	EA

3050990260F-X0 PISTON SLEEVE ASM D63 PL					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
037	0370033006N	PLUNGER CYlINDER D63	0370033006	1	EA
068	0680183606N	PLUNGER ROD L=2 10	0680183XYY	1	EA
012A	0120308262N	PLUNGER HEAD D.63	0120308XYY	1	EA
435	4350123171N	SET SCREW M10 X 12 CUP PT	4350123XXY	2	EA
438G	4380233180N	D.63 PLUNGER RING	4380233XX0	1	EA

6.3.7 DISPLACEMENT CHAMBER ASSEMBLY / DISASSEMBLY PL 266 >100 mm Plunger

DRAWING: 777000107

DISASSEMBLY	ASSEMBLY	
	Position	**Torque**
	[435C]	**40 N.m (29.5 ft-lbs)**
	[435E]	**120 N.m (88.5 ft-lbs)**
	[009]	**80 N.m (59.0 ft-lbs)**

Pilot

1. Remove the contour plate [098]. It is advisable to use a hook between the upper section of the pilot and the contour plate.
2. Remove the O-ring [438D] in order to replace it.
3. Remove the pilot [021] using the extractor.
4. Remove the seals [438] (if replacement is needed).

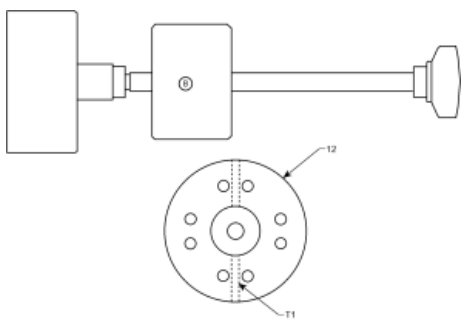
Chamber Assembly

1. Unscrew the plunger mounting screw [009] (liquid end/spacer junction).
2. From inside the spacer, unscrew the four screws [435E] (liquid end/spacer junction), and extract the displacement chamber [072] assembly with the plunger.
3. Remove the seal [025] in order to replace it. If necessary, remove the seal [438G] in order to replace it.

Plunger Head

1. Separate the plunger from the cylinder [037].
2. Replace the seal [438E] and [438F].
3. Unscrew the two screws [435] and separate the plunger head [012A].

Plunger Tool (fig 7.2d)



Plunger head

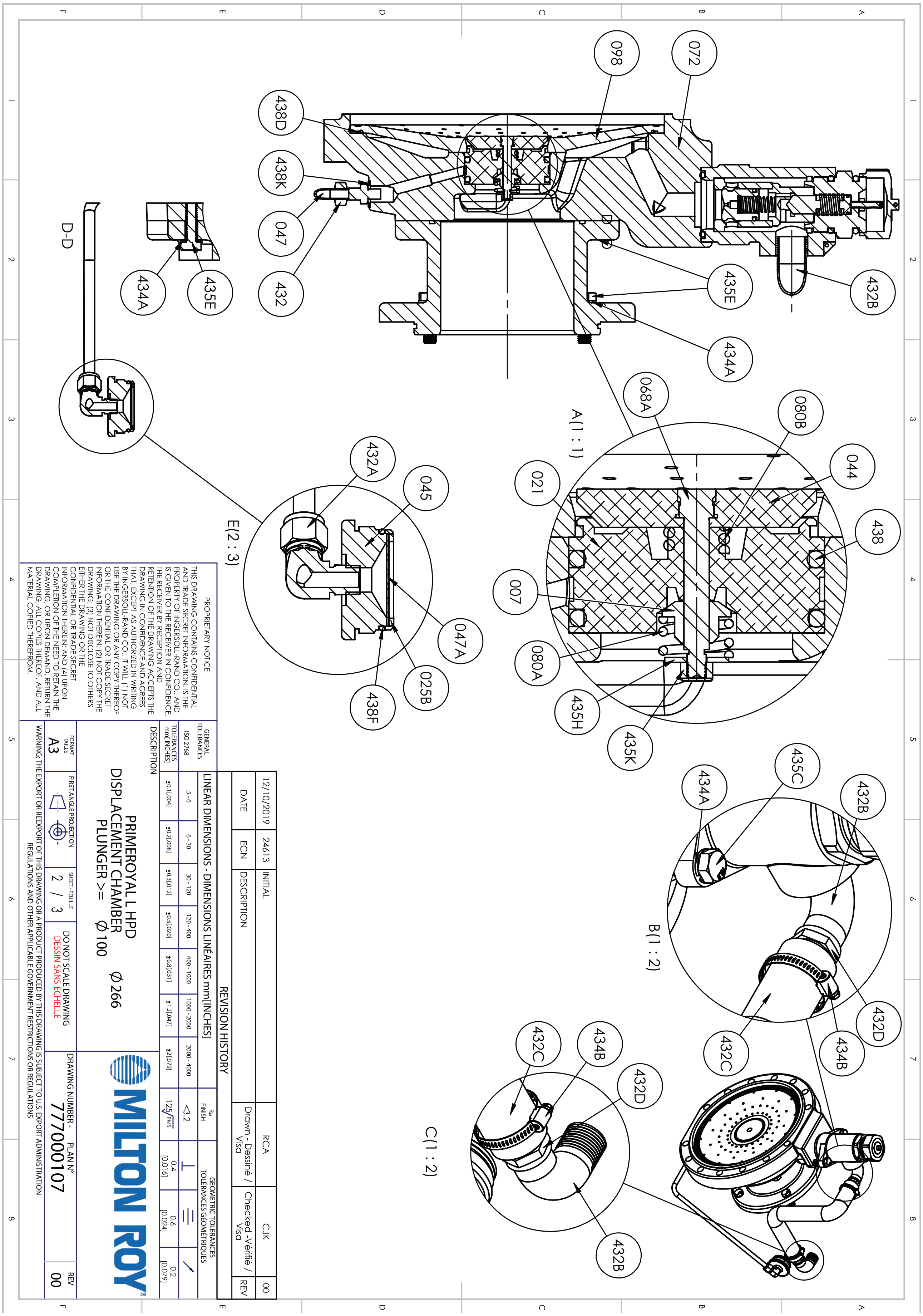
1. Fit the seal [438E] and [438F].
2. Fit the plunger head [012B] on the plunger rod [068].
3. Tighten the screws [435C].

Chamber assembly

1. Where applicable, fit the O-ring [438E] on the cylinder [037] and fit the paper seal [025] on the displacement chamber [072]. Fit the adaptor piece [072A] on the displacement chamber (screws [435E]).
2. Fit the O-ring [S] and paper seal [025A] on the adaptor piece [072A].
3. Position the displacement chamber assembly in the spacer and screw the plunger mounting screw [009] in the crosshead without torqueing.
4. Attach the displacement chamber assembly on the spacer with the screws [435D].
5. Lock the plunger mounting screw [009].

Pilot

1. Where applicable, fit the seals [438] on the pilot [021].
2. Apply hydraulic fluid on the seals and in the pilot recess.
3. Place the pilot in the extractor. Centre the pilot in the displacement chamber [072]. It must, mandatory, be correctly positioned (see Figure 7.2d).
4. Fit the pilot in the displacement chamber by gently striking it with the counterweight of the tool.



072
098
438D
438K
047
432
432B
435E
434A
435E
434A
D-D
A(1 : 1)
068A
080B
044
021
438
007
080A
435H
435K
E(2 : 3)
432A
045
047A
025B
438F
B(1 : 2)
435C
434A
432B
432D
434B
432C
C(1 : 2)
432C
434B
432D
432B
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REVISION HISTORY
DATE
ECN
DESCRIPTION
Drawn - Dessiné / Visa
Checked - Vérifié / Visa
REV
12/10/2019
24613
INITIAL
RCA
CJK
00
LINEAR DIMENSIONS - DIMENSIONS LINÉAIRES mm[INCHES]
GENERAL TOLERANCES
ISO 2768
TOLERANCES mm[INCHES]
.5 - 6
6 - 30
30 - 120
120 - 400
400 - 1000
1000 - 2000
2000 - 4000
±0.1[.004]
±0.2[.008]
±0.3[.012]
±0.5[.020]
±0.8[.031]
±1.2[.047]
±2[.079]
Ra FINISH
<3.2
125 RMS
GEOMETRIC TOLERANCES
TOLERANCES GEOMETRIQUES
0.4 [0.016]
0.6 [0.024]
0.2 [0.079]
DESCRIPTION
PRIMEROYAL L HPD
DISPLACEMENT CHAMBER Ø 266
PLUNGER >= Ø 100
MILTON ROY
FORMAT TAILLE
A3
FIRST ANGLE PROJECTION
SHEET - FEUILLE
2 / 3
DO NOT SCALE DRAWING
DESSIN SANS ECHELLE
DRAWING NUMBER - PLAN N°
777000107
REV
00
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3050926431F-X0 PRIMEROYALL HPD DISPLACEMENT CHAMBER ∅266 PLUNGER>= ∅100					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
007	0070055006N	PILOT VALVE	0070055OYY	1	EA
021	0210766062N	CHECK VALVE BODY	02107660YY	1	EA
025B	0250196075N	BUSH PTFE	02501960YY	1	EA
044	0440115062N	TIRIGGER	04401ISOYY	1	EA
045	0450104006N	FOOT VALVE CONNECTION	0450104006	1	EA
047	04707830001N	PIPE	04707830YYY	1	EA
047A	0470396073N	FILTER CLOTH / (DM) D43 EP.1	0470396073	1	EA
068A	0680187006N	PILOT STEM	06801870YY	1	EA
072	07204750002N	DISPLACEMENT CHAMBER D266	07204750YYY	1	EA
080A	0800074006N	SPRING	0800074006	1	EA
080B	0800102006N	SPRING AISI 1074	08001020YY	1	EA
098	0980137006N	CONTOUR PLATE	0980137006	1	EA
432	4320357062N	CONNECTIION 3/8' GAZ X D10 OD	4320357XXY	1	EA
432A	4320186022N	MALE ELBOW UNION	SP	1	EA
432B	4320324069N	ELBOW 90° MALE-FEM 1" BSPP		2	EA
432C	4320298070N	FLIEXIBLE PIPETRICOCLAIR AL		50	CM
-432D	4320297111N	CONNECTION FLEXIBLIE TUIBING	4320297XXY	2	EA
434A	4340009095N	SPRING LOCK WASHER D.12		10	EA
434B	4340029050N	HOSE CLAMP 25-45MM W-8MM		2	EA
435C	4350126030N	HEX HEAD SCREW M12X60 FULL THR		2	EA
435E	4350038892N	HEX HEAD BOLT M12X40 FULL THRD		8	EA
435H	4340069002N	PLAIN WASHER/ 6.4 X 20 X 1.5		1	EA
435K	4350122020N	PREVAILING TORQUE HEXAGON NUT	4350122XXY	1	EA
438	4380006405N	O-RING 69.22 X 5.33		2	EA
-438D	4380019371N	O-RING 274 X 3	4380019XXY	1	EA
438F	4380018061N	O-RING 42.52 X 2.6		1	EA
438K	4380022180N	WASHER 16,7 X 24 X 1,5	4380022XXY	1	EA

3050990300F-X0 PISTON SLEEVE ASM D115 PL					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
037	03701452011N	PLUNGER LINER	0370145XYYY	1	EA
068	0680183606N	PLUNGER ROD L=210	0680183XYY'	1	EA
012B	0120302762N	PLUNGER HEAD	0120302XYY	1	EA
435	4350123171N	SET SCREW M10X12 CUP PT	4350123XXY	2	EA
438H	4380233310N	PLUNGER RING		1	EA
438L	4380019391N	O RING 164.5 X 3		1	EA
438G	4380065311N	O-RING 139 X 3.53		1	EA

6.3.8 DISPLACEMENT CHAMBER ASSEMBLY / DISASSEMBLY PN 166

DRAWING: 777000042

DISASSEMBLY	ASSEMBLY	
	Position	**Torque**
	[435D]	**60 N.m (44.2 ft-lbs)**
	[435E]	**120 N.m (88.5 ft-lbs)**
	[009]	**60 N.m (44.2 ft-lbs)**
	[435]	**30N.m (22.1 ft-lbs)**

Pilot

1. Remove the contour plate [098]. It is advisable to use a hook between the upper section of the pilot and the contour plate.
2. Remove the O-ring [438D] in order to replace it.
3. Remove the pilot [044,021,068A] using the extractor.
4. Remove the seals [438] if they have to be replaced.

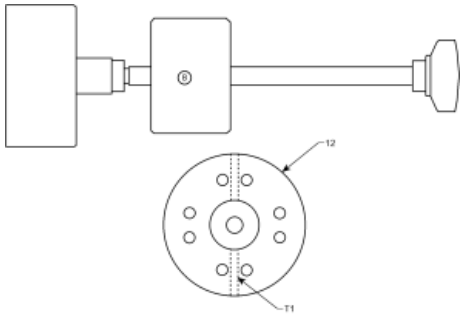
Displacement chamber

1. Unscrew the plunger mounting screws [009] (liquid end/crosshead junction).
2. Unscrew the screws [435D] (liquid end/spacer junction), and extract the displacement chamber assembly with the plunger.

Plunger Head

1. Separate the plunger from the cylinder [037].
2. Unscrew the two screws [435] and separate the plunger head [012A] from the plunger rod [068].

Plunger Tool (fig 7.2d)



Plunger head

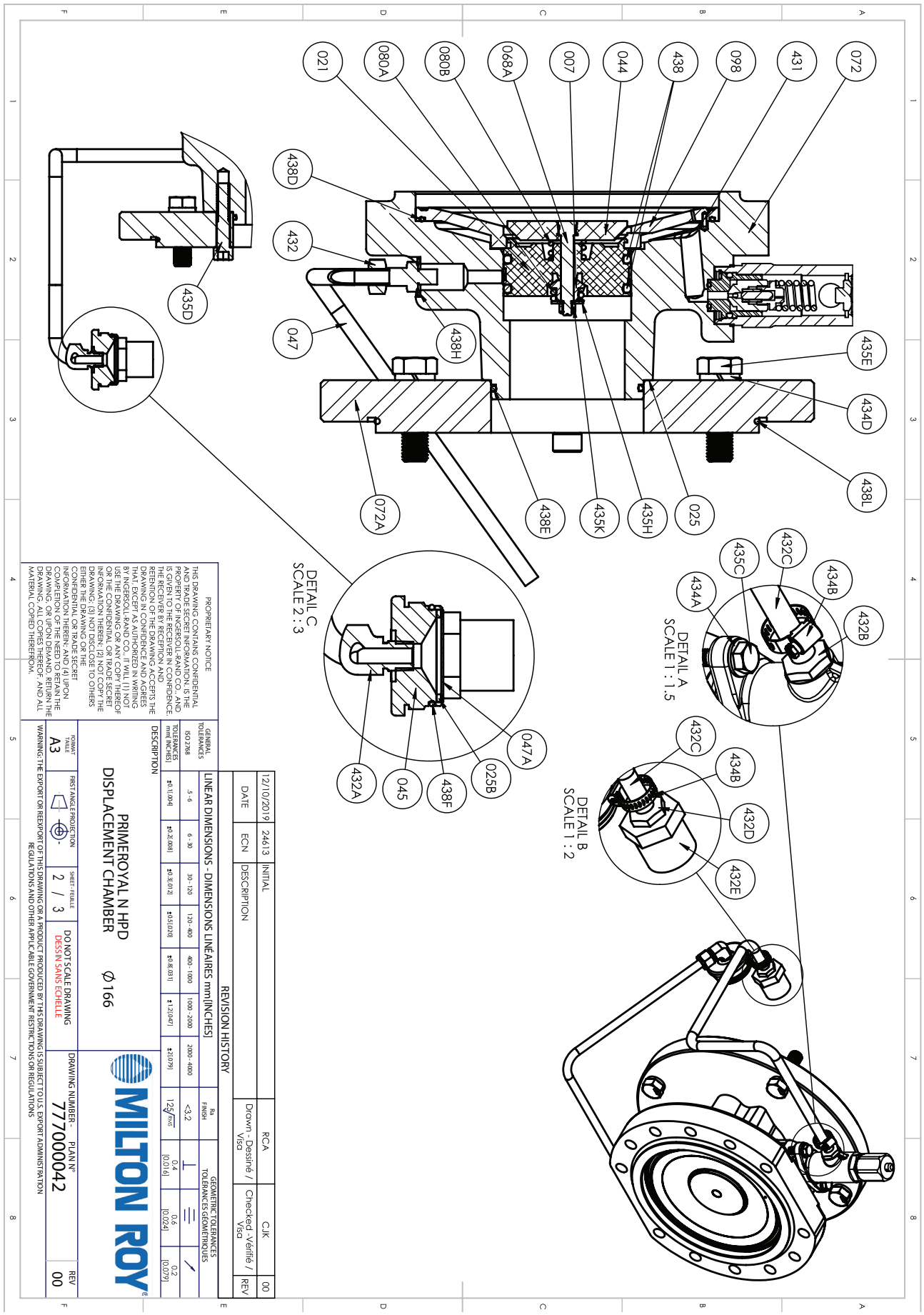
1. Fit the plunger head [012A] on the plunger rod [068] with two screws [435].
2. Engage the plunger in the cylinder [037].

