

**HIDRACAR S.A.**

**WE DESIGN AND MANUFACTURE:...**



**Bladder,  
Membrane & Bellows  
Pulsation Dampers  
(all dismountable units)**



**Piston  
Accumulators**



**Oleo-pneumatic Suspensions  
for Vehicles with a High Relation  
Loaded / Unloaded**

**Oleo-hydraulic Starters  
for Diesel Engines**



**Shock Absorbers**



**HIDRACAR S.A.**

since 1974

CNC lathe with robotized loading

**EXPERIENCE,  
TECHNOLOGY  
AND SERVICE ...**

Rubber bladder vulcanizing presses

**... AT YOUR DISPOSITION**



Plasma & MAG welding robot

HIDRACAR, S.A.  
Pol. Ind. Les Vives - c/ Anaïs Nin, 14  
08295 Sant Vicenç de Castellet, Barcelona (SPAIN)  
www.hidracar.com E-mail: hidracar@hidracar.com  
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# ***HIDRACAR S.A.***

***SINCE 1974***

**WHEN YOU BUY AN *HIDRACAR* ACCUMULATOR OR PULSATION DAMPER, YOU OBTAIN:**

- **More than 30 years of experience in designing, manufacturing and applying hydro-pneumatic accumulators**
- **A pressure apparatus that accomplish the CE regulations**
- **Precision of mechanization in CNC lathe machines**
- **Safety**
  - \*All our accumulators are hydraulic tested up to 1.5 times the design maximum pressure.*
  - \*Insurance of civil responsibility).*
- **Quality control**
  - \*We have the ISO 9001 certificate.*
  - \*Manufacture control registration that permit us identify any accumulator manufactured since 1976.*
  - \*The charging valve seals up to 700 bar.*

# Certificate

Standard **ISO 9001:2008**

Certificate Registr. No. 0.04.07074

TÜV Rheinland Ibérica Inspection, Certification & Testing S.A.  
certifies:

Certificate Owner: **HIDRACAR, S.A.**  
Pol. Ind. "Les Vives", s/n  
E-08295 Sant Vicenç de Castellet (Barcelona)

Scope: Design and Manufacture of Hydropneumatic Accumulators,  
Pulsation Dampers, Dynamometers, Shock Absorbers,  
Oleo-hydraulic Starters and Suspension Cylinders.

An audit was performed, Report No. 07074. Proof has been  
furnished that the requirements according to ISO 9001:2008  
are fulfilled.

The due date for all future audits is 28-09 (dd-mm).

Validity: The certificate is valid from 2010-12-28 until 2013-12-27.  
First certification 2007-12-28.

2011-01-12 TÜV Rheinland Ibérica Inspection, Certification & Testing S.A.  
Garrotxa, 10-12 - E-08320 El Prat de Llobregat

# HIDRACAR PULSATION DAMPER IDENTIFICATION CODE

To identify our dampeners by our reference code:

**I** The first letter indicates the type of the dampener:

U for bladder  
M for membrane  
F for bellows

**II** The following three digits identify the volume or the dampener size (see the table on each technical leaf).

Example: 002 = 0.15 litres  
010 = 0.95 litres  
040 = 3.70 litres

**III** The letter A followed by two digits means the design pressure of the dampener multiplied by 10.

Example: A01 = 01 x 10 = 10 bar  
A18 = 18 x 10 = 180 bar

**IV** The next letter identifies the material of the separator element between both fluids, the gas (N<sub>2</sub>) and the liquid of the circuit.

Example:

For bladder: N = Nitrile rubber  
E = EPDM rubber  
V = FPM rubber  
B = Butyl rubber  
S = Silicone rubber

For membrane & bellows: T = TFM & PTFE

**V** The number 1 means one port standard connection (see the standard threads on each technical leaf).

**VI** The raw material of the body and the insert is identified by two letters:

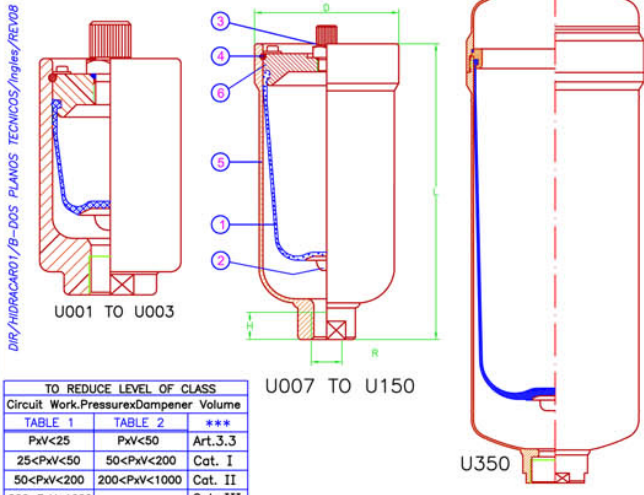
AI = AISI 316      PP = Polypropylene      PC = PVC      PD = PVDF

FOR HIGHER PRESSURES,(Up to 800bar)OTHER BLADDER RUBBERS,AND THREAD CONNECTIONS,PLEASE,CONSULT

Note: Maxi.Working Pressure ≤ K (@Constant Temp.)  
Inflate gas Pressure

- A20=200 BAR
- A18=180 BAR
- A13=130 BAR
- A05=50BAR
- A04=40BAR
- A03=30BAR
- A02=20BAR

ORDER EXAMPLE: U060 A04 V 1 AI  
Capacity; 5.6 litres  
A04=40 bar  
V=FPM rubber bladder  
Body & insert material; AISI316  
1-1/2" standard connection



PULSATION DAMPER REF.	VOLUME (litres)	DESIGN PRESSURE (bar@20°C)	D (mm)	L (mm)	R (BSP)	H (mm)	WEIGHT (Kg)	K VALUE	PRESSURE VESSELS CE(P.E.D.)	
									TABLE1	TABLE2
U001	0.07	200	55	93	3/8"	14	0,9	2,5	Art.3.3	
U002	0.15	180	70	118	1/2"	16	1,8	3	Art.3.3	
U003	0.35	130	80	162		20	2,6			
U007	0.65	50	90	205	3/4"	25	2,5	3,5	Art.3.3	
U010	0.95	40	110	200		25	4,3			
U015	1.4	30	140	245	1"	27	4,6	5	***	Cat. I
U030	2.6		295	5,3			Cat. II		Module A	
U040	3.7	390	5,7	***	Cat. III	Module B+F	5	4	***	Cat. II
U060	5.6	40	170							
U100	9.5	30	220	442	2"	35	17	5	24	4
U150	15	625	17	5			24	4		
U350	35	20	270	790	2 1/2"					