Displacement chamber

1. Fit the adaptor piece [072A] on the displacement chamber. Tighten the screws [435E].
2. Position the displacement chamber assembly in the spacer and screw the plunger mounting screws [009] in the crosshead without torqueing.
3. Attach the displacement chamber on the spacer with the screws [435D].
4. Lock the plunger mounting screw [009].

Pilot

1. Where applicable, fit the seals [438] on the pilot [044,021,068A].
2. Apply hydraulic fluid on the seals and in the pilot recess.
3. Place the pilot in the extractor. Center the pilot in the displacement chamber [072]. It must, mandatory, be correctly positioned (see tooling figure).
4. Fit the pilot in the displacement chamber by gently striking it with the counterweight of the tool.



REVISION HISTORY

DESCRIPTION	ECN	DATE
INITIAL	24613	12/10/2019

	RCA	CJK	
	Drawn - Dessiné / Visa	Checked - Vérifié / Visa	REV
			00

LINEAR DIMENSIONS - DIMENSIONS LINÉAIRES mm[INCHES]

5 - 6	6 - 30	30 - 120	120 - 400	400 - 1000	1000 - 2000	2000 - 4000
±0.1 (.004)	±0.2 (.008)	±0.3 (.012)	±0.5 (.020)	±0.8 (.031)	±1.2 (.047)	±2 (.079)

Ra FINISH: <3.2 ; 125 RMS

GEOMETRIC TOLERANCES TOLÉRANCES GÉOMÉTRIQUES

⊥	0.4 [0.016]	
=	0.6 [0.024]	
⁄	0.2 [0.079]	

GENERAL TOLERANCES ISO 2768

TOLERANCES mm[INCHES]

DESCRIPTION

PRIMEROYAL N HPD
DISPLACEMENT CHAMBER Ø 166

MILTON ROY®

FORMAT / TAILLE: A3

FIRST ANGLE PROJECTION

SHEET - FEUILLE: 2 / 3

DO NOT SCALE DRAWING
DESSIN SANS ECHELLE

DRAWING NUMBER - PLAN N°: 77700042

REV: 00

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3O5092651F-X0 PRIMEROYAL N HPD DISPLACEMENT CHAMBER ∅166					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
007	0070055006N	PILOT VALVE	00700550YY	1	EA
021	0210766062N	CHECK VALVEBODY	02107660YY	1	EA
025	0250111099N	SPACER GASKET	0250111XYY	1	EA
0258	0250196075N	BUSH PTFE	02501960YY	1	EA
044	0440115062N	TRIGGER	04401150YY	1	EA
045	0450104006N	FOOT VALVE CONNECTION	0450104006	1	EA
047	04708110006N	RE-SUPPLY PIPE	0470811XYYY	1	EA
047A	0470396073N	FILTER CLOTH / (DM) D43 EP.1	0470396073	1	EA
068A	0680187006N	PILOT STEM	06801870YY	1	EA
072	0720164001N	DISPLACEMENT CHAMBER	07201640YY	1	EA
072A	07205280011N	FLANGE	07205280YYY	1	EA
080A	0800074006N	SPRING	0800074006	1	EA
0808	0800102006N	SPRING AISI 1074	08001020YY	1	EA
098	0980139006N	CONTOUR PLATE	0980139006	1	EA
431	4310009285N	GROOVED PIN G05 2.5 X 8 316SS	4310009XXY	1	EA
432	4320357062N	CONNECTION 3/8' GAZ X D10 OD	4320357XXY	1	EA
432A	4320186022N	MALE ELBOW UNION	SP	1	EA
4328	4320297031N	CONNECTION	4320297XXY	1	EA
432C	4320298030N	FLEXIBLE PIPE TRICOCLAIR AL		50	CM
432D	4320297051N	CONNECTION	4320297XXY	1	EA
432E	4320059241N	REDUCER SERIES 3000	4320059XXY	1	EA
434A	4340005085N	M8 PLAIN FLAT WASHER 316 A4-70	4340005XXY	2	EA
4348	4340029000N	HOSE CLAMP 14-22MM W-8MM 304SS		2	EA
434D	4340009112N	ECO SPRING LOCKWASHER D.16		4	EA
435C	4350035557N	HEX HD SCREW M8 X 40 THREAD 22		2	EA
435D	4350047932N	SHCSM 12 X 60 THRD 30		2	EA
435E	57101	ECO HX HD M 16X55 DIN 933		4	EA
435H	4340069002N	PLAIN WASHER / 6.4X20X1.5		1	EA
435K	4350122020N	PREVAILING TORQUE HEXAGON NUT	4350122XXY	1	EA
438	4380006405N	O-RING 69.22 X 5.33		2	EA
438D	438001931IN	O-RING 178 X 3	4380019XXY	1	EA
438E	4380065151N	O-RING 88.5 X 3.53	4380065XXY	1	EA
438F	4380018061N	O-RING 42.52 X 2.6		1	EA
438H	4380022180N	WASHER 16,7 X 24 X 1.5	4380022XXY	1	EA
438L	4380065481N	O-RING 234.54 X 3.53		1	EA

3051221020F-X0 PISTON SLEEVE ASM D40 PN					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
037	0370036206N	PLUNGER CYLINDER D.40	0370036XYY	1	EA
068	0680188506N	PLUNGER ROD LG 180	0680188XYY	1	EA
012A	0120314162N	PLUNGER HEAD D.40	0120314XYY	1	EA
435	4350123091N	SET SCREW M8 X 8 CUP PT	4350123XXY	2	EA
438G	4380233040N	D.40 PLUNGER RING	4380233XX0	1	EA

3051221000F-X0 PISTON SLEEVE ASM PN D50					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
037	0370036306N	PLUNGER CYLINDER D.50	0370036XYY	1	EA
068	0680183106N	PLUNGER ROD L=185	0680183XYY	1	EA
012A	0120308162N	PLUNGER HEAD D.50	0120308XYY	1	EA
435	4350123171N	SET SCREW M10 X 12 CUP PT	4350123XXY	2	EA
438G	4380233100N	D.50 PLUNGER RING	4380233XX0	1	EA

3051221000F-X0 PISTON SLEEVE ASM PN D50					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
037	0370036406N	PLUNGER CYLINDER D.55	0370036XYY	1	EA
068	0680183106N	PLUNGER ROD L=185	0680183XYY	1	EA
012A	0120308062N	PLUNGER HEAD D.55	0120308XYY	1	EA
435	4350123171N	SET SCREW M10 X 12 CUP PT	4350123XXY	2	EA
438G	4380233120N	D.55 PLUNGER RING	4380233XX0	1	EA

6.3.9 DISPLACEMENT CHAMBER ASSEMBLY / DISASSEMBLY PN 266

DRAWING: 777000050

DISASSEMBLY	ASSEMBLY	
	Position	**Torque**
	[435D]	**80 N.m (59.0 ft-lbs)**
	[435E]	**120 N.m (88.5 ft-lbs)**
	[009]	**80 N.m (59.0 ft-lbs)**
	[435]	**30N.m (22.1 ft-lbs)**

Pilot

1. Remove the contour plate [098]. It is advisable to use a hook between the upper section of the pilot and the contour plate.
2. Remove the O-ring [438D] in order to replace it.
3. Remove the pilot [021] using the extractor.
4. Remove the seals [438] if they have to be replaced.

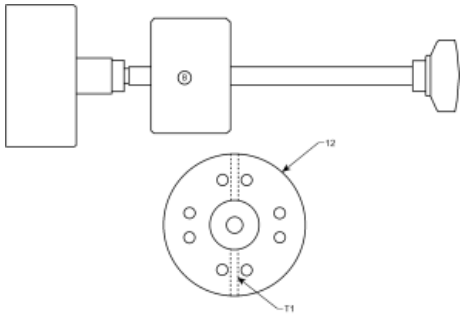
Chamber assembly

1. Unscrew the plunger mounting screw [009] (liquid end / cross head junction).
2. From inside the spacer, unscrew the screws [435D] (liquid end/spacer junction), and extract the displacement chamber assembly with the plunger.
3. If required, remove the O-ring [438E] in order to replace it. Remove the paper seal [025] in order to replace it.
4. If necessary, remove the screws attaching the adaptor piece [072A] on the displacement chamber [072] to replace the O-ring [438L].

Plunger Head

1. Separate the plunger from the cylinder [037].
2. Unscrew the two screws [435] and separate the plunger head [012B] from the plunger rod [068].

Plunger Tool (fig 7.2d)



Plunger head

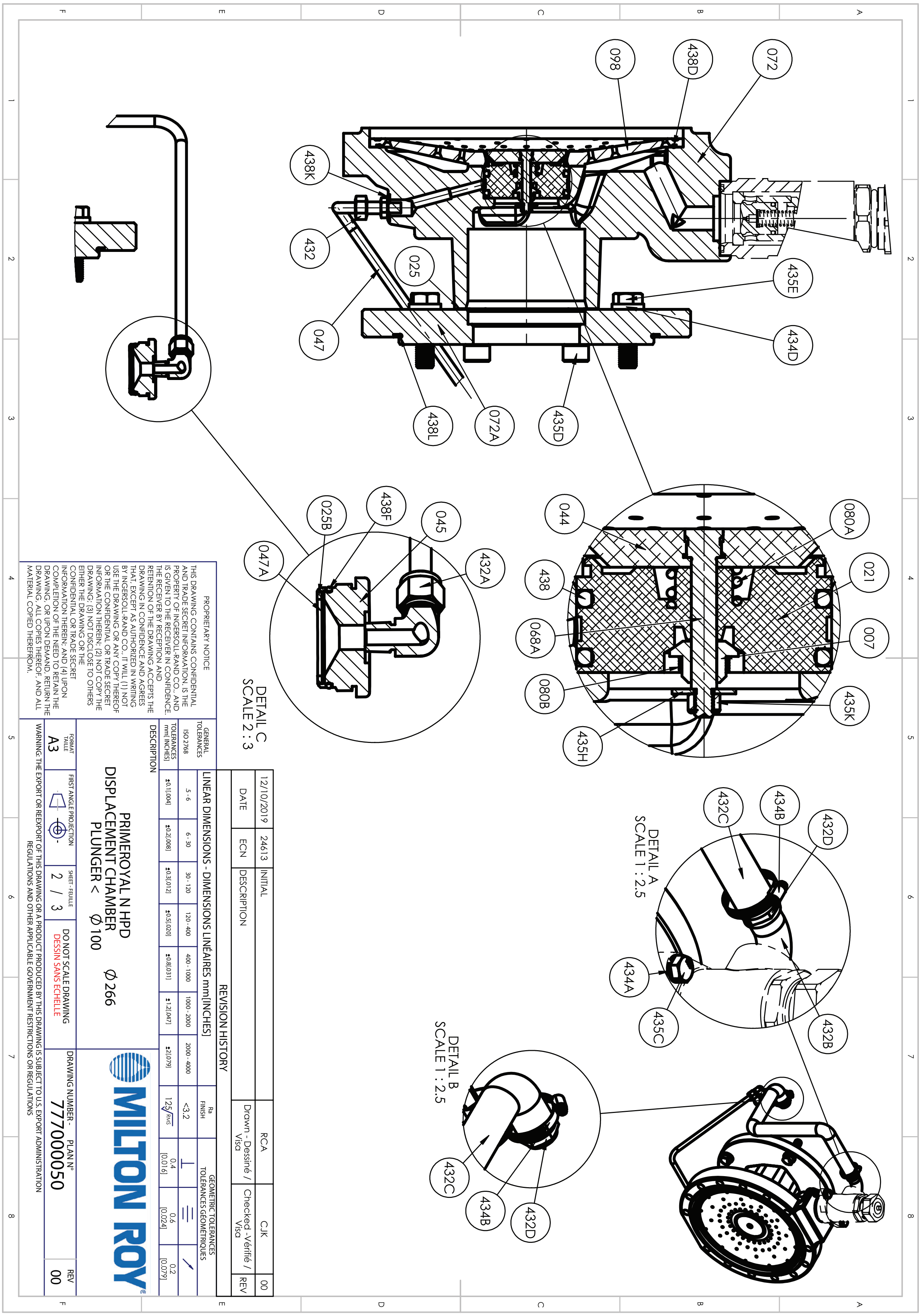
1. Fit the plunger head [012B] on the plunger rod [068] with two screws [435].
2. Engage the plunger in the cylinder [037]

Chamber assembly

1. Fit the paper seal [025] on the displacement chamber [072]. Fit the adaptor piece [072A] on the displacement chamber (screws [435D])
2. Fit the O-ring [438L] on the adaptor piece [072A].
3. Position the displacement chamber assembly in the spacer and screw the plunger mounting screw [009] in the crosshead without torquing.
4. Attach the displacement chamber assembly on the spacer with the screws [435E]
5. Lock the plunger mounting screw [009]

Pilot

1. Where applicable, fit the seals [438] on the pilot [021].
2. Apply hydraulic fluid on the seals and in the pilot recess.
3. Place the pilot in the extractor. Centre the pilot in the displacement chamber [072]. It must, mandatory, be correctly positioned (see Figure 7.2d).
4. Fit the pilot in the displacement chamber by gently striking it with the counterweight of the tool.


098
438D
072
438K
432
025
047
435E
434D
438L
072A
435D
044
080A
021
438
068A
007
080B
435K
435H
025B
438F
045
047A
432A
DETAIL C
SCALE 2 : 3
432C
434B
432D
DETAIL A
SCALE 1 : 2.5
434A
435C
432B
DETAIL B
SCALE 1 : 2.5
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12/10/2019 24613 INITIAL 00
DATE ECN DESCRIPTION REV
REVISION HISTORY
RCA CJK
Drawn - Dessiné / Visa Checked - Vérifié / Visa
GENERAL TOLERANCES ISO 2768
LINEAR DIMENSIONS - DIMENSIONS LINÉAIRES mm[INCHES]
TOLERANCES mm[INCHES]
.5 - 6 | 6 - 30 | 30 - 120 | 120 - 400 | 400 - 1000 | 1000 - 2000 | 2000 - 4000
±0.1[.004] | ±0.2[.008] | ±0.3[.012] | ±0.5[.020] | ±0.8[.031] | ±1.2[.047] | ±2[.079]
Ra FINISH <3.2 125 RMS
GEOMETRIC TOLERANCES TOLERANCES GÉOMÉTRIQUES
0.4 [0.016] 0.6 [0.024] 0.2 [0.079]
DESCRIPTION
PRIMEROYAL N HPD
DISPLACEMENT CHAMBER Ø 266
PLUNGER < Ø 100
MILTON ROY
FORMAT TAILLE A3
FIRST ANGLE PROJECTION
SHEET - FEUILLE 2 / 3
DO NOT SCALE DRAWING
DESSIN SANS ECHELLE
DRAWING NUMBER - PLAN N°
777000050
REV 00
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3050926411F-X0 PRIMEROYAL N HPD DISPLACEMENT CHAMBER ∅166					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
007	0070055006N	PILOT VALVE	00700550YY	1	EA
021	0210766062N	CHECK VALVEBODY	02107660YY	1	EA
025	0250111099N	O'RING	0250123099	1	EA
0258	0250196075N	BUSH PTFE	02501960YY	1	EA
044	0440115062N	TRIGGER	04401150YY	1	EA
045	0450104006N	FOOT VALVE CONNECTION	0450104006	1	EA
047	04708060001N	RE-SUPPLY PIPE	04708060YYY	1	EA
047A	0470396073N	FILTER CLOTH/ (DM) D43 EP.1	0470396073	1	EA
068A	0680187006N	PILOT STEM	06801870YY	1	EA
072	0720164001N	DISPLACEMENT CHAMBER	07201620YY	1	EA
072A	07205250011N	266 ADAPTOR HP	0720525XYYY	1	EA
080A	0800074006N	SPRING	0800074006	1	EA
080B	0800102006N	SPRING AISI 1074	08001020YY	1	EA
098	0980137006N	CONTOUR PLATE	0980137006	1	EA
432	4320357062N	CONNECTION 3/8" GAZ X D10 OD	4320357XXY	1	EA
432A	4320186022N	MALE ELBOW UNION	SP	1	EA
432B	4320324069N	ELBOW 90° MALE-FEM 1" BSPP		1	EA
432C	4320298070N	FLEXIBLE PIPE TRICOCLAIR AL		50	CM
432D	4320297111N	CONNECTION FLEXIBLE TUBING	4320297XXY	2	EA
434A	4340009095N	SPRING LOCKWASHER D.12		2	EA
434B	4340029050N	HOSE CLAMP 25-45MM W-8MM		2	EA
434D	4340009116N	ECO SPRING LOCKWASHER D.16		4	EA
435C	4350126030N	HEX HEAD SCREW M12 X 60 FULL THR		2	EA
435D	4350048342N	SHCSM16 X 60 THRD 38	4350048XXY	4	EA
435E	57102	ECOGUARD HCS M16 X 60 DIN 933		4	EA
435H	4340069002N	PLAIN WASHER/ 6.4 X 20 X 1.5		1	EA
435K	4350122020N	PREVAILING TORQUE HEXAGON NUT	4350122XXY	1	EA
438	4380006405N	O-RING 69.22 X 5.33		2	EA
438D	4380019371N	O-RING 27 4X3	4380019XXY	1	EA
438F	4380018061N	O-RING 42.52 X 2.6		1	EA
438K	4380022180N	WASHER 16,7 X 24 X 1.5	4380022XXY	1	EA
438L	4380065481N	O-RING 234.54 X 3.53		1	EA

30504353301-X0 PISTON SLEEVE ASM D63					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
037	0370029006N	PLUNGER CYLINDER	0370029XYY	1	EA
068	0680183206N	PLUNGER ROD L=220	0680183XYY	1	EA
012A	0120308262N	PLUNGER HEAD D.63	0120308XYY	1	EA
435	4350123171N	SET SCREW M10X12 CUP PT	4350123XXY	2	EA
438G	4380233180N	D.63 PLUNGER RING	4380233XX0	1	EA
438E	4380065201N	O-RING 104.37 X 3.53	4380065XXY	2	EA

30504353320F-X0 PISTON SLEEVE ASM D80					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
037	0370029306N	CHEMISE PISTON D.80	0370029XYY	1	EA
068	0680183006N	PLUNGER ROD	0680183XYY	1	EA
012A	0120302262N	PLUNGER HEAD D.80	0120302XYY	1	EA
435	4350123171N	SET SCREW M10X12 CUP PT	4350123XXY	2	EA
438G	4380233260N	PLUNGER RING D.80	4380233XX0	1	EA
438E	4380065201N	O-RING 104.37 X 3.53	4380065XXY	2	EA

30S0435310F-X0 PISTON SLEEVE ASM D90					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
037	0370028006N	PLUNGER CYLINDER	0370028006	1	EA
068	0680183006N	PLUNGER ROD	0680183XYY	1	EA
012A	0120302162N	PLUNGER HEAD D.90	0120302XYY	1	EA
435	4350123171N	SET SCREW M10X12 CUP PT	4350123XXY	2	EA
438G	4380233240N	PLUNGER RING D.90	4380233XX0	1	EA
438E	4380065201N	O-RING 104.37 X 3.53	4380065XXY	2	EA

3050435300F-X0 PLUNGER SLEEVE ASM D100 PN					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
037	03701620011N	LINER DIA 100 HPD266	03701620YYY	1	EA
068	0680183006N	PLUNGER ROD	0680183XYY	1	EA
012A	0120302062N	PLUNGER HEAD D.100	0120302XYY	1	EA
435	4350123171N	SET SCREW M10 X 12 CUP PT	4350123XXY	2	EA
438G	4380233230N	D.100 PLUNGER RING	4380233XX0	1	EA
438E	4380017082N	O-RING 105 X 2.5	4380017XXY	1	EA

6.3.10 DISPLACEMENT CHAMBER ASSEMBLY / DISASSEMBLY PN 366

DRAWING: 777000048

DISASSEMBLY

Preliminary operation:
To disconnect the pipe [432C] of the valve and the tube [047] of the displacement chamber

Pilot

1. Remove the contour plate [098]. It is advisable to use a hook between the upper section of the pilot and the contour plate.
2. Remove the O-ring [438D] in order to replace it.
3. Remove the pilot [021] using the pilot extractor tool.
4. Remove the seals [438D] if they have to be replaced.

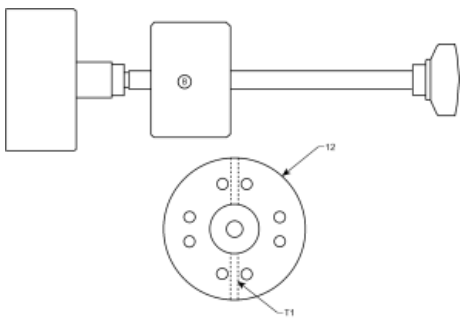
Chamber assembly

1. Unscrew the plunger mounting screw [009] (Plunger / Crosshead junction).
2. From inside the spacer, unscrew the screws [435E] (displacement chamber / spacer junction), and extract the displacement chamber assembly with the plunger.
3. If required, remove the O-ring [438G] in order to replace it. Remove the paper seal [025] in order to replace it.
4. If necessary, remove the screws attaching the adaptor piece [072A] on the displacement chamber [072] to replace the O-ring [438L].

Plunger Head

1. Separate the plunger from the cylinder [037].
2. Unscrew the two screws [435C] and separate the plunger head [012B] from the plunger rod [068A].

Plunger Tool (fig 7.2d)



ASSEMBLY

Position	Torque
[435E]	120 N.m (88.5 ft-lbs)
[009]	80 N.m (59.0 ft-lbs)

Plunger head

1. Fit the plunger head [012A] on the plunger rod [068A] with two screws [435C]. Tighten to a torque of 30 N.m.
2. Engage the plunger in the cylinder [037].

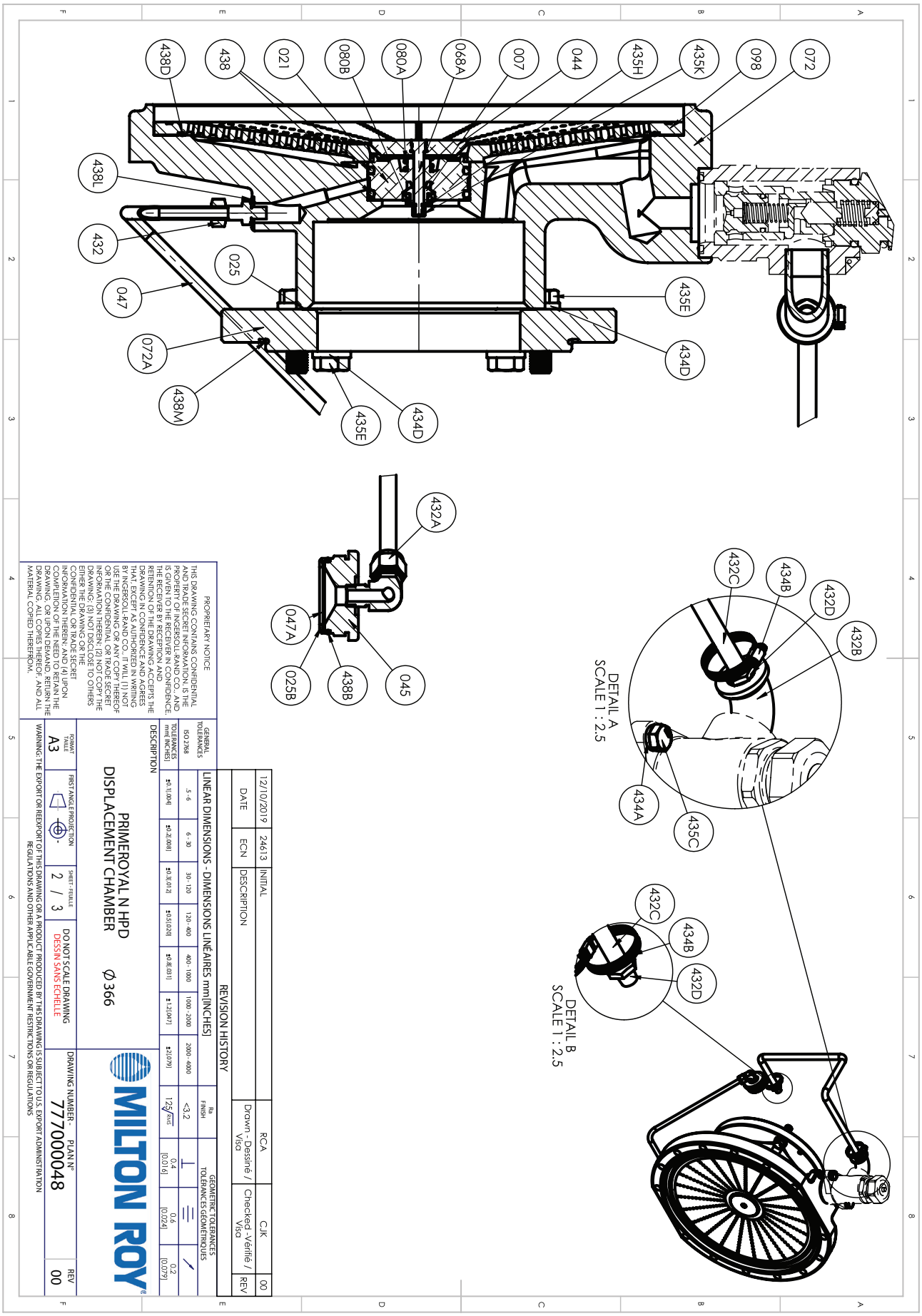
Chamber assembly

1. Fit the O-ring [438G] on the plunger in the cylinder [037]. Fit the adaptor piece [072A] on the displacement chamber (screws [435E], torque 80 N.m).
2. Fit paper seal [025] and the O-ring [438L] on the adaptor piece [072A].
3. Position the displacement chamber assembly in the spacer and screw the screws [435E] the plunger mounting screw [009] in the crosshead without torqueing.
4. Attach the displacement chamber assembly on the spacer with the screws [435E] (torque 120 N.m)
5. Lock the plunger mounting screw [009].
6. Lock the the screws [435E].

Pilot

1. Where applicable, fit the seals [438] on the pilot [021].
2. Apply hydraulic fluid on the seals [438] and in the pilot recess [072].
3. Place the pilot in the extractor. Centre the pilot in the displacement chamber [072]. It must, mandatory, be correctly positioned (see Figure 7.2d).
4. Fit the pilot in the displacement chamber by gently striking it with the counterweight of the tool (mechanical stop).

To Connect the pipe [432C] of the valve and the tube [047] of the displacement chamber.



REVISION HISTORY				
DESCRIPTION	ECN	DATE	RCA Drawn - Dessiné / Visa	CJK Checked - Vérifié / Visa
INITIAL	24613	12/10/2019		00
				REV

LINEAR DIMENSIONS - DIMENSIONS LINÉAIRES mm[INCHES]								GEOMETRIC TOLERANCES TOLÉRANCES GÉOMÉTRIQUES	
GENERAL TOLERANCES ISO 2768	5 - 6	6 - 30	30 - 120	120 - 400	400 - 1000	1000 - 2000	2000 - 4000	Ra FINISH	
TOLERANCES mm[INCHES]	±0.1[.004]	±0.2[.008]	±0.3[.012]	±0.5[.020]	±0.8[.031]	±1.2[.047]	±2[.079]	<3.2	125 RMS
DESCRIPTION								0.4 [0.016]	0.6 [0.024]
									0.2 [0.079]

PRIMEROYAL N HPD
DISPLACEMENT CHAMBER Ø 366

MILTON ROY®

FORMAT TAILLE	FIRST ANGLE PROJECTION	SHEET - FEUILLE	DO NOT SCALE DRAWING DESSIN SANS ECHELLE	DRAWING NUMBER - PLAN N°	REV
A3		2 / 3		77700048	00

3050926611 F-X0 PRIMEROYAL N HPD DISPLACEMENT CHAMBER ∅366					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
007	0070055006N	PILOT VALVE	00700550YY	1	EA
021	0210766062N	CHECK VALVEBODY	02107660YY	1	EA
025	0250108099N	GASKET	02501080YY	1	EA
025B	0250196075N	BUSH PTFE	02501960YY	1	EA
044	0440115062N	TRIGGER	04401150YY	1	EA
045	0450104006N	FOOT VALVE CONNECTION	0450104006	1	EA
047	04708050001N	RE-SUPPLY PIPE	04708050YYY	1	EA
047A	0470396073N	FILTER CLOTH / (DM) D43 EP.I	0470396073	1	EA
068A	0680187006N	PILOT STEM	06801870YY	1	EA
072	0720161001N	DISPLACEMENT CHAMBER	07201610YY	1	EA
072A	07205170011N	LIQUID END PLATE 168/366	07205170YYY	1	EA
080A	0800074006N	SPRING	0800074006	1	EA
080B	0800102006N	SPRING AISI 1074	08001020YY	1	EA
098	0980136006N	CONTOUR PLATE	0980136006	1	EA
432	4320357062N	CONNECTION 3/8"GAZXD10 OD	4320357XXY	1	EA
432A	4320186022N	MALE ELBOW UNION	SP	1	EA
432B	4320324069N	ELBOW 90° MALE-FEM I" BSPP		1	EA
432C	4320298070N	FLEXIBLE PIPE TRICOCLAIR AL		50	CM
432D	4320297111N	CONNECTION FLEXIBLE TUBING	4320297XXY	2	EA
434A	434000909SN	SPRING LOCK WASHER D.12		2	EA
434B	4340029050N	HOSE CLAMP 25-45MM W-8MM		2	EA
434D	4340009116N	ECO SPRING LOCK WASHERD.16		8	EA
435C	4350126030N	HEX HEAD SCREW M12X60 FULL THR		2	EA
435E	57101	ECO HX HD M16X55 DIN 933		8	EA
435H	4340069002N	PLAIN WASHER/ 6.4X20X1.5		1	EA
435K	4350122020N	PREVAILING TORQUE HEXAGON NUT	4350122XXY	1	EA
438	4380006405N	O-RING 69.22 X 5.33		2	EA
438B	4380018061N	O-RING 42.52 X 2.6		1	EA
438D	4380019381N	O-RING 370 X 3	4380019XXY	1	EA
438L	4380022180N	WASHER 16.7 X 24 X 1,5	4380022XXY	1	EA
438M	4380065481N	O-RING 234.54 X 3.53		1	EA