TO REDUCE LEVEL OF CLASS

Circuit	Work.Pressure	Dampener	Volume	***
TABLE 1	TABLE 2			Art.3.3
PxV<25	PxV<50			Cat. I
25<PxV<50	50<PxV<200			Cat. II
50<PxV<200	200<PxV<1000			Cat. III
200<PxV<1000				

WORKING TEMPERATURES VERSUS DESIGN PRESSURES \*\*

FOR A TEMPERATURE OF	50°C	80°C	130°C	170°C	CORRESPOND THE DESIGN PRESS.
"	"	"	"	"	x0,95
"	"	"	"	"	x0,90
"	"	"	"	"	x0,82
"	"	"	"	"	x0,74

STANDARD BLADDER RUBBERS: N=NITRILE, E=EPDM, V=FPM

(OTHER RUBBERS: BUTYL, HYPALON, ETC)	N	E	V
RUBBERS MAX.WORKING TEMPERATURES (°C)	+80 -15	+130 -30	+170 -10

THE RUBBER MAX. WORKING TEMP. VALUES CAN BE REDUCED DEPENDING UPON THE LIQUID IN CONTACT AND TIME OPERATION

**HIDRACAR SA**  
08295 S.VTE. CASTELLET  
(BARCELONA) SPAIN  
TEL.34.93.8330252 FAX.34.93.8331950

Customer	Customer Ref.	Replaced Drg.N°	Drawn	Approved
		AV.AI.BP.IN.DOC.Rev07		M.Carcaré
Title S.S.MEDIUM & LOW PRESSURE	Drg.No	Rev.	Date	Scale
BLADDER PULSATION DAMPERS (standard units)	AV.AI.MP-BP.IN.DOC.	08	JUN.05	

FILLING WITH GAS,AND MOUNTING POSITION:VERTICAL ,VALVE ③ UP

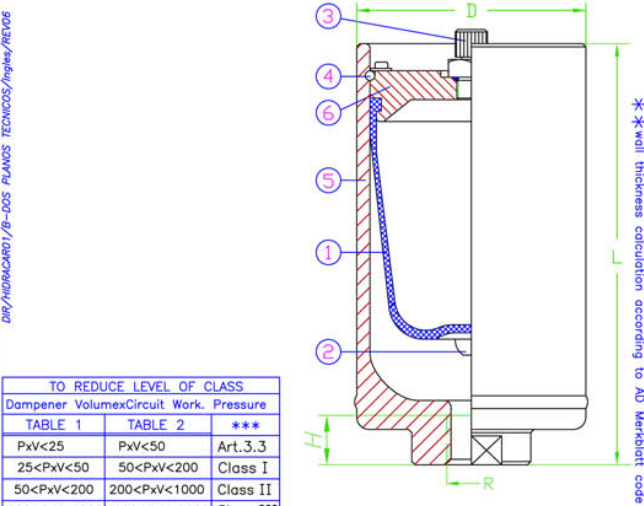
6	COVER	1	AISI 316
5	BODY	1	AISI 316
4	RETAINING RING	1	DIN17224(AISI 302)
3	INFLATING N2 VALVE	1	AISI 316(1/4" BSP)
2	INSERT	1	AISI 316L
1	BLADDER	1	Nitrile,EPDM & FPM
N°	DENOMINATION	QT.	MATERIALS

FOR HIGHER PRESSURES, OTHER BLADDER RUBBERS,THREAD CONNECTIONS, PLEASE CONSULT (WE CAN MANUFACTURE UP TO 800 BAR)

Note: Maxi. Pressure ≤ K (@Constant Temp.)  
Inflate gas Pressure

- A20=200 BAR
- A18=180 BAR
- A13=130 BAR
- A12=120 BAR
- A11=110 BAR

ORDER EXAMPLE: U003 A13 N 1 AI  
Capacity; 0,35 litres  
A13=130 bar  
N=Nitrile rubber bladder  
Body & insert material; AISI316  
1/2" standard connection



PULSATION DAMPER REF.	VOLUME (litres)	PRESSURE DESIGN (bar@20°C)	D (mm)	L (mm)	R (BSP)	H (mm)	WEIGHT (Kg)	K VALUE	PRESSURE VESSELS CE(P.E.D.)	
									TABLE1	TABLE2
U001	0.07	200	55	93	3/8"	14	0,9	2,5	Art.3.3	
U002	0.15	180	70	118	1/2"	16	1,8	3	Art.3.3	
U003	0.35	130	80	162		20	2,6			
U007	0.65	120	90	205	3/4"	25	3,8	3,5	Art.3.3	
U010	0.95	110	112	200		25	6		3	
U015	1.40		245	6,8	3,5					
U030	2.60	140	290	1"	27	10,5	5	***	Class III	Module B+F
U040	3.70		386	12,2	5					
U060	5.60	170	414	1 1/2"	35	24	4	***	Class IV	Module B+F
U100	9.50		442	46		4				
U150	15	224	625	2"	35	52,5	4	***	Class III	Module B+F
U180	18		760	56		3,5				

TO REDUCE LEVEL OF CLASS

Dampener	Volume	Circuit	Work. Pressure	***
TABLE 1	TABLE 2			Art.3.3
PxV<25	PxV<50			Class I
25<PxV<50	50<PxV<200			Class II
50<PxV<200	200<PxV<1000			Class III
200<PxV<1000	1000<PxV<3000			Class IV
1000<PxV				

WORKING TEMPERATURES VERSUS WORKING PRESSURES \*\*

FOR A TEMPERATURE OF	50°C	80°C	130°C	170°C	CORRESPOND THE PRESS.DESIGN
"	"	"	"	"	x0,95
"	"	"	"	"	x0,90
"	"	"	"	"	x0,82
"	"	"	"	"	x0,74