3050435300F-X0 PLUNGER SLEEVE ASM D100 PN					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
012A	01203575071N	PLUNGER DIA 125	0120357XYYY	1	EA
037	0370027006N	PLUNGER CYLINDER	0370027006	1	EA
068	0680183106N	PLUNGER ROD L = 185	0680183XYY	1	EA
435	4350123171N	SET SCREW M10X12 CUP PT	4350123XXY	3	EA
438G	4380065361N	O-RING 158.35 X 3.53	4380065XXY	2	EA
438E	43802537000N	PLUNGER RING D 125 TYPE 8		2	EA
438F	43802547000N	PLUNGER STRIP D 125 20X2 CHRMEX		1	EA

3050990810F-XO PISTON SLEEVE ASM D145					
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**	**UM**
009	0090006006N	PLUNGER HOOKING SCREW	00900060YY	1	EA
012A	01203576071N	PLUNGER DIA 145	0120357XYYY	1	EA
037	0370026006N	PLUNGER CYLINDER	0370027006	1	EA
068	0680183106N	PLUNGER ROD L = 185	0680183XYY	1	EA
435	4350123171N	SET SCREW M10X12 CUP PT	4350123XXY	3	EA
438G	4380065361N	O-RING 158.35 X 3.53	4380065XXY	2	EA
438E	43802575000N	PLUNGER STRIP D 145		2	EA
438F	43802581000N	PLUNGER RING ON 145 TYPE		1	EA

6.4.1 SAFETY VALVE ASSEMBLY / DISASSEMBLY

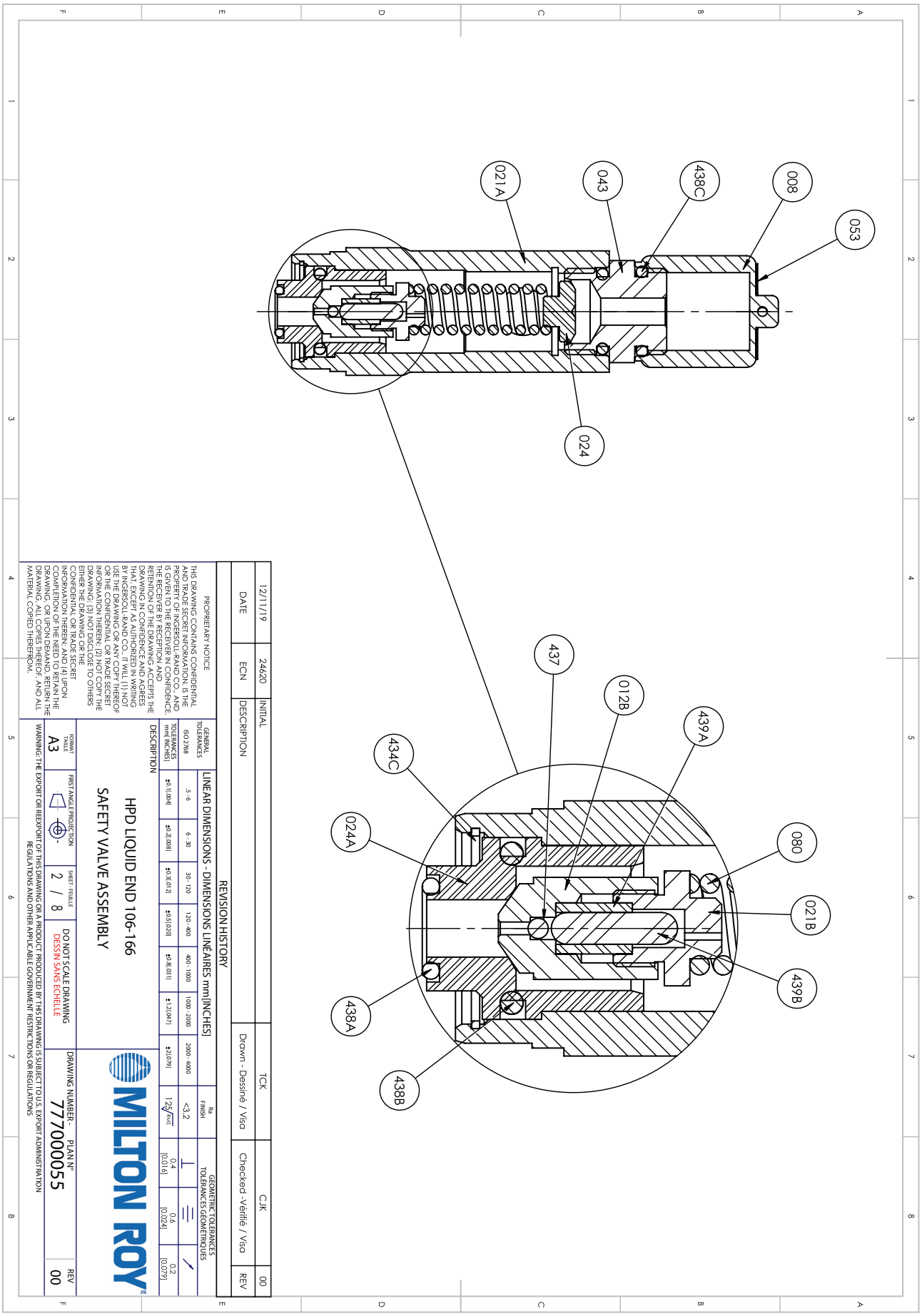
DRAWING: 777000055

DISASSEMBLY	ASSEMBLY	
	Position	**Torque**
	PK [435C]	**20 N.m (14.7 ft-lbs)**
	PL [435C]	**40 N.m (29.5 ft-lbs)**
	PN [435C]	**40 N.m (29.5 ft-lbs)**
1. Unscrew the two screws to remove the safety valve 2. Remove the seal [438A] in order to replace it in	1. Place the seal [438A] in the recess on the displacement chamber 2. Fit the safety valve with two screws [435C] (See Displacement Chambers)	

CLEANING THE AIR BLEED BUILT INTO THE SAFETY VALVE

⚠ CAUTION **DO NOT CARRY OUT THIS OPERATION UNLESS PARTICLES HAVE BLOCKED THE AIR BLEED IMPEDING ITS OPERATION**

1. Unscrew the screws to remove the safety valve.
2. Remove the lead seal on the safety valve.
3. Unscrew the cap [008].
4. Mark the position of the screw [435B] with respect to the valve plug [043].
5. Unscrew the nut [435A] and remove the screws [435B].
6. Remove the valve plug [043] (equipped with O-Rings [438C])
7. Remove the spring seat [024], spring [080] and the components of the bleed (bleed body [021B], needles [439B], ball [437], guide bushing [439A] and valve closure element [012B]).
8. Proceed with the cleaning of the component parts for the bleed.
9. Reinstall the component parts of the bleed in the valve body [021A].
10. Reinstall the spring [080], spring seat [024], and valve plug [043]
11. Install the screw [435B] in accordance with the measurement taken during dismantling.
12. Screw on the nut [435A], fixing the screw [435B]. Screw on the cap [008].
13. If necessary, replace the seal [438A and fit the safety valve with the two screws (torque 40 N.m.).



REVISION HISTORY			
DESCRIPTION	ECN	DATE	INITIAL
	24620	12/11/19	

REV	CJK	TCK
00	Checked - Vérifié / Visa	Drawn - Dessiné / Visa

LINEAR DIMENSIONS - DIMENSIONS LINÉAIRES mm[INCHES]

GENERAL TOLERANCES ISO 2768	0.5 - 6	6 - 30	30 - 120	120 - 400	400 - 1000	1000 - 2000	2000 - 4000
TOLERANCES mm[INCHES]	±0.1[.004]	±0.2[.008]	±0.3[.012]	±0.5[.020]	±0.8[.031]	±1.2[.047]	±2[.079]

GEOMETRIC TOLERANCES TOLÉRANCES GÉOMÉTRIQUES			
0.2 [0.079]	0.6 [0.024]	0.4 [0.016]	

Ra FINISH: <3.2 | 125 RMS

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DESCRIPTION

HPD LIQUID END 106-166

SAFETY VALVE ASSEMBLY

MILTON ROY

FORMAT TAILLE	FIRST ANGLE PROJECTION	SHEET - FEUILLE	DO NOT SCALE DRAWING	DRAWING NUMBER - PLAN N°	REV
A3		2 / 8	DESSIN SANS ECHELLE	777000055	00

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3060023521F-X0 PrimeRoyal Safety Relief Valve (106/166:0-72)				
Bubble#	**Part#**	**Description**	**Drawing#**	**Qty**
008	0080068006N	RELIEF VALVE CAP	0080068006	I
012B	0120313006N	RELIEF VALVE POPPET	01203130YY	I
021A	0210768001N	RELIEF VALVE BODY	02107680YY	1
021B	0210767006N	DRAIN BODY	02107670YY	1
024	0240181062N	SPRING SEAT	02401810YY	1
024A	0240182352N	SEAT D.9	0240182XYY	1
043	0430061006N	RELIEF SET PLUG	04300610YY	1
053	05302276025N	NAME PLATE	0530227XYYY	1
080	0800157006N	SPRING STEINEL SZ8010.20X51 GREEN COLOR		1
434C	4340020301N	CIRCLIPS	4340020XX1	1
435A	4350000062N	ECO HEX NUT M10		1
435B	4350068312N	SHCS M10 X 45	4350068XXY	1
437	4070014036N	BALLD 3.175		1
438A	4380006111N	O-RING 10.5 X 2.7 (R9)		1
438B	4380006181N	O-RING 19.8 X 3.6 (R16)		2
438C	4380006191N	O-RING 21.3 X 3.6 (R17)		1
439A	4390020001N	NEEDLE 5X19.8 CLASS G2		1
439B	4390036000N	GUIDE BUSH 5 X 8 - LENGHT = 12		1

3060023521 F-X0 Prime Royal Safety Relief Valve (106/166: 42-72)				
Bubble#	**Part#**	**Description**	**Drawing#**	**Qty**
008	0080068006N	RELIEF VALVE CAP	0080068006	I
012B	0120313006N	RELIEF VALVE POPPET	01203130YY	I
021A	0210768001N	RELIEF VALVE BODY	02107680YY	1
021B	0210767006N	DRAIN BODY	02107670YY	1
024	0240181062N	SPRING SEAT	02401810YY	1
024A	0240182352N	SEAT D.9	0240182XYY	1
043	0430061006N	RELIEF SET PLUG	04300610YY	1
053	05302276025N	NAME PLATE	0530227XYYY	1
080	0800157006N	SPRING STEINEL SZ8010.20X51 BLUE COLOR		1
434C	4340020301N	CIRCLIPS	4340020XX1	1
435A	4350000062N	ECO HEX NUT M10		1
435B	4350068312N	SHCS M10 X 45	4350068XXY	1
437	4070014036N	BALLD 3.175		1
438A	4380006111N	O-RING 10.5 X 2.7 (R9)		1
438B	4380006181N	O-RING 19.8 X 3.6 (R16)		2
438C	4380006191N	O-RING 21.3 X 3.6 (R17)		1
439A	4390020001N	NEEDLE 5 X 19.8 CLASS G2		1
439B	4390036000N	GUIDE BUSH 5 X 8 - LENGHT = 12		1

3060023531F-X0 PrimeRoyal Safety Relief Valve (106/ 1 66: 72-162)				
Bubble#	**Part#**	**Description**	**Drawing#**	**Qty**
008	0080068006N	RELIEF VALVE CAP	0080068006	I
012B	0120313006N	RELIEF VALVE POPPET	01203130YY	I
021A	0210768001N	RELIEF VALVE BODY	02107680YY	1
021B	0210767006N	DRAIN BODY	02107670YY	1
024	0240181062N	SPRING SEAT	02401810YY	1
024A	0240182352N	SEAT D.9	0240182XYY	1
043	0430061006N	RELIEF SET PLUG	04300610YY	1
053	05302276025N	NAME PLATE	0530227XYYY	1
080	0800157006N	SPRING STEINEL SZ8010.20X51 RED COLOR		1
434C	4340020301N	CIRCLIPS	4340020XX1	1
435A	4350000062N	ECO HEX NUT M10		1
435B	4350068312N	SHCS M10 X 45	4350068XXY	1
437	4070014036N	BALLD 3.175		1
438A	4380006111N	O-RING 10.5 X 2.7 (R9)		1
438B	4380006181N	O-RING 19.8 X 3.6 (R16)		2
438C	4380006191N	O-RING 21.3 X 3.6 (R17)		1
439A	4390020001N	NEEDLE 5 X 19.8 CLASS G2		1
439B	4390036000N	GUIDE BUSH 5 X 8 - LENGHT = 12		1

3060023551F-X0 PrimeRoyal Safety Relief Valve (106/1 66: 221-366)				
Bubble#	**Part#**	**Description**	**Drawing#**	**Qty**
008	0080068006N	RELIEF VALVE CAP	0080068006	I
012B	0120313006N	RELIEF VALVE POPPET	01203130YY	I
021A	0210768001N	RELIEF VALVE BODY	02107680YY	1
021B	0210767006N	DRAIN BODY	02107670YY	1
024	0240181062N	SPRING SEAT	02401810YY	1
024A	0240182352N	SEAT D.9	0240182XYY	1
043	0430061006N	RELIEF SET PLUG	04300610YY	1
053	05302276025N	NAME PLATE	0530227XYYY	1
080	0800159006N	SPRING STEINEL SZ8010.20 X 51 YELLOW COLOR		1
434C	4340020301N	CIRCLIPS	4340020XX1	1
435A	4350000062N	ECO HEX NUT M10		1
435B	4350068312N	SHCS M10 X 45	4350068XXY	1
437	4070014036N	BALLD 3.175		1
438A	4380006111N	O-RING 10.5 X 2.7 (R9)		1
438B	4380006181N	O-RING 19.8 X 3.6 (R16)		2
438C	4380006191N	O-RING 21.3 X 3.6 (R17)		1
439A	4390020001N	NEEDLE 5 X 19.8 CLASS G2		1
439B	4390036000N	GUIDE BUSH 5 X 8 - LENGHT = 12		1

3060023561F-X0 PrimeRoyal Safety Relief Valve (106/1 66: 366-590)				
Bubble#	**Part#**	**Description**	**Drawing#**	**Qty**
008	0080068006N	RELIEF VALVE CAP	0080068006	l
012B	01203740193N	RELIEF VALVE POPPET	01203130YY	l
021A	11 99959729N	RELIEF VALVE BODY	02107680YY	1
021B	0210767006N	DRAIN BODY	02107670YY	1
024	0240181062N	SPRING SEAT	02401810YY	1
024A	02402033194N	SEAT D.5.5	0240182XYY	1
043	0430061006N	RELIEF SET PLUG	04300610YY	1
053	05302276025N	NAME PLATE	0530227XYYY	1
080	0800159006N	SPRING STEINEL SZ8010.20 X 51 YELLOW COLOR		1
434C	4340020301N	CIRCLIPS	4340020XX1	1
435A	4350000062N	ECO HEX NUT M10		1
435B	4350068312N	SHCS M10 X 45	4350068XXY	1
437	4070014036N	BALLD 3.175		1
438A	4380006111N	O-RING 10.5 X 2.7 (R9)		1
438B	4380006181N	O-RING 19.8 X 3.6 (R16)		2
438C	4380006191N	O-RING 21.3 X 3.6 (R17)		1
439A	4390020001N	NEEDLE 5 X 19.8 CLASS G2		1
439B	4390036000N	GUIDE BUSH 5 X 8 - LENGHT = 12		1

6.4.2 SAFETY VALVE ASSEMBLY / DISASSEMBLY

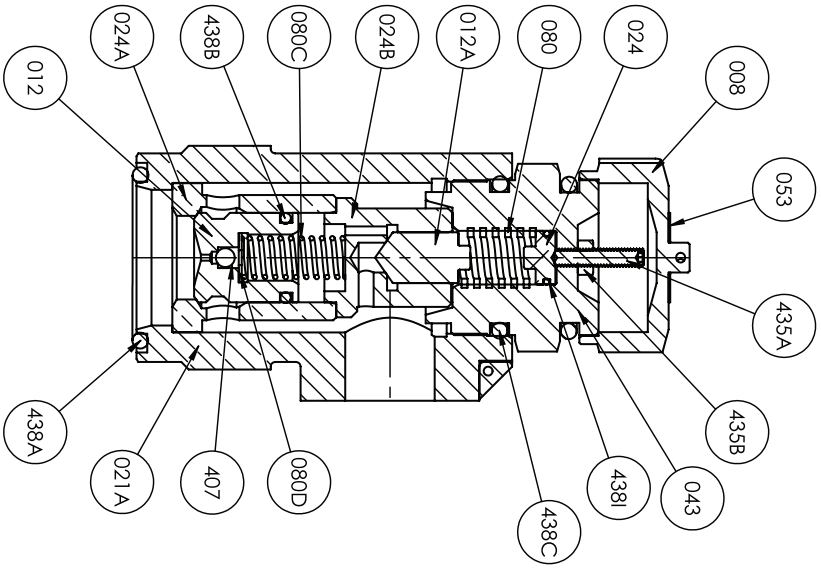
DRAWING: 777000098

DISASSEMBLY	ASSEMBLY	
	Position	**Torque**
	PH [435B]	**20 N.m (14.7 ft-lbs)**
	PK [435B]	**20 N.m (14.7 ft-lbs)**
	PL [435C]	**40 N.m (29.5ft-lbs)**
	PN [435C]	**40 N.m (29.5 ft-lbs)**
1. Unscrew the two screws to remove the safety valve 2. Remove the seal [438A] in order to replace it in the context of annual overhaul	3. Place the seal [438A] in the recess on the displacement chamber 4. Fit the safety valve with two screws [435C]	

CLEANING THE AIR BLEED BUILT INTO THE SAFETY VALVE

⚠ CAUTION **DO NOT CARRY OUT THIS OPERATION UNLESS PARTICLES HAVE BLOCKED THE AIR BLEED IMPEDING ITS OPERATION**

14. Unscrew the screws [435C] to remove the safety valve
15. Remove the lead seal on the safety valve.
16. Unscrew the cap [008].
17. Mark the position of the screw [435A] with respect to the valve plug [043].
18. Unscrew the nut [435B] and remove the screws [435A].
19. Remove the valve plug [043] (equipped with O-rings [438C]).
20. Remove the spring seat [024], spring [080] and the components of the bleed (the valve closure element [012A], valve seat [024B], spring [080C], valve closure element [012] and valve seat [024A]).
21. Proceed with the cleaning of the component parts of the bleed (using a cleansing solution).
22. Reinstall the component parts of the bleed in the valve body [021A].
23. Reinstall the valve plug [043], spring [080] and spring seat [024].
24. Install the screw [435A] in accordance with the measurement taken during dismantling.
25. Screw on the nut [435B], fixing the screw [435A]
26. Screw on the cap [008].
27. If necessary, replace the seal [438A] and fit the safety valve with screws (torque: 40N.m)



REVISION HISTORY				
REV	DESCRIPTION	ECN	DATE	
00	INITIAL	24620	12/11/19	

	TCK	CJK
	Drown - Dessiné / Vdd	Checked - Vérifié / Vdd

PROPRIETARY NOTICE

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GENERAL TOLERANCES: ISO 2768

LINEAR DIMENSIONS - DIMENSIONS LINÉAIRES mm [INCHES]

DESCRIPTION	5 - 6	6 - 30	30 - 120	120 - 400	400 - 1000	1000 - 2000	2000 - 4000
TOLERANCES mm [INCHES]	±0.1 [.004]	±0.2 [.008]	±0.3 [.012]	±0.5 [.020]	±0.8 [.031]	±1.2 [.047]	±2 [.079]

Ra FINISH: <3.2 (125 RMS)

GEOMETRIC TOLERANCES / TOLERANCES GÉOMÉTRIQUES

⊥	0.4	[0.016]
=	0.6	[0.024]
⁄	0.2	[0.079]

FORMAT / TAILLE: A3

FIRST ANGLE PROJECTION

SHEET / FEUILLE: 2 / 5

DO NOT SCALE DRAWING
DESSIN SANS ECHELLE

MILTON ROY®

HPD LIQUID END 266-366 (0-40)

SAFETY RELIEF VALVE ASSEMBLY

DRAWING NUMBER / PLAN N°: 777000098

REV: 00

WARNING: THE EXPORT OR REEXPORT OF THIS DRAWING OR A PRODUCT PRODUCED BY THIS DRAWING IS SUBJECT TO U.S. EXPORT ADMINISTRATION REGULATIONS AND OTHER APPLICABLE GOVERNMENT RESTRICTIONS OR REGULATIONS

3060024311F-X0 PrimeRoyal Safely Relief Valve (266/366: 0-17}				
Bubble#	**Part#**	**Description**	**Drawing#**	**Qty**
008	0080069006N	VALVE CAP STEEL 1035	0080069006	1
012	0120317006N	VALVE	0120317006	1
012A	0120318006N	VALVE	0120318006	1
021A	0210775001N	RELIEF VAL VE BODY 266-366	02107750YY	1
024	0240183062N	SPRING SEAT	0240183062	1
024A	0240184052N	RELIEF VALVE SEAT	0240184052	1
024B	0240185052N	RELIEF VAL VE SEAT	0240185XYY	1
043	0430062006N	SETTING PLUG	0430062006	1
053	05302276025N	NAME PLATE	0530227XYYY	1
080	0800154006N	SPRING FIBRO 241.15.16.025 BLUE COLOR		1
080C	0800153006N	SPRING STEIN EL ST8100 15X40		1
080D	0800108026N	CARTRIDGE CLIP	08001080YY	1
407	4070014070N	BALL D6.35		1
435A	4350120251N	SET SCREW M6X30		1
435B	4350000005N	HEX NUT M6		1
438A	4380006341N	O-RING 50.17 X 5.33 (R32)		1
438B	4380006201N	O-RING 23 X 3.6 (R18)		1
438C	4380006321N	O-RING 43.82 X 5.33 (R30)		2
438I	4380008231N	O-RING 14X2	4380008XXY	1

3060024321F-X0 PrimeRoyal Solely Relief Valve (266/366: 17-28)				
Bubble#	**Part#**	**Description**	**Drawing#**	**Qty**
008	0080069006N	VALVE CAP STEEL 1035	0080069006	1
012	0120317006N	VALVE	0120317006	1
012A	0120318006N	VALVE	0120318006	1
021A	0210775001N	RELIEF VAL VE BODY 266-366	02107750YY	1
024	0240183062N	SPRING SEAT	0240183062	1
024A	0240184052N	RELIEF VALVE SEAT	0240184052	1
024B	0240185052N	RELIEF VAL VE SEAT	0240185XYY	1
043	0430062006N	SETTING PLUG	0430062006	1
053	05302276025N	NAME PLATE	0530227XYYY	1
080	0800155006N	SPRING FIBRO 241.06.17.025 ORANGE COLOR		1
080C	0800153006N	SPRING STEIN EL ST8100 15X40		1
080D	0800108026N	CARTRIDGE CLIP	08001080YY	1
407	4070014070N	BALL D6.35		1
435A	4350120251N	SET SCREW M6 X 30		1
435B	4350000005N	HEX NUT M6		1
438A	4380006341N	O-RING 50.17 X 5.33 (R32)		1
438B	4380006201N	O-RING 23 X 3.6 (R18)		1
438C	4380006321N	O-RING 43.82 X 5.33 (R30)		2
438I	4380008231N	O-RING 14X2	4380008XXY	1

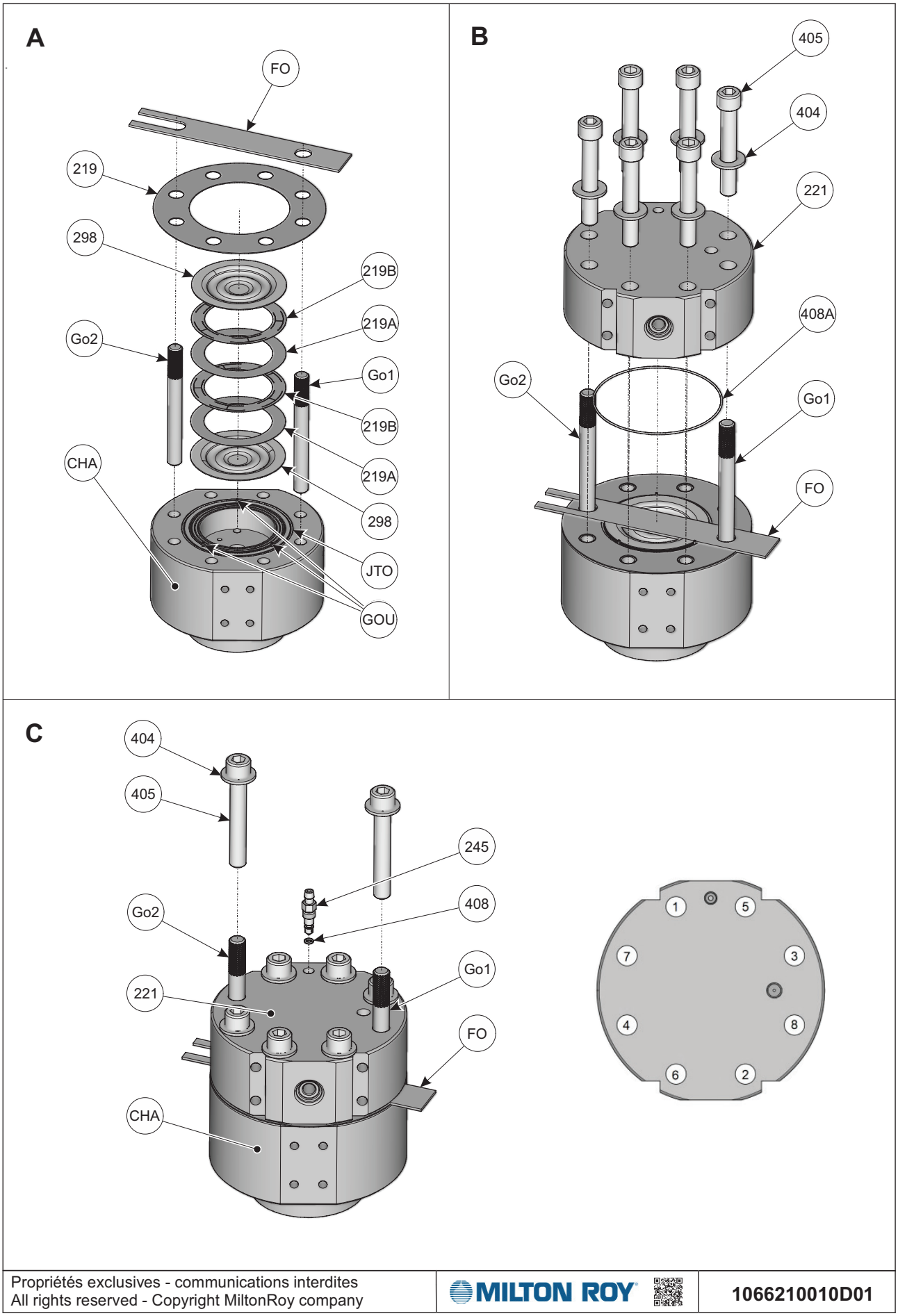
3060024331F-X0 PrimeRoyol Sofety Relief Valve (266/366: 28-40)				
Bubble#	**Part#**	**Description**	**Drawing#**	**Qty**
008	0080069006N	VALVE CAP STEEL 1035	0080069006	1
012	0120317006N	VALVE	0120317006	1
012A	0120318006N	VALVE	0120318006	1
021A	0210775001N	RELIEF VAL VE BODY 266-366	02107750YY	1
024	0240183062N	SPRING SEAT	0240183062	1
024A	0240184052N	RELIEF VALVE SEAT	0240184052	1
024B	0240185052N	RELIEF VAL VE SEAT	0240185XYY	1
043	0430062006N	SETTING PLUG	0430062006	1
053	05302276025N	NAME PLATE	0530227XYYY	1
080	0800155006N	SPRING FIBRO 241.06.17.025 YELLOW COLOR		1
080C	0800153006N	SPRING STEIN EL ST8100 15X40		1
080D	0800108026N	CARTRIDGE CLIP	08001080YY	1
407	4070014070N	BALL D6.35		1
435A	4350120251N	SET SCREW M6 X 30		1
435B	4350000005N	HEX NUT M6		1
438A	4380006341N	O-RING 50.17 X 5.33 (R32)		1
438B	4380006201N	O-RING 23 X 3.6 (R18)		1
438C	4380006321N	O-RING 43.82 X 5.33 (R30)		2
438I	4380008231N	O-RING 14X2	4380008XXY	1

6.5.1 LIQUID END ASSEMBLY / DISASSEMBLY PH 106 Low Flow

DRAWING: 1066210010D01

DISASSEMBLY	Labels	Tightening torques N.m.	Tools	Weight Kg
 Wear the personal protective equipment at your work environment.	[405]	1: Manuel 2: 50 3: 140	Torque wrench + Allen connector	
	[245]	Mechanical stop + turn 1/4		
	[CHA] + [221]			8 Kg (17.64 lbs)
	[Go1+Go2+FO]		Available for sale under the number : 3076840001F	

View	Disassembly	Vue	Assembly
C	1. Unscrew the part [245] then remove the O-ring [408].	A	1. Place the parts [298], [219A] and [219B] onto the part [CHA] between the parts [GOU] like indicated on the drawing.
B	2. Unscrew the screws [405] then remove the part [221].		Pay attention to the assembly direction of the part [298]. Respect the alternation of parts [219A] and [219B].
B	3. Remove the O-ring [408A].		Drop a little hydraulic oil between the 2 parts [298].
A	4. Remove the parts [298], [219A], [219B] and [219].	A	2. Manually tighten the studs [Go1] and [Go2] into the part [CHA] like indicated on the drawing.
			Check the presence of O-ring [JTO] on the part [CHA].
		A	3. Place the seal [219] onto the part [CHA] through the studs [Go1] and [Go2].
		A	4. Place the part [FO] onto the parts [298], [219A], [219B] and [219] through the two studs [Go1] and [Go2] to keep everything in place.
		B	5. Place the O-ring [408A] onto the part [221].
		B	6. Assemble the part [221] onto the part [CHA] through the 2 studs [Go1] and [Go2] like indicated on the drawing.
		B	7. Manually tighten 6 screws [405] like indicated on the drawing.
		C	8. Unscrew the 2 studs [Go1] and [Go2].
		C	9. Gently remove the part [FO].
		C	10. Manually tighten the last 2 screws [405].
		C	11. Tighten the screws [405] to the tightening torques in the order shown on the drawing.
		C	12. Fit the O-ring [408] onto the part [245].
		C	13. Screw the part [245] into the part [221] like indicated on the drawing.