STANDARD BLADDER RUBBERS: N=NITRILE, E=EPDM, V=FPM(Viton)

H = MAXI. LENGTH OF MALE SCREW ADAPTER CONNECTION	N	E	V
RUBBERS MAX.WORKING TEMPERATURES (°C)	+80 -15	+130 -30	+170 -10

THE MAX. WORKING TEMP. VALUES CAN BE REDUCED DEPENDING UPON THE LIQUID IN CONTACT AND USED TIME

**HIDRACAR SA**  
08295 S.VTE. CASTELLET  
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Customer	Customer Ref.	Replaced Drg.N°	Drawn	Approved
		AV.AI.MP.IN.DOC.Rev05		M.Carcaré
Title S.S.MEDIUM PRESSURE	Drg.No	Rev.	Date	Scale
BLADDER PULSATION DAMPERS (standard units)	AV.AI.MP.IN.DOC	06	FEB.03	

FILLING WITH GAS,AND MOUNTING POSITION:VERTICAL ,VALVE ③ UP

6	COVER	1	AISI 316
5	BODY	1	AISI 316
4	RETAINING RING	1	DIN17224(AISI 302)
3	INFLATING N2 VALVE	1	AISI 316(1/4" BSP)
2	INSERT	1	AISI 316L
1	BLADDER	1	Nitrile,EPDM & FPM
N°	DENOMINATION	QT.	MATERIALS

FOR OTHER PRESSURES, PLASTIC MATERIALS THREAD, CONNECTIONS AND RUBBERS, PLEASE CONSULT

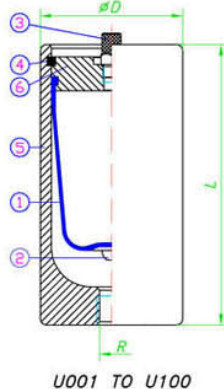
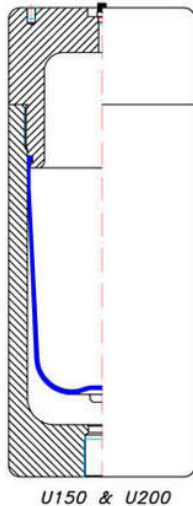
Note:  $\frac{\text{Maxi. Working Pressure}}{\text{Inflate gas Pressure}} \leq K$  (@Constant Temp.)

ORDER EX.: U007 A01 E 1 PP

Capacity: 0,65 litre  
 A01 = 10 bar  
 E = EPDM rubber bladder  
 Body & insert material polipropilene  
 3/4" standard connection

PP = POLIPROPILENE  
 PD = PVDF  
 PC = PVC

PRESSURE DESIGN 10 BAR ALL SIZES



TOLERANCES:  
 EXTERNAL DIMENSIONS: ±2%  
 VOLUME: ±1,5% WEIGHT: ±3,5%

PULSATION DAMPER REF.	VOLUME (litres)	D (mm)	L (mm)	R (BSP)	WEIGHT (Kg)		K VALUE
					PC & PD	PP	
U001	0.07	60	98	3/8"	0,35	0,25	2,5
U002	0.15	80	135	1/2"	0,7	0,5	
U003	0.35	90	170	3/4"	1,2	0,8	3
U007	0.65	100	230		1,8	1,2	3,5
U010	0.95	130	245	1"	3	2	3
U015	1.40		295		3,5	2,4	
U030	2.60		325		5	3,5	
U040	3.70	160	422	1 1/2"	5.8	4	5
U060	5.60		458		13	9	
U100	9.50	250	500	2"	20,4	14	4
U150	15		672		23,3	17	2,5
U200	21		880		27,7	21	3

\*\* MINIMUM SAFETY FACTOR: 4:1

INFLATING WITH GAS (N2), AND MOUNTING POSITION: VERTICAL, VALVE ③ UP

STANDARD BLADDER RUBBERS N=NBR, E=EPDM, V=FPM

MAXI. WORKING TEMPERATURES +50, -5°C

THE MAXI. WORKING TEMPERATURES CAN BE REDUCED DEPENDING UPON THE LIQUID AND TIME OPERATION

6	COVER	1	(+) PP, PD or PC
5	BODY	1	(+) PP, PD or PC
4	RETAINING RING	1	(+) PP, PD or PC
3	INFLATING (AIR OR N2) VALVE	1	AISI 316 1/4" BSP
2	INSERT (BUTTON)	1	(+) PP, PD or PC
1	BLADDER	1	NBR, EPDM, & FPM
N°	DENOMINATION	QT.	MATERIALS



**HIDRACAR SA**  
 08295 S.VTE. CASTELLET  
 (BARCELONA) SPAIN  
 TEL. 34.93.8330252 FAX. 34.93.8331950

Customer  
 Title PLASTIC PULSATION DAMPERS  
 (standard units)

Customer Ref.  
 Replaced Drg.No  
 AV.PL.BP.IN.DOC.Rev08  
 Drg.No  
 AV.PL.BP.IN.DOC.

Drawn  
 Approved  
 J.FONT  
 Date  
 Scale  
 Rev. 09  
 Date: 14.10.10 MAR.03

A20=200bar  
 A10=100bar  
 A05=50bar  
 A04=40bar  
 A03=30bar  
 A02=20bar

\*\* wall thickness calculation according to AD 2000 Code

ORDER EXAMPLE: M030 A03 T 1 AI

Capacity: 2,8 litres  
 A03=30bar  
 T=TFM1600 MEMBRANE  
 1-1/2" standard connection  
 Body & insert material: AISI 316L

Tolerances: External dimensions: ±3% / Volume: ±2.5% / Weight: ±4%

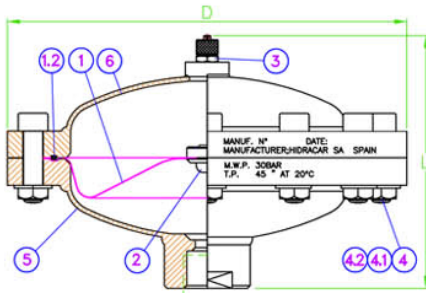
FOR OTHERS PRESSURES, SIZES, MATERIALS AND CONNECTIONS, PLEASE CONSULT

Note:  $\frac{\text{Working Pressure}}{\text{Filling gas Pressure}} \leq 2$  (@Constant Temp.) K