MILTON ROY

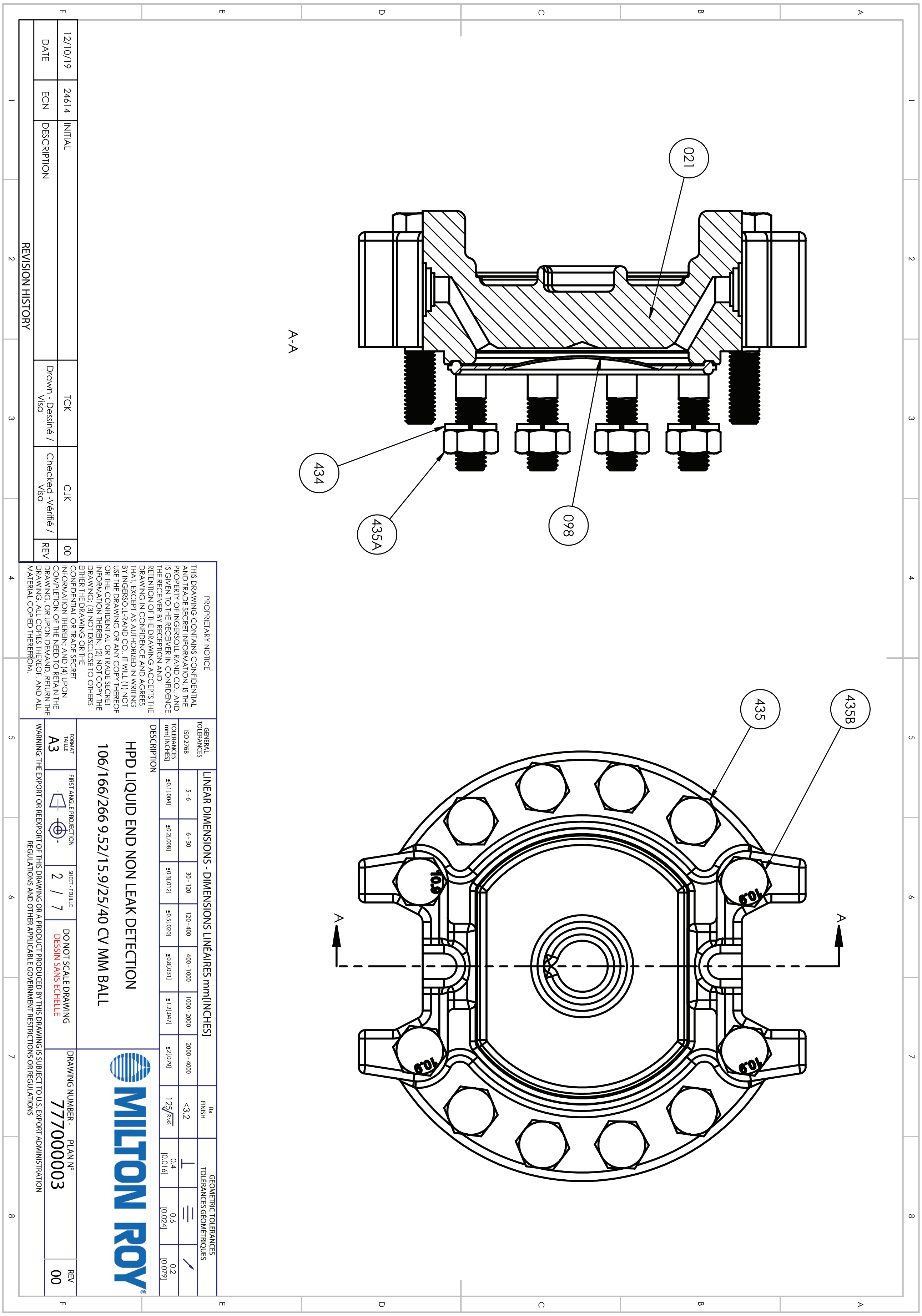
1066210010D01

3051629000F-X0 LOW FLOW LIQUID END				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
402	4020012013	1/8 HEX HD PIPE PLUG #6000		1
221	20319	DIAPH HEAD LOFLO HPD 6"D A479	22109131YY	1
245	20352	BARB, AIR BLEED 316/316LSS	2450045000	1
405	4050031214	SOC HD SCR 1/2-13X3-1/4 ULTRA	4050031XXY	8
404	4040151033	FLAT WASHER SAE 1/2 NOM ULTRA	4040151XXY	8
408	A5-1007	O-RING 2-007 VITON		1
298	20325	DIAPHRAGM LO FLO HPD	2980129000	1

6.5.2 LIQUID END ASSEMBLY / DISASSEMBLY 106-166-266

DRAWING: 777000003

<table>
<tr><th colspan="2">DISASSEMBLY</th><th colspan="4">ASSEMBLY</th></tr>
<tr><td colspan="2" rowspan="5"></td><td colspan="4">Torque</td></tr>
<tr><td></td><td colspan="3">Diaphragm Diameter</td></tr>
<tr><td>Bubble #</td><td>106 mm
(4.17 inch)</td><td>166 mm
(6.53 inch)</td><td>266mm
(10.47 inch)</td></tr>
<tr><td>[435]</td><td>120 N.m
(88.5 ft-lbs)</td><td>180 N.m
(132.7 ft-lbs)</td><td>180 N.m
(132.7 ft-lbs)</td></tr>
<tr><td>[435B]</td><td>120 N.m
(88.5ft-lbs)</td><td>180 N.m
(132.7 ft-lbs)</td><td>180 N.m
(132.7 ft-lbs)</td></tr>
<tr><th colspan="2">DISASSEMBLY</th><th colspan="4">ASSEMBLY</th></tr>
<tr><td colspan="2">1. Unscrew the screws [435], [435B]
2. Remove the part [021]
3. Remove the part [098] (Provide for a receptacle to collect drips).</td><td colspan="4">1 Fit the diaphragm [098] on the contour plate with the blue side visible (position with care).
2 Position the part [021]
3 Screw the screws [435],[435B] (torque 20 N.m at a time) (by opposite pairs)
4 Tighten the screws [435], [435B]</td></tr>
</table>


A-A
021
434
435A
098
435
435B
10.9
A
A
12/10/19
24614
INITIAL
TCK
CJK
00
DATE
ECN
DESCRIPTION
Drawn - Dessiné / Visa
Checked - Vérifié / Visa
REV
REVISION HISTORY
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GENERAL TOLERANCES
ISO 2768
TOLERANCES mm[INCHES]
LINEAR DIMENSIONS - DIMENSIONS LINÉAIRES mm[INCHES]
.5 - 6 ±0.1[.004]
6 - 30 ±0.2[.008]
30 - 120 ±0.3[.012]
120 - 400 ±0.5[.020]
400 - 1000 ±0.8[.031]
1000 - 2000 ±1.2[.047]
2000 - 4000 ±2[.079]
Ra FINISH
<3.2
125 RMS
GEOMETRIC TOLERANCES
TOLÉRANCES GÉOMÉTRIQUES
0.4 [0.016]
0.6 [0.024]
0.2 [0.079]
DESCRIPTION
HPD LIQUID END NON LEAK DETECTION
106/166/266 9.52/15.9/25/40 CV MM BALL
MILTON ROY
FORMAT TAILLE
A3
FIRST ANGLE PROJECTION
SHEET - FEUILLE
2 / 7
DO NOT SCALE DRAWING
DESSIN SANS ECHELLE
DRAWING NUMBER - PLAN N°
777000003
REV
00
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3050434053F-X0

PrimeRoyal Liquid End 106 Diaphragm 9 .52 CV Ball 3 16 SS

Bubble#	Part #	Description	Drawing #	Qty
021	0210346016N	DIAPHRAGM HEAD 106 / 9.52 316L	02103460YY	1
098	0980131099N	DIAPHRAGM D106 (NITRILE}	0980131X99	1
434	4340009105N	SPRING LOCK WASHER D.14		12
435A	4350000093N	HEX NUT M14		8
435	4350036173N	HEX HD SCREW M14 X 80 THREAD 34		8
435B	4350036193N	HEX HD SCREW M14 X 90 THREAD 34		4

3050434153F-X0

Prime Royal Liquid End l 06 Diaphragm 15.9 CV Ball 316 SS

Bubble#	Part #	Description	Drawing #	Qty
021	0210346016N	DIAPHRAGM HEAD 106 / 15.9 3 16L	02103430YY	1
098	0980131099N	DIAPHRAGM D106 (NITRILE}	0980131X99	1
434	4340009105N	SPRING LOCK WASHER D.14		12
435A	4350000093N	HEX NUT M14		8
435	4350036173N	HEX HD SCREW M14 X 80 THREAD 34		8
435B	4350036193N	HEX HD SCREW M14 X 90 THREAD 34		4

3050434212F-X0

PrimeRoyal Liquid End 166 Diaphragm 15.9 CV Ball 316 SS

Bubble#	Part #	Description	Drawing #	Qty
021	0210361016N	DIAPHRAGM HEAD 166/15.9	02103610YY	1
098	0980129099N	DIAPHRAGM D166 NITRILE DMR	0980129X99	1
434	4340009105N	SPRING LOCK WASHER D.14		12
435A	4350000090N	ECO HEX NUT M14		12
435	57100	ECOGUARD HCS M14 X 90 THREAD 34		8
435B	4350036236N	HEX HD SCREW M14 X 90 THREAD 34		4

3050434252F-X0

PrimeRoyal Liquid End 166 Diaphragm 25 CY Ball 3 16 SS

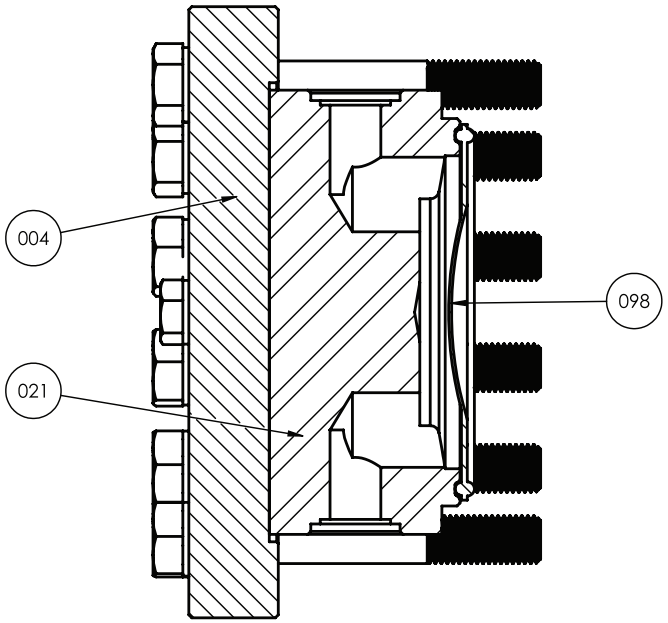
Bubble#	Part #	Description	Drawing #	Qty
021	0210360016N	LIQUID END BODY 166/25	02103610YY	1
098	0980129099N	DIAPHRAGM D166 NITRILE DMR	0980129X99	1
434	4340009105N	SPRING LOCK WASHER D.14		12
435A	4350000090N	ECO HEX NUT M14		12
435	57100	ECOGUARD HCS M14 X 90 THREAD 34		8
435B	4350036236N	HEX HD SCREW M14 X 130 THREAD 40		4

3050434312F-X0 PrimeRoyal Liquid End 266 Diaphragm 40 CV Ball 316 SS				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
021	0210352016N	DIAPHRAGM HEAD D.266/40	02103520YY	1
098	0980130099N	DIAPHRAGM 266 NITRILE PN	0980130X99	1
434	4340009115N	SPRING LOCK WASHER D.16		14
435A	4350000103N	HEX NUT M16		14
435	4350036414N	ECO HX HD SCRW M16 X 100 THRD 38		10
435B	4350036474N	ECO HX HD SCRW M16 X 160 THRD 44		4

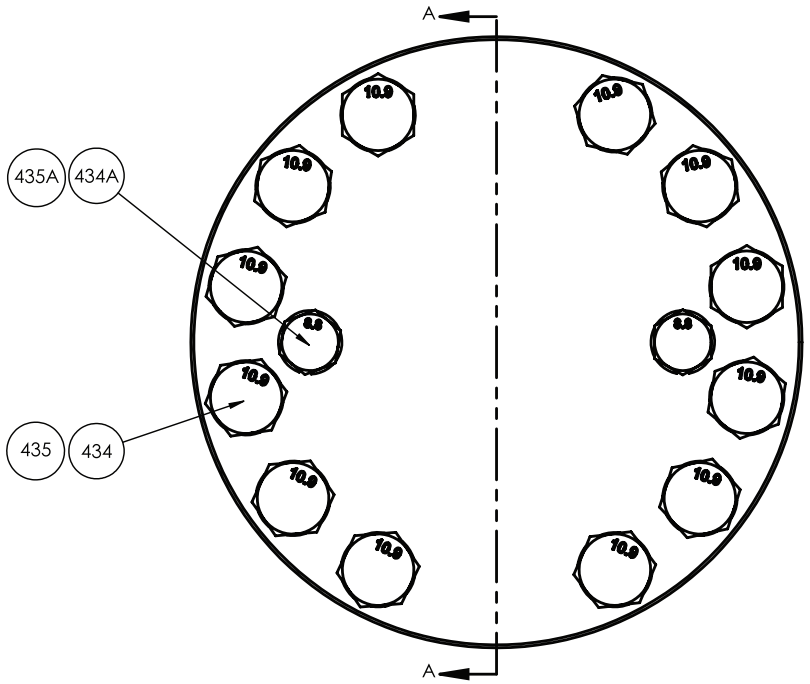
6.5.3 LIQUID END ASSEMBLY / DISASSEMBLY 106 HP

DRAWING: 777000008

<table>
<tr><th>DISASSEMBLY</th><th colspan="4">ASSEMBLY</th></tr>
<tr><td rowspan="5">Perform the following steps before this operation</td><td colspan="4">Torque</td></tr>
<tr><td></td><td colspan="3">Diaphragm Diameter</td></tr>
<tr><td>Bubble #</td><td>106 mm
(4.17 inch)</td><td>166 mm
(6.53 inch)</td><td>266mm
(10.47 inch)</td></tr>
<tr><td>[435]</td><td>120 N.m
(88.5 ft-lbs)</td><td>180 N.m
(132.7 ft-lbs)</td><td>180 N.m
(132.7 ft-lbs)</td></tr>
<tr><td>[435B]</td><td>120 N.m
(88.5ft-lbs)</td><td>180 N.m
(132.7 ft-lbs)</td><td>180 N.m
(132.7 ft-lbs)</td></tr>
<tr><th>DISASSEMBLY</th><th colspan="4">ASSEMBLY</th></tr>
<tr><td>4. Unscrew the screws [435], [435B]
5. Remove the part [021]
6. Remove the part [098] (Provide for a receptacle to collect drips).</td><td colspan="4">5. Fit the diaphragm [098] on the contour plate with the blue side visible (position with care).
6. Position the part [021]
7. Screw the screws [435],[435B] (torque 20 N.m at a time) (by opposite pairs)
8. Tighten the screws [435],[435B]
⚠ CAUTION CONSULT FACTORY FOR TORQUE SPEC. OF ALL PRESSURE CONTAINING HARDWARE BEFORE OPERATING PUMP.</td></tr>
</table>



A-A



REVISION HISTORY					
1/11/2019	23234	INITIAL	R.ALLSPACH	T.KUSTURISS	00
DATE	ECN	DESCRIPTION	Drawn - Dessiné / Visa	Checked -Vérifié / Visa	REV

GENERAL TOLERANCES	LINEAR DIMENSIONS - DIMENSIONS LINÉAIRES mm[INCHES]							Ra FINISH	GEOMETRIC TOLERANCES TOLÉRANCES GÉOMÉTRIQUES		
ISO 2768	.5 - 6	6 - 30	30 - 120	120 - 400	400 - 1000	1000 - 2000	2000 - 4000	<3.2	⊥	=	⟋
TOLERANCES mm[INCHES]	±0.1[.004]	±0.2[.008]	±0.3[.012]	±0.5[.020]	±0.8[.031]	±1.2[.047]	±2[.079]	125 √RMS	0.4 [0.016]	0.6 [0.024]	0.2 [0.079]

DESCRIPTION

PRIMEROYAL
LIQUID END TYPE H106-166-266 HP
ASSEMBLY

MILTON ROY
an Accudyne Industries brand

FORMAT TAILLE	FIRST ANGLE PROJECTION	SHEET - FEUILLE	SCALE	DRAWING NUMBER - PLAN N°	REV
A3		2 / 3	2:3	777000008	00

1199903461 F-X0 106 9 .52 Liquid End High Pressure				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
004	0040399116N	FLANGE PLATE 106	0040399XYY	1
021	0210756016N	DIAPHRAGM HEAD 106/9.52 HP	02107560YY	1
098	0980131099N	DIAPHRAGM D106 (NITRILE}	0980131X99	1
434A	4340009095N	SPRING LOCKWASHER D.12		2
434	4340060050N	ECO WASHER W D16	4340060XXY	12
435	4350036436N	ECO HX HD SCRW M16 X 120 THRD		12
435A	4350038895N	HEX HD SCREW M12 X 40 FULL THR		2