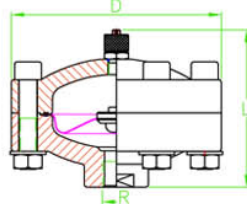
⊕ In this model the working p. ≤ 1,5 x filling gas pressure ⊕ constant temperature

RECOMMENDED MOUNTING POSITION: VERTICALITY, VALVE (3) ON TOP

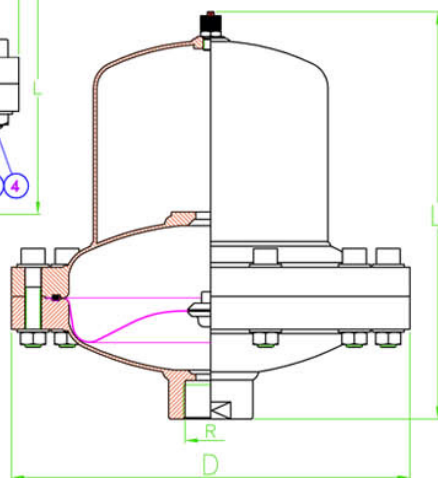
TEMPERATURES RANGE  
 -40° to +200°C



M008 to M030 & M060



M002 & M004



M040 & M100

PULSATION DAMPER REF.	VOLUME (litres)	DESIGN PRESSURE (bar @ 20°C)	D (mm)	L (mm)	R (BSP)	WEIGHT (Kg)
M002	0.2	200	140	100	1/2"	5,2
M004	0.4	100	164	122		9,2
M008	0.8	50	180	150	3/4"	5
M012	1,2	40	224	160	1-1/2"	7,5
M030	2.8	30	289	180		15,5
M040	4			275	17	
M060	5.6	20	340	233	24,5	
M100	10			398	26	

6	UPPER SHELL	1	AISI 316L
5	LOWER SHELL	1	AISI 316L
4.2	NUT	8 to 12	DIN934 A4.70
4.1	GASKET	8 to 12	DIN125 A4.70
4	BOLT	8 to 12	DIN912 A4.70
3	FILLING N2 VALVE	1	AISI 316L (1/4" BSP)
2	INSERT (button)	1	AISI 316L
1.2	"O" RING	1	SILICONE
1	MEMBRANE	1	PTFE (TFM1600)
N°	DENOMINATION	QT.	MATERIALS

\*\* WORKING TEMPERATURES VERSUS DESIGN PRESSURES

FOR A WORK TEMPERATURE OF	50°C	100°C	150°C	200°C	CORRESPOND THE DESIGN PRESS.
"	"	"	"	"	x0,94
"	"	"	"	"	x0,82
"	"	"	"	"	x0,75
"	"	"	"	"	x0,68



**HIDRACAR SA**  
 08295 S.VTE. CASTELLET  
 (BARCELONA) SPAIN  
 TEL. 34.93.8330252 FAX. 34.93.8331950

Customer  
 Title S.S.PULSATION DAMPER MEMBRANE

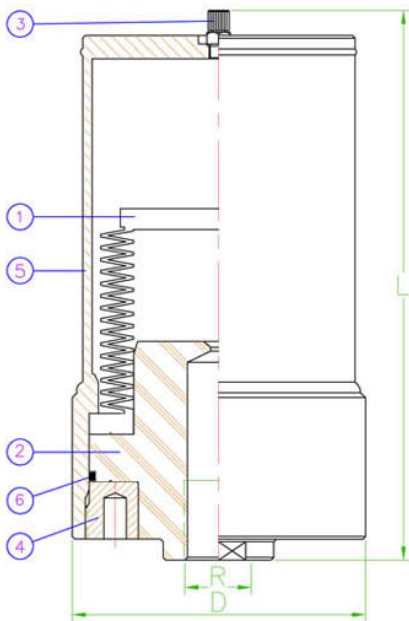
Customer Ref.  
 Replaced Drg.No  
 AM.AI.BP.IN.DOC-Rev14  
 Drg.No  
 AM.AI.BP.IN.DOC.

Drawn  
 Checked  
 J.FONT  
 M.CARCARE  
 Rev. 15  
 Date: 17.05.11  
 Date  
 Scale  
 JUL 05  
 none

Note:  $\frac{\text{Maxi. Pressure}}{\text{Filling gas Pressure}} \leq 2$  (@Constant Temp.)

ORDER EXAMPLE: F030 A02 T 1 AI PD  
 Capacity; 2.6 litres  
 A02=20bar Nozzle material;PVDF  
 T=PTFE bellows Body material;AISI316  
 1" standard connection

DIR/HIDRACAR01/B-005 PLANOS TECNICOS/Ingen/REV07



(+) PTFE = TF  
 (+) PVDF = PD  
 (+) PVC = PC

TOLERANCES:  
 External dimensions:  $\pm 3\%$   
 Volume:  $\pm 2.5\%$  Weight:  $\pm 5\%$   
 FOR HIGHER PRESSURES, PLEASE CONSULT

PULSATION DAMPER MODEL	MAXI. ΔV ADMITTED (c.c.)*	VOLUME (litres)	D (mm)	L (mm)	R (BSP)	WEIGHT (kg.)
F002	15	0.15	64	180	1/2"	1,8
F003	45	0.3	78	240		2,6
F007	120	0.7	98	225	3/4"	4,9
F015	250	1.4	112	295		6,6
F030	600	2.6	158	320	1"	12
F040		3,7		385		12,5
F060		5.6		490		13,5
F100	1500	9.5	212	465	2"	24

6	SEAL GASKET	1	FEP
5	BODY	1	AISI 316
4	RETAINING NUT	1	AISI 304
3	FILLING (AIR OR N2) VALVE	1	AISI 316 (1/4" BSP)
2	NOZZLE	1	(+)( PVDF, PTFE or PVC)
1	BELLOWS	1	PTFE
N°	DENOMINATION	QT.	MATERIALS

WORKING LIMITS TEMPERATURES(°C): (-15°, +70° for PVDF), (-5°, +50° for PVC) (-40°, +200° for PTFE)