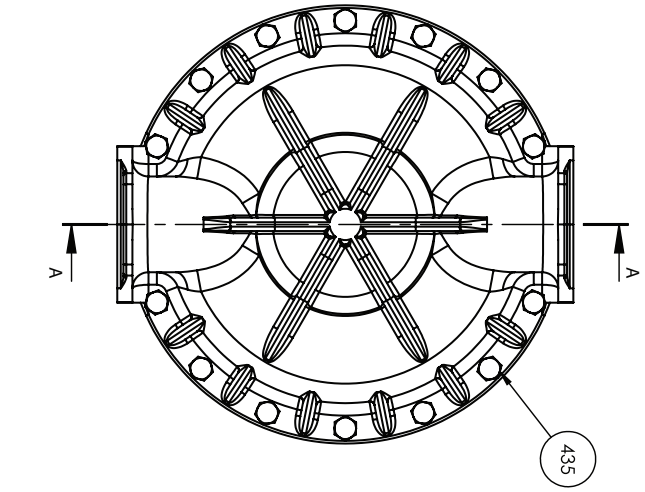
3050927102F-X0 106 15.9 Liquid End High Pressure				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
004	0040399116N	FLANGE PLATE 106	0040399XYY	1
021	0210756016N	DIAPHRAGM HEAD 106/15.9 HP	02107450YY	1
098	0980131099N	DIAPHRAGM D106 (NITRILE}	0980131X99	1
434A	4340009095N	SPRING LOCKWASHER D.12		2
434	4340060050N	ECO WASHER W D16	4340060XXY	12
435	4350036436N	ECO HX HD SCRW M16 X 120 THRD		12
435A	4350038892	HEX HD SCR M12 - 1.75 X 40 GRADE 8		2

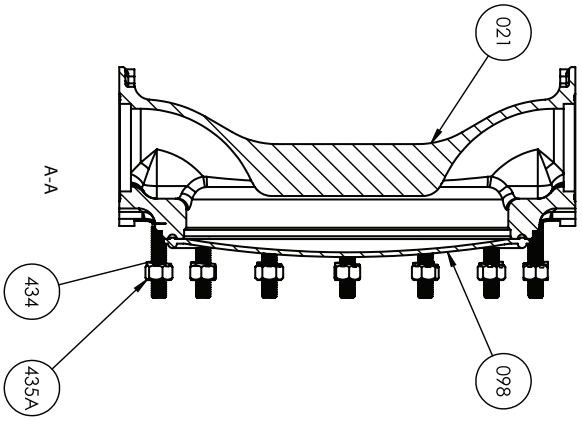
6.5.4 LIQUID END ASSEMBLY / DISASSEMBLY 366

DRAWING: 777000008

DISASSEMBLY	ASSEMBLY	
Perform the following steps before this operation		
	Bubble #	**Torque**
	[435]	**20 N.m - 180 N.m (14.75 ft-lbs - 132.76 ft-lbs)**

DISASSEMBLY	ASSEMBLY
1. Unscrew the screws [435], [435B] 2. Remove the part [021] 3. Remove the part [098] (Provide for a receptacle to collect drips).	1. Apply tallow on the groove in the contour plate and position the O-ring in it. 2. Fit the contour plate on the displacement chamber. 3. Fit the diaphragm [098] on the contour plate with the blue side visible (position with care). 4. Position the liquid end body [021] and secure it with screws [435], 5. Tightening evenly over the 14 attaching points, proceeding by opposite pairs 6. Lock the screws [435]





REVISION HISTORY

REV	DESCRIPTION	ECN	DATE
00	INITIAL RELEASE	24614	12/10/19

Drawn - Dessiné / Visa: TCK
Checked -Vérifié / Visa: CIK

GENERAL TOLERANCES ISO 2768

LINEAR DIMENSIONS - DIMENSIONS LINÉAIRES mm [INCHES]						
TOLERANCES mm [INCHES]	5 - 6	6 - 30	30 - 120	120 - 400	400 - 1000	1000 - 2000	2000 - 4000
±0.1 [.004]	±0.2 [.008]	±0.3 [.012]	±0.5 [.020]	±0.8 [.031]	±1.2 [.047]	±2 [.079]

Ra FINISH: <3.2 | 125 RMS

GEOMETRIC TOLERANCES / TOLERANCES GÉOMÉTRIQUES

⊥	0.4 [0.016]	0.2 [0.079]
=	0.6 [0.024]	
⁄		

DESCRIPTION

HPD LIQUID END NON LEAK DETECTION

METALLIC 366 70 MM CV BALL

MILTON ROY®

FORMAT / TAILLE: A3
FIRST ANGLE PROJECTION
SHEET / FEUILLE: 2 / 3
DO NOT SCALE DRAWING / DESSIN SANS ECHELLE
DRAWING NUMBER / PLAN N°: 777000007
REV: 00

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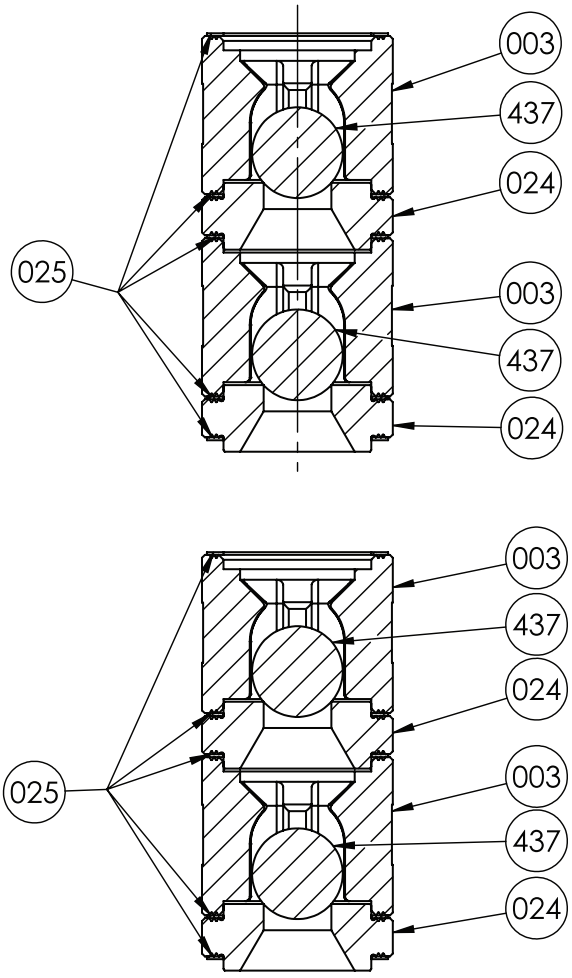
3050434402F-X0 PrimeRoyal Liquid End 366 Diaphragm 70 CV Ball 316 SS				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
021	0210351016N	DIAPHRAGM HEAD 366 316L	02103510YY	1
098	0980140099N	DIAPHRAGM	0980140X99	1
434	4340009115N	SPRING LOCK WASHER D.16		14
435A	4350000103N	HEX NUT M16		14
435	4350036426N	ECO HX HD SCRW M16 X 110 THRD 38		14

6.6.1 CHECK VALVE ASSEMBLY / DISASSEMBLY DOUBLE BALL

DRAWING: 777000123

DISASSEMBLY	ASSEMBLY
1. Remove the seal [025], ball guide [003], ball [437] and two seats [024] equipped them with two seals [025]. 2. Clean the ball guide [003] if it is not to be replaced.	1. Assemble the parts of the suction and discharge check valves (See drawing) 2. Fit this assembly in the liquid end body (don't forget the seals [025]) 3. Realize the procedure: Assembly / Disassembly of the connections



DATE	ECN	DESCRIPTION	Drawn - Dessiné / Visa	Checked -Vérifié / Visa	REV
4/6/2020	25127	ADDED BILL OF MATERIAL FOR 9.52 LD OR HARDENED BALL (3050591102F-X0)	RCA	CJK	02
01/29/2020	24811	BALL AND CHECK VALVE SEAT QUANTY WAS X2. ADDED DRAWING NUMBER TO SHEET 2	A.GARCIA	T.KUSTURISS	01
12/11/2019	24626	INITIAL RELEASE	A.GARCIA	T.KUSTURISS	00

REVISION HISTORY

GENERAL TOLERANCE	LINEAR DIMENSIONS - DIMENSIONS LINÉAIRES mm[INCHES]							Ra FINISH	GEOMETRIC TOLERANCES TOLÉRANCES GÉOMÉTRIQUES		
ISO2768-MK	.5 - 6	6 - 30	30 - 120	120 - 400	400 - 1000	1000 - 2000	2000 - 4000	<3.2	⊥	=	⟋
TOLERANCES mm[INCHES]	±0.1[.004]	±0.2[.008]	±0.3[.012]	±0.5[.020]	±0.8[.031]	±1.2[.047]	±2[.079]	125 RMS	0.4 [0.016]	0.6 [0.024]	0.2 [0.079]

DESCRIPTION

PRIMEROYAL
DOUBLE BALL CHECK VALVE

MILTON ROY

FORMAT TAILLE	FIRST ANGLE PROJECTION	SHEET - FEUILLE	DO NOT SCALE DRAWING DESSIN SANS ECHELLE	DRAWING NUMBER - PLAN N°	REV
A4		3 / 8		777000123	02

3050583092F-X0 PRIMEROYAL DOUBLE BALL CHECK VALVE 9.52mm 316SS				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
003	0030066016N	BALL GUIDE D9.52	00300660YY	4
024	0240106016N	CHECK-VALVE SEAT	02401060YY	2
025	0250109075N	CHECK-VALVE GASKET	0250109XYY	10
437	4070014112N	BALL D9.52 316L SS		2

3050583202F-X0 PRIMEROYAL SINGLE BALL CHECK VALVE 15.9mm 316SS				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
003	0030067016N	BALL GUIDE D15.9	00300670YY	2
024	0240107016N	CHECK-VALVE SEAT	02401070YY	2
437	4070014172N	BALL D 15,9		2
025	0250109175N	CHECK VALVE GASKET	0250109XYY	6

3050583222F-X0 PRIMEROYAL SINGLE BALL CHECK VALVE 25mm 316SS				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
003	0030068016N	BALL GUIDE D25	0030068XYY	2
024	0240108016N	CHECK VALVE SEAT	02401080YY	2
025	0250109275N	CHECK VALVE GASKET	4370000XXY	6
437	4370000254N	BALL D 25	0250109XYY	2

3050583232F-X0 PRIMEROY AL SINGLE BALL CHECK VAL VE 40mm 316SS				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
003	0030069016N	BALL GUIDE D40	0030068XYY	2
024	0240109016N	BALL SEAT D40	02401080YY	2
025	0250109375N	CHECK VALVE GASKET	4370000XXY	6
437	4370000404N	BALL D40 316L	0250109XYY	2

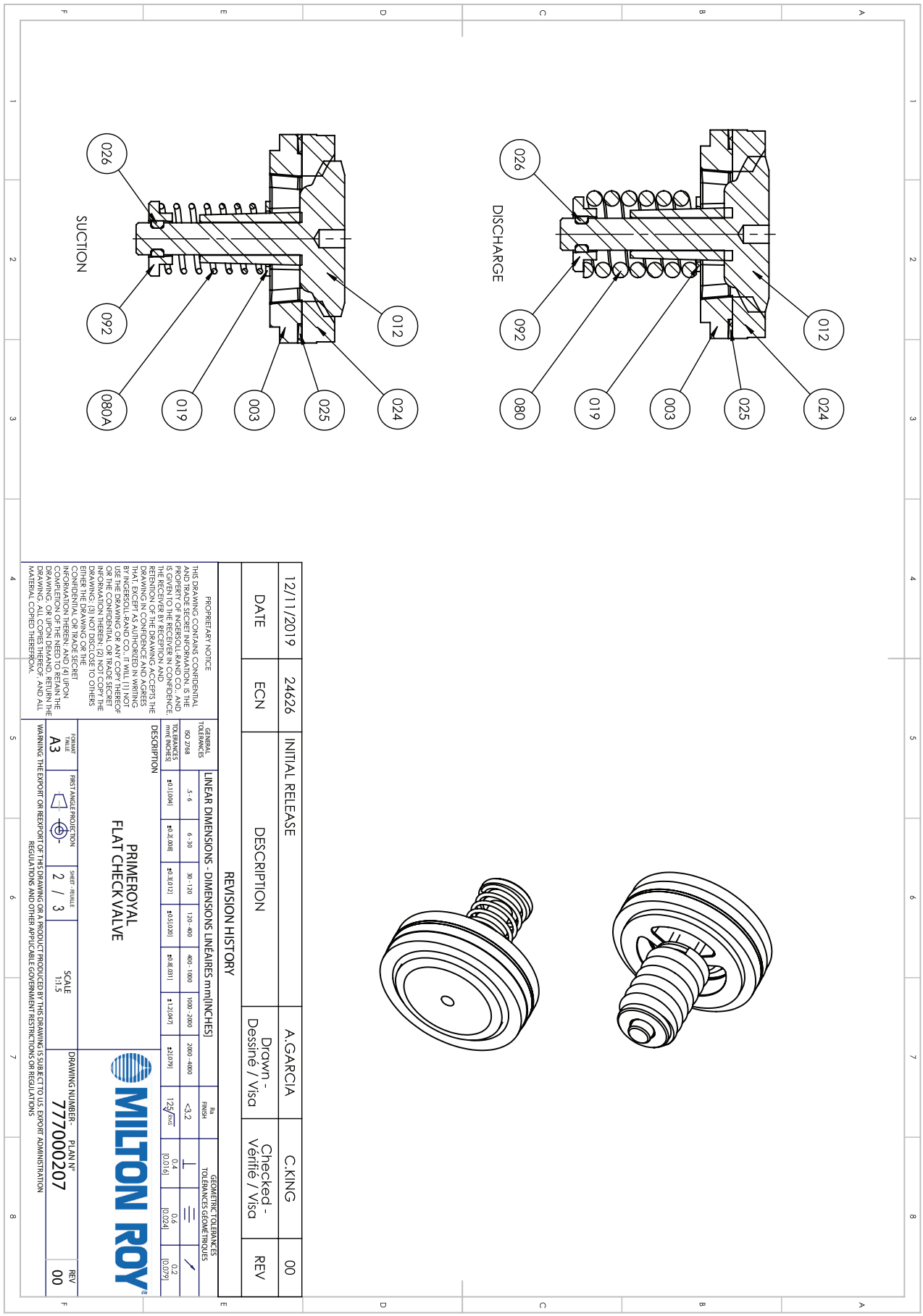
3050583092F-X0 PRIMEROYAL DOUBLE BALL CHECK VALVE 9.52mm 316SS				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
003	0030069016N	BALL GUIDE D40	0030069XYY	2
024	0240109016N	BALL SEAT D40	02401090YY	2
025	0250109375N	CHECK-VALVE GASKET	0250109XYY	6
437	4370000404N	BALL D40 316L	4370000XXY	2