THE MAXI TEMPERATURE CAN BE REDUCED DEPENDING ON THE LIQUID IN CONTACT

Those Pulsation Dampeners ought to be filled with gas at a value of 0.80x the pressure to stabilize and that at the working temperature

\*\*  $\Delta V \geq C/2$  for a single head pump ("C"=Head pump volume)  
 $\Delta V \geq C/6$  for a duplex heads pump  
 $\Delta V \geq C/18$  for a three heads pump

NOTE: The precharge with gas or air must be done slowly and with the adequate tool

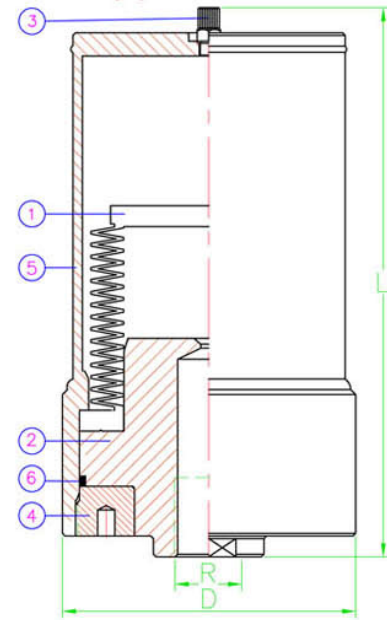
**HIDRACAR SA**  
 08295 S.VIE. CASTELLET  
 (BARCELONA) SPAIN  
 TEL.34.93.8330252 FAX.34.93.8331950

Customer	Customer Ref.	Replaced Drg.N°	Drawn	Approved
Title PULSATION DAMPER WITH PTFE BELLOWS,SS BODY (ALL PARTS IN CONTACT WITH LIQUID IN PTFE AND PVDF or PVC)	AFT.AI.BP.IN.PL.DOC	AFT.AI.BP.IN.PL.DOC.REV.07	Rev. 08	M.Carcaré
			19.02.10	Date Scale MAY07

Note:  $\frac{\text{Maxi. Pressure}}{\text{Filling gas Pressure}} \leq 2$  (@Constant Temp.)

ORDER EXAMPLE: F007 A05 T 1 AI  
 Capacity; 0.7 litre  
 A05=50bar Body material;AISI316  
 T=PTFE bellows 1" standard connection

DIR/HIDRACAR01/B-005 PLANOS TECNICOS/Ingen/REV06(2007)



(void thickness calculations according to AD Merkblatt code)  
 TOLERANCES:  
 External dimensions:  $\pm 3\%$   
 Volume:  $\pm 2.5\%$  Weight:  $\pm 5\%$   
 FOR HIGHER PRESSURES, PLEASE CONSULT

PULSATION DAMPER MODEL	MAXI. ΔV ADMITTED (c.c.)*	VOLUME (litres)	PRESSURE DESIGN *(bar)	D (mm)	L (mm)	R (BSP)	WEIGHT (kg.)	*** Notified Body:TÜV	PRESSURE VESSELS CE(P.E.D.)
									TABLE 1   TABLE 2
F002	15	0.15	160	64	180	1/2"	2.3	Art.3.3	Class II Module B+F   Class I Module A
F003	45	0.3	140	78	240		3.7		
F007	120	0.7	50	98	225	6.2			
F015	250	1.4	39	112	295	9.7			
F030	600	2.6		158	320	16			
F040		3,7		385	16.5				
F060	5.6	490	18	Class III Module B+F   Class II Module B+F					
F100	1500	9.5	29	212	465	1 1/4"	32	Class III Module B+F   Class II Module B+F	

TO REDUCE LEVEL OF CLASS		
Dampener	VolumexCircuit Work.	Pressure
TABLE 1	TABLE 2	***
25<PxV<50	50<PxV<200	Class I
50<PxV<200	200<PxV<1000	Class II
200<PxV<1000		Class III

TEMPERATURES RANGE -20°, +160°C

THE MAXI TEMPERATURE CAN BE REDUCED DEPENDING ON THE LIQUID IN CONTACT

WORKING TEMPERATURES VERSUS WORKING PRESSURES \*  
 FOR A TEMPERATURE OF 50°C CORRESPOND THE PRESS. DESIGN x0,95  
 " " " 100°C " " PRESS.DESIGN x0,85  
 " " " 160°C " " PRESS.DESIGN x0,76

Those Pulsation Dampeners ought to be filled with gas at a value of 0.8x the pressure to stabilize and that at the working temperature

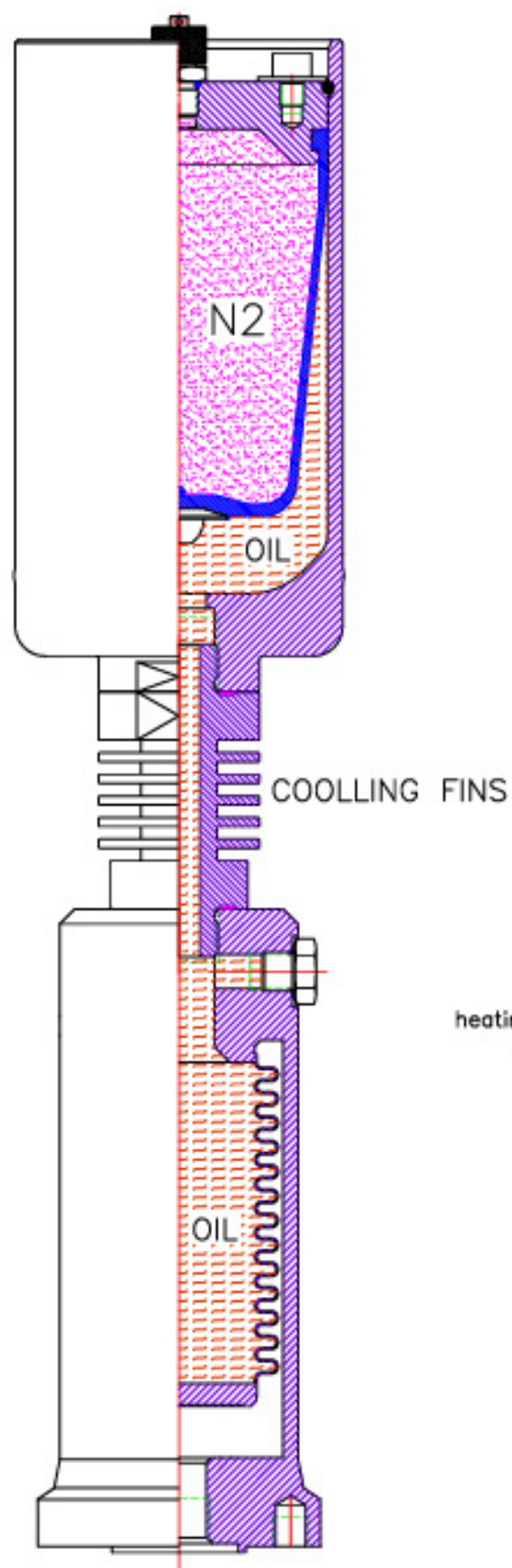
\*\*  $\Delta V \geq C/2$  for a single head pump ("C"=Head pump volume)  
 $\Delta V \geq C/6$  for a duplex heads pump  
 $\Delta V \geq C/18$  for a three heads pump

NOTE: The precharge with gas or air must be done slowly and with the adequate tool

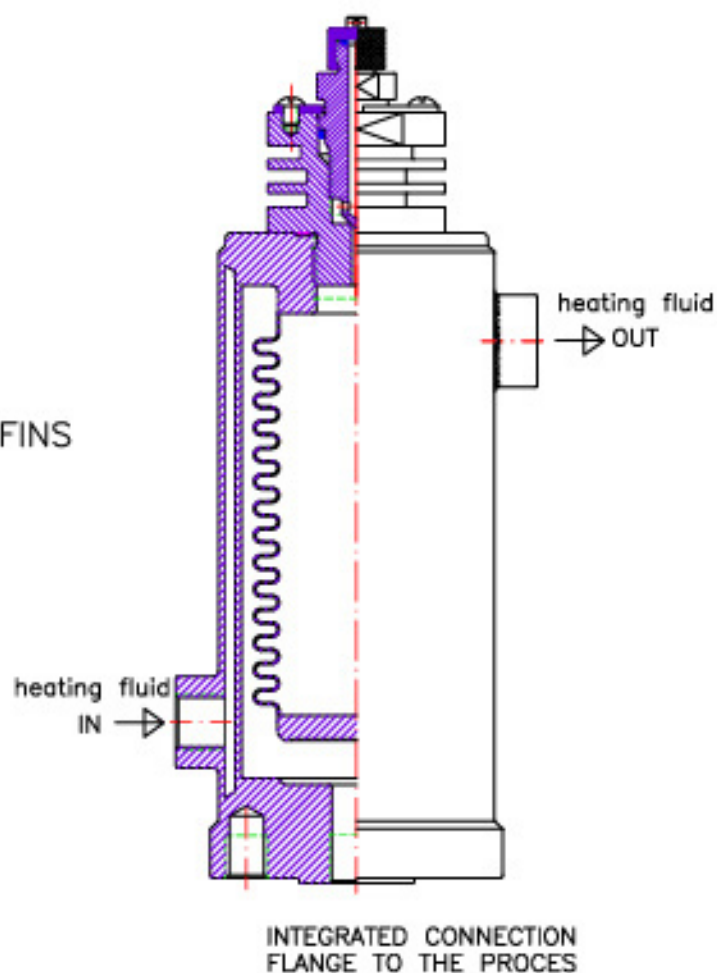
**HIDRACAR SA**  
 08295 S.VIE. CASTELLET  
 (BARCELONA) SPAIN  
 TEL.34.93.8330252 FAX.34.93.8331950

Customer	Customer Ref.	Replaced Drg.N°	Drawn	Approved
Title PULSATION DAMPER WITH PTFE BELLOWS,SS BODY	AFT.AI.BP.IN.DOC	AF.AI.BP.IN.DOC.REV05	Rev. 06	M.Carcaré
			06	Date Scale MAY07





DAMPENER WITH HEATING JACKED



## HIGH WORKING TEMPERATURE PULSATION DAMPERS

Customer

Title S.S.BELLOWS PULSATION DAMPER WITH HEATING JAQUET & WITH BLADDER ACCUMULATOR

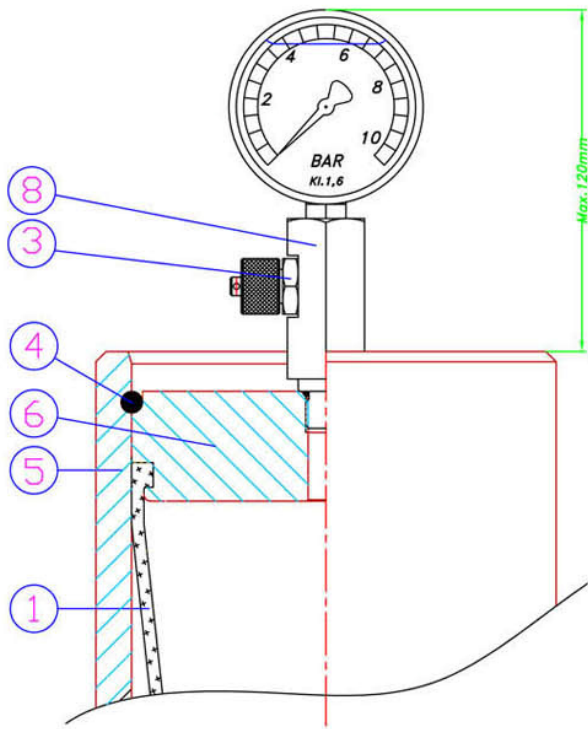


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**NOTE:**

TO CHARGE WITH N2 GAS OR COMPRESSED AIR WITH THE ADAPTOR ADACNEU.5

8	"T" + MANOMETRE	1	VARIOUS
6	COVER	1	AISI 316, PP, PVC, PVDF..
5	BODY	1	AISI 316, PP, PVC, PVDF..
4	RETAINING RING	1	DIN17224(AISI302)
3	CHARGING VALVE	1	AISI 316
1	BLADDER	1	Nitrile,EPDM,& FPM
Nº	DENOMINATION	QT.	MATERIALS