6.6.2 CHECK VALVE ASSEMBLY / DISASSEMBLY FLAT VALVE

DRAWING: 777000207

DISASSEMBLY	ASSEMBLY	
	Position	**Torque**
	[435]	**120 N.m (88.50 ft-lbs)**

DISASSEMBLY	ASSEMBLY
1. Unscrew the four bolts to remove the connecting assembly 2. Remove the valve assembly 3. If the valve assembly must be removed press the valve stop [092] to release the valve locking system [026] 4. Remove the valve locking system [026], valve stop [092], spring [080](discharge circuit) or [080A] (suction circuit), washer [019], valve guide [003], seal [025], seat [024], and valve [012] 5. Either replace or clean the parts, as required	1. Fit the seat support [004], and the seat [024] on the valve [012]. Then fit the seal [025], the valve guide [003], the washer [019], and the spring [080] (discharge circuit) or [080A] (suction circuit) on the seat. Fit the valve stop [092] n the spring and, then the valve-locking device (two eccentric catches) [026]. 2. Fit a valve assembly either on the liquid end body [003] (discharge circuit) or on the connecting assembly (suction circuit). 3. Assemble the valve set with the connecting assembly, on the liquid end by means on the four bolts. **⚠ CAUTION** THE FLANGE MUST BE PERPENDICULAR TO THE CENTERLINE OF THE VALVES



REV	DESCRIPTION	DATE
00	INITIAL RELEASE	12/11/2019
	24626	ECN

REVISION HISTORY

Drawn - Dessiné / Visa	A.GARCIA
Checked - Vérifié / Visa	C.KING

GEOMETRIC TOLERANCES TOLÉRANCES GÉOMÉTRIQUES

⊥	0.4 [0.016]	00
⫽	0.4 [0.024]	REV
⌭	0.2 [0.079]	

Ra FINISH	LINEAR DIMENSIONS - DIMENSIONS LINÉAIRES mm[INCHES]							GENERAL TOLERANCES
	200 - 4000	1000 - 2000	400 - 1000	120 - 400	30 - 120	6 - 30	0.5 - 6	ISO 2768
<3.2	±2.0 [.079]	±1.2 [.047]	±0.8 [.031]	±0.5 [.020]	±0.3 [.012]	±0.2 [.008]	±0.1 [.004]	TOLERANCES mm& [INCHES]

DESCRIPTION

PRIMEROYAL
FLAT CHECK VALVE

MILTON ROY

FORMAT TAILLE	FIRST ANGLE PROJECTION	SHEET - FEUILLE	SCALE
A3		2 / 3	1:1.5

DRAWING NUMBER - PLAN N° 777000207 REV 00

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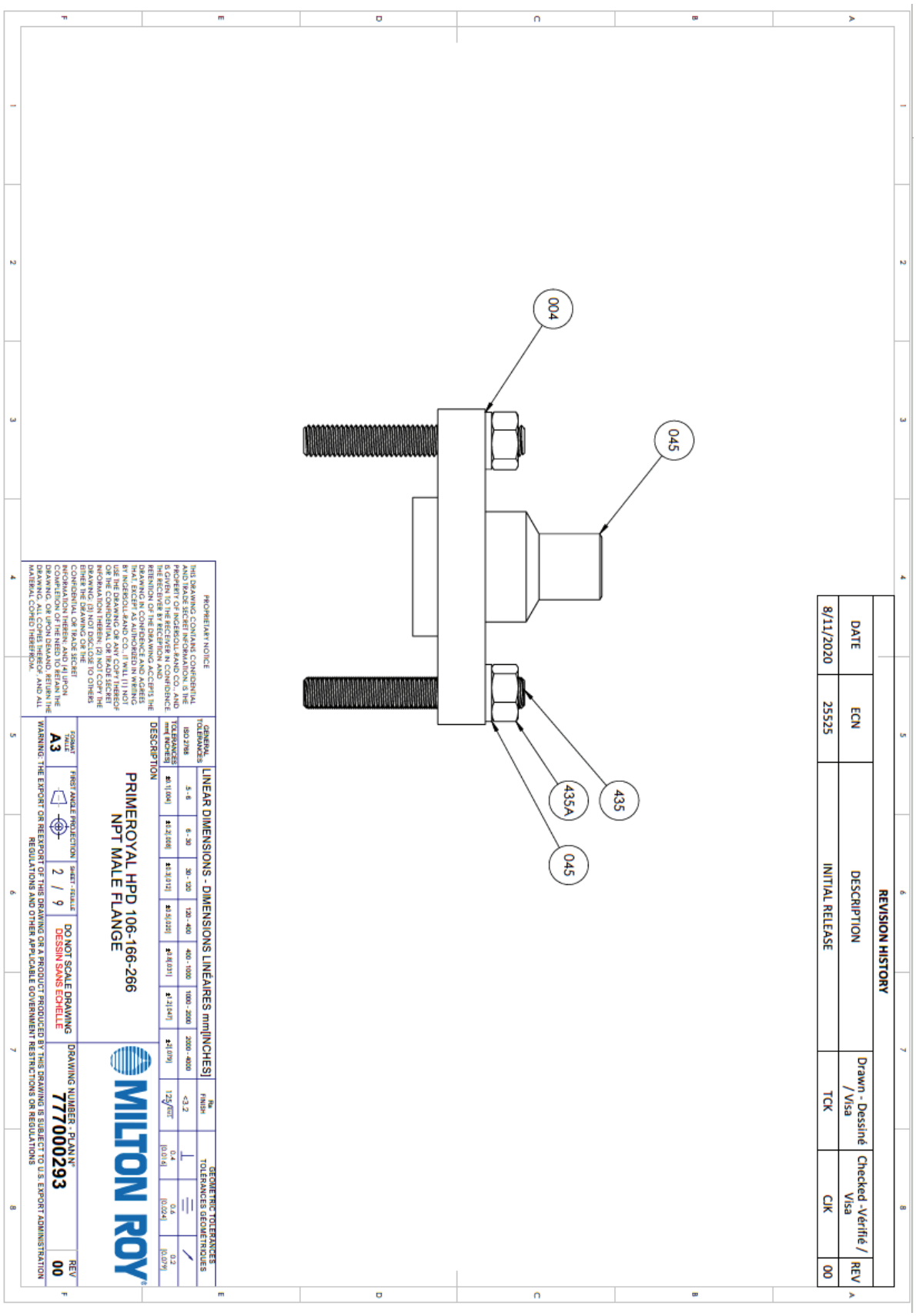
050658032F-X0 PRIMEROYAL FLAT CHECK VALVE 73mm				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
003	0030065016N	CHECK VAL VE GUIDE	00300650YY	2
012	0120136016N	CHECK-VALVE (PLUN.90)	01201360YY	2
019	0190142016N	SUPPORT WASHER D73	01901420YY	2
024	0240103016N	SEAT	02401030YY	2
025	0250107075N	CHECK VALVE GASKET	0250107X75	2
026	0260009016N	HECK-VALVE LOCK	02600090YY	2
080	0800071016N	SPRING	08000710YY	1
080A	0800111016N	CHECK-VALVE SPRING	08001110YY	1
092	0920028016N	CHECK-VALVE STOP	09200280YY	2

6.7.1 CONNECTION ASSEMBLY / DISASSEMBLY

DRAWING: 777000101-M

Torque Value	
PH Low Flow	**XX N.m**
PH High Flow	**XX N.m**
PH / PK Low Pressure	**40 N.m (29.50 ft- lbs)**
PH / PK High Pressure	**70 N.m (51.62 ft- lbs)**
PL Low Pressure	**70 N.m (51.62 ft- lbs)**
PL Medium Pressure	**70 N.m (51.62 ft- lbs)**
PL High Pressure	**70 N.m (51.62 ft- lbs)**
PN Low Pressure	**70 N.m (51.62 ft- lbs)**
PN Medium Pressure	**100 N.m (73.75 ft- lbs)**
PN High Pressure	**120 N.m (88.50 ft- lbs)**

DISASSEMBLY	ASSEMBLY
1. Unscrew the nuts [435A] 2. Remove the parts [004] and [045] (suction and discharge)	1. Fit the part [045] with the part [004] on the check valves (suction and discharge) 2. Screw the nuts [435A] **⚠ CAUTION** **THE PARTS [004] MUST BE PERPENDICULAR TO THE CENTERLINE OF THE VALVES**


004
045
435
435A
045
REVISION HISTORY
DATE
ECN
DESCRIPTION
Drawn - Dessiné / Visa
Checked -Vérifié / Visa
REV
8/11/2020
25525
INITIAL RELEASE
TCK
CJK
00
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GENERAL TOLERANCES
ISO 2768
TOLERANCES mm[INCHES]
DESCRIPTION
LINEAR DIMENSIONS - DIMENSIONS LINÉAIRES mm[INCHES]
5 - 6
6 - 30
30 - 120
120 - 400
400 - 1000
1000 - 2000
2000 - 4000
±0.1[.004]
±0.2[.008]
±0.3[.012]
±0.5[.020]
±0.8[.031]
±1.2[.047]
±2[.079]
Ra FINISH
<3.2
125µ/RMS
GEOMETRIC TOLERANCES
TOLERANCES GÉOMÉTRIQUES
0.4 [0.016]
0.4 [0.024]
0.2 [0.079]
PRIMEROYAL HPD 106-166-266
NPT MALE FLANGE
MILTON ROY
FORMAT TAILLE
A3
FIRST ANGLE PROJECTION
SHEET - FEUILLE
2 / 9
DO NOT SCALE DRAWING
DESSIN SANS ECHELLE
DRAWING NUMBER - PLAN N°
777000293
REV
00
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93642 & 3075250000F-X0 106 9.52 PORT ADAPTER 1/ 2 NPT HPD DOUBLE BALL HP				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
004	0040400016N	CHECK VALVE FLANGE 106/15.9 H	00404000YY	1
045	0450301116N	SOCKET SCREWED	0450301XYY	1
434	4340009095N	SPRING LOCKWASHER D.12		4
435A	4350000083N	HEX NUT M12		4
435	4350109085N	STUD M12 X 90-30 J = 15		4

93636 & 3051 211 009F-X0 I 06 9 .52 PORT ADAPTER 1 /2 NPT HPD DOUBLE BALL				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
004	0040221016N	CHECK VALVE FLANGE 106/15.9 H	00402210YY	1
045	0450301116N	SOCKET SCREWED	0450301XYY	1
434	4340009015N	SPRING LOCKWASHER D.12		4
435A	4350000065N	HEX NUT M10		4
435	4350006260N	STUD M10 X 45/26 J = 15 A4		4

93645 & 93647 106 15.9 PORT ADAPTER I /2 NPT HPD DOUBLE BALL HP				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
004	0040400016N	CHECK VALVE FLANGE 106/15.9 H	00404000YY	1
045	0450301116N	SOCKET SCREWED 1/2" NPT	0450306XY	1
434	4340009095N	SPRING LOCKWASHER D.12		4
435A	4350000083N	HEX NUT M12		4
435	4350006729N	STUD M12 X 120/30 J = 15 A4		4

93639 & 3075550001F-X0 106 15.9 PORT ADAPTER 1/2 NPT HPD DOUBLE BALL				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
004	0040221016N	CONNECTING FLANGE	00402210YY	1
045	0450306116N	SOCKET SCREWED 1/2" NPT	0450306XYY	1
434	4340009015N	SPRING LOCKWASHER D.10		4
435A	4350000065N	HEX NUT M10		4
435	4350109013N	STUD M10 X 75-26 J=15		4

93648 & 3051211012F-X0 106 15.9 PORT ADAPTER 1/2 NPT HPD DOUBLE BALL				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
045	0450110116N	CONNECTION 1 NPT	0450110XYY	1
004	0040153006N	BRIDE DE BAC 166 BP ACIER	00401530YY	1
434	4340009095N	SPRING LOCKWASHER D.12		4
435A	4350000083N	HEX NUT M12		4
435	4350006693N	STUD M12 X 100/30 J = 15 A4		4

93651 &3051211011F-X0 266 40 PORT ADAPTER 1-1 /2 NPT HPD DOUBLE BALL				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
004	0040154016N	CHECK VALVE FLANGE 40 BP INOX	00401540YY	1
045	0450109116N	SOCKET SCREWED 1-1/2 NPT	0450109XYY	1
434	4340009095N	SPRING LOCKWASHER D.12		4
435A	4350000083N	HEX NUT M12		4
435	4350109073N	STUD M12 X 145-36 J = l 5		4

93654 & 3051211002F-X0 266 40 PORT ADAPTER 1-1 /2 NPT HPD DOUBLE BALL MP				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
004	0040394016N	CHECK VALVE FLANGE	00401540YY	1
045	0450109116N	SOCKET SCREWED 1-1 /2 NPT	0450109XYY	1
434	4340009096N	ECO SPRING LOCKWASHER D.12		4
435A	4350000080N	HEX NUT M12		4
435	4350006886N	ECO STUD M12 X 175-36 J = 15		4

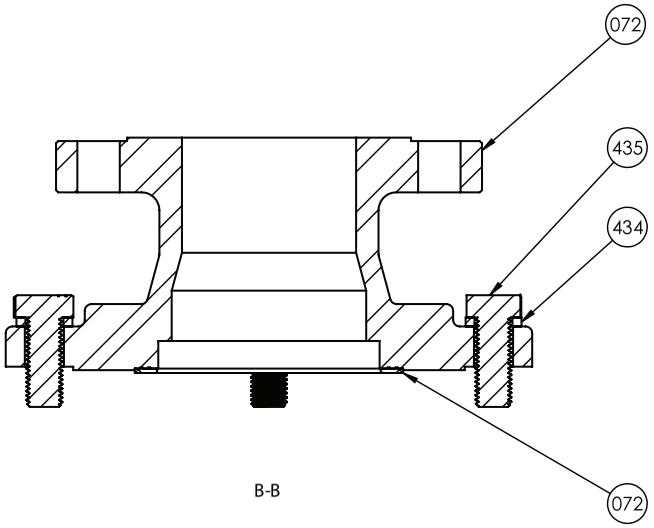
6.7.2 CONNECTION ASSEMBLY / DISASSEMBLY 366 FLANGE CONNECTION

DRAWING: 777000214

DISASSEMBLY	ASSEMBLY	
	Position	**Torque**
	[435]	**120 N.m (88.50 ft - lbs)**

DISASSEMBLY	ASSEMBLY
1. Unscrew the Nuts [435] 2. Remove the parts [072] and [025] (suction and discharge)	1. Fit the parts [072] with the part [025] on the check valves (suction and discharge) 2. Screw the nuts [435] **⚠ CAUTION** **THE PARTS [072] MUST BE PERPENDICULAR TO THE CENTERLINE OF THE VALVES.** **⚠ CAUTION** **STARTING UP: REFER TO CHAPTER III**

REVISION HISTORY					
DATE	ECN	DESCRIPTION	Drawn - Dessiné / Visa	Checked -Vérifié / Visa	REV
8/11/2020	25525	INITIAL RELEASE	TCK	CJK	00



B-B

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GENERAL TOLERANCES	LINEAR DIMENSIONS - DIMENSIONS LINÉAIRES mm[INCHES]							Ra FINISH	GEOMETRIC TOLERANCES TOLÉRANCES GÉOMÉTRIQUES		
ISO 2768	.5 - 6	6 - 30	30 - 120	120 - 400	400 - 1000	1000 - 2000	2000 - 4000	<3.2	⊥	⫽	⟋
TOLERANCES mm[INCHES]	±0.1[.004]	±0.2[.008]	±0.3[.012]	±0.5[.020]	±0.8[.031]	±1.2[.047]	±2[.079]	125 √RMS	0.4 [0.016]	0.6 [0.024]	0.2 [0.079]

DESCRIPTION

PRIMEROYAL HPD 106-166-266
NPT MALE FLANGE

MILTON ROY

FORMAT TAILLE	FIRST ANGLE PROJECTION	SHEET - FEUILLE		DRAWING NUMBER - PLAN N°	REV
A3		2 / 4	DO NOT SCALE DRAWING DESSIN SANS ECHELLE	777000214	00

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3050990225F-X0 PISTON SLEEVE ASM D25 PL PN				
Bubble#	**Part #**	**Description**	**Drawing #**	**Qty**
025	0250107175N	GASKET	0250107X75	1
072	0720175016N	SPACER 3 150LBS	0720175XYY	1
434	4340009115N	SPRING LOCKWASHER D.16		4
435	4350001985N	HEX HDSCREW M16X40 ECO	4350001XXY	4

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www.miltonroy.com

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