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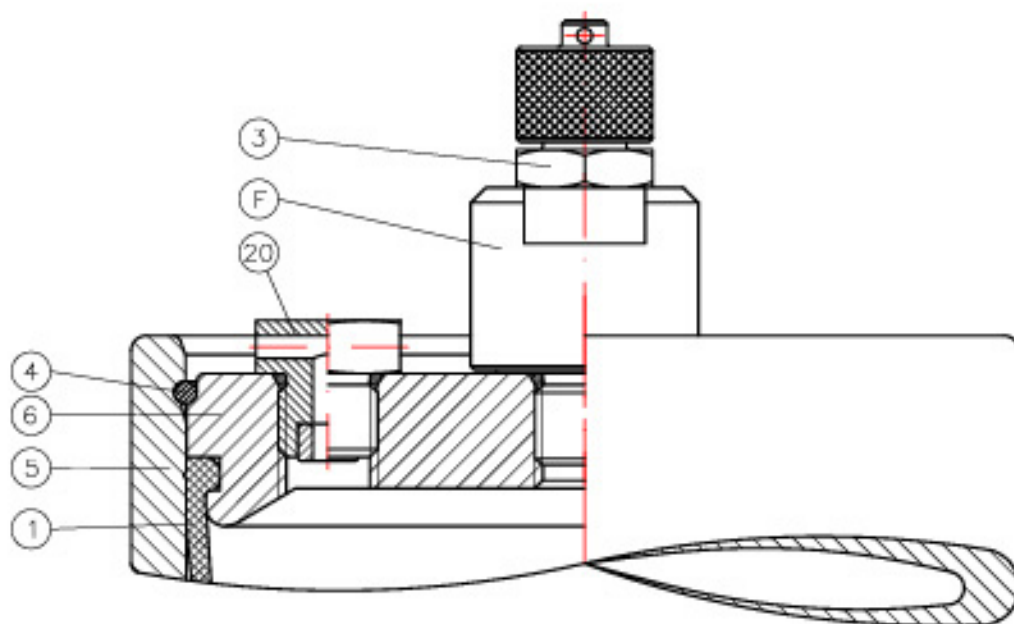
Customer	Customer Ref.	Drawed	Approved
Title PULSATION DAMPERS WITH "T" + MANOMETRE ON GAS SIDE	Drg.No "T"+MANOMETRE	Rev. 00	E. Ponsa
			Date 02.05.05
			Scale

(F)

THE TEMPERATURE FUSE ADAPTER MOUNTED ON THE DAMPENER GAS SIDE AVOIDS DAMPENER EXPLOSION IN CASE OF AN EXTERNAL FIRE . WHEN THE EXTERNAL TEMPERATURE RISE 160°C A SEAL RING MELTS AND THE GAS CONTAINED IN THE DAMPENER IS EXHAUSTED TO THE ATMOSPHERE

**MOUNTING INSTRUCTIONS IN AN ACCUMULATOR(OR DAMPENER) ALREADY INSTALLED**

- I) Vent the internal gas from the accumulator or dampener(use the adequate tool)
- II) Unscrew the filling gas valve(3) already installed in the accumulator or dampener
- III) In the free thread hole screw the security temperature fuse body (F)
- IV) Screw the filling gas valve(3) on the top of the fuse body(F)
- V) Fill the accumulator or dampener again with gas(N2) at the adequate pressure



(20)

THE RUPTURE DISC PLUG IS A DEVICE THAT PREVENTS THAT THE ACCUMULATOR OR PULSATION DAMPER, EXPLODES IN CASE OF EXCESS PRESSURE IN THE HYDRAULIC CIRCUIT TO WHICH THE PRESSURE VESSEL IS CONNECTED.THE RUPTURE DISC MUST BE CALCULATED AT A VALUE OF AT LEAST 25% ABOVE THE CIRCUIT MAXIMUM PRESSURE TO AVOID THE RUPTURE BY FATIGUE. IN CASE OF FIRE THE RUPTURE DISC DOES NOT GUARANTEE THAT THE INTERNAL GAS WILL BE EXHAUSTED TO THE ATMOSPHERE BEFORE THE VESSEL RUPTURES

RUPTURE DISC STANDARD RELIEF RANGES  
230,460 & 600 BAR(+,-3%)\*

PURCHASE ORDER REF.

(F) FST-AI-00

(20) VS-\*

20		1	CK-22
6	GAS COVER	1	AISI 316
5	DAMPENER/ACCU. BODY	1	AISI 316
4	RETAINING RING	1	DIN 17224 (AISI302)
3		1	AISI 316
F		1	AISI 316
1	BLADDER	1	NITRILE/EPDM/VITON

**HIDRACAR SA**

08295 S.VTE. CASTELLET

(Barcelona)SPAIN

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Fax 34.93.8331950

Customer

Reference

Drawed

Aproved

Maurici Cobo

M.CARCARE

Drawing N° SECURITY TEMPERATURE FUSE & RUPTURE DISC PLUG

Revisions

Date

Escale

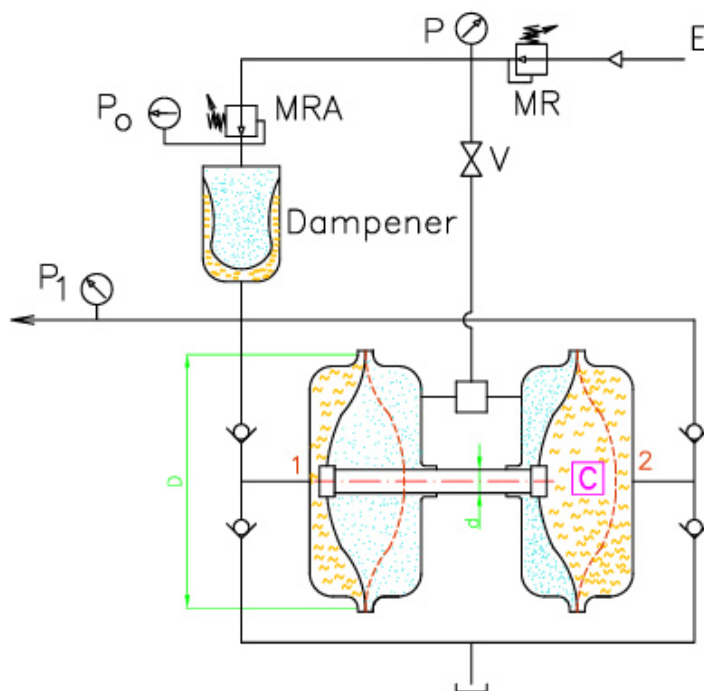
01

11.07.03

16.06.03

1:1

# PULSATION DAMPER APPLICATION ON AN AIR VARIABLE PRESSURE DRIVING MEMBRANE PUMP



E – Air at ~8 bar from factory circuit.

MR – Air pressure reducer

MRA – Inside Dampener air pressure Reducer

V – Isolating valve. Keep this valve closed before start pumping. Once the working and the inflating pressures has been adjusted, then open the valve "V"

NEVER start pumping liquid without air inside the Dampener. The Bladder, Membrane or Bellows of the Dampener can be damaged

P – Air driving pressure

P<sub>1</sub> – Liquid pumped pressure

P<sub>0</sub> – Dampener inflating pressure

$$P \times (D-d)^2 = P_1 \times D^2$$

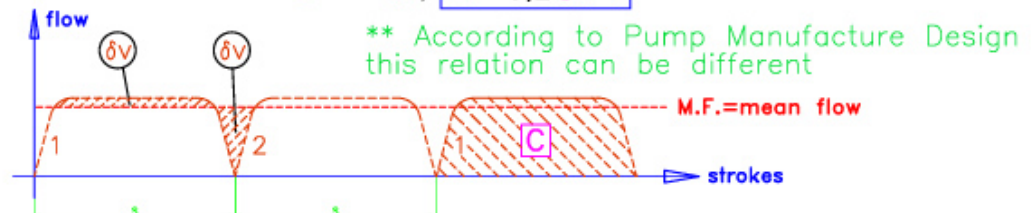
$$P_1 = \frac{P \times (D-d)^2}{D^2} \quad ; \quad \frac{(D-d)^2}{D^2} = \text{PUMP CONSTANT} = K$$

$$P_0 \approx 0.75 \times P_1 \rightarrow P_0 \approx 0.75 \times P \times K$$

P <sub>1</sub> versus P <sub>0</sub> @Constant Temperature	
P <sub>1</sub>	P <sub>0</sub>
8	6
7	5
6	4,5
5	3,5
4	3
3	2
2	1,5
1	0,7

δv = Liquid going into/out the Dampener  
C = Liquid volume pumped per stroke  
S = Pump stroke

\* Relation between C and δv; δv ≈ 0,2 C \*\*



FORMULA TO CALCULATE THE PULSATION DAMPER SIZE (V<sub>0</sub>)\*

$$V_0 \approx 15 \times \delta v **$$

\*FOR A RESIDUAL OSCILATING PRESSURE OF APROX. +,-5% @ CONSTANT TEMPERATURE (To reduce this percentage, increase the Dampener size or for more accuracy, see our Pulsation Damper Technical and Practical Article)



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## **INSTRUCTIONS FOR USE, MAINTENANCE & DISMANTLING OF OUR HYDROPNEUMATIC ACCUMULATORS AND PULSATION DAMPERS**

### **USE**

For a correct function of an hydro-pneumatic accumulator or a pulsation damper, the apparatus should be pre-charge with gas (DRY NITROGEN) at a pressure between 0,7 to 0,9 of the minimum pressure of the circuit, according to different applications.

The maximum pressure in the circuit must NEVER be higher than the maximum working pressure of the apparatus which is indicated on the adhesive label.

The working temperature of the liquid must always be between those max. and min. showed in the label.

The bladder rubbers or seals must be suitable with the liquid of the circuit.

The thread of the port connection of the accumulator must be identical to the thread of the adapter connection to the pipe circuit. **ATTENTION** if a play exists between threads, made a control to see which is out of norm and tolerance.

**DO NOT** try to compensate the excess clearance between threads, with Teflon tape or similar.

The nominal size of an accumulator shows very approximately the inside volume of the shell in litres, but not the amount of liquid that can store. It depends on the range of pressures at which the apparatus should work.

### **MAINTENANCE**

Our apparatus do not need practically any maintenance.

We only recommend every six or ten months, to verify the pre-charge pressure. For this reason, you must use the charging kit assembly (see on the charging instructions sheet, how to use this accessory).

When the apparatus is submitted at limit working condition such as max. temperature, very corrosive liquid, 24 hours working, etc; then you must make a control of pre-charging pressure every three months.

### **DISMANTLING**

Before proceeding to dismantle the apparatus, you must be sure all the remaining gas is exhausted to the atmosphere, using the charging kit.

When the apparatus is completely empty of gas, you have to proceed to remove the end closure introducing it into the body until the retaining ring is free and it can be removed from the groove existing in the shell (see catalogue or drawing). You have to take out before the retaining bolt in the closure when existing.

When the retaining ring is out, the end closure can be easily removed with the help of an adequate extractor. This can be attached on the charging valve (3) thread for pulling on.

When introducing or removing the closure (end cover), you must be sure it moves completely coaxial with the body (shell) of the apparatus. We recommend for piston type accumulators to change always the seals after removing end plates (closures) and piston.

For re-assembling you have to proceed exactly at reverse of dismantling, using a high unctuousness lubricant suitable with the rubber bladder compound.

For bladder type accumulator, when removing the end closure, the bladder should follow it.

---

**HIDRACAR S.A.**

## INSTRUCTIONS FOR USE, MAINTENANCE & DISMANTLING OF OUR PULSATION DAMPERS MEMBRANE TYPE

### USE

For a correct function of a pulsation damper, the apparatus should be pre-charged with gas (DRY NITROGEN) at a pressure between 0,7 to 0,8 of the minimum pressure of the circuit.

The maximum pressure in the circuit must NEVER be higher than the design pressure of the apparatus which is indicated on the adhesive label.

The working temperature of the liquid must always be between those max. and min. showed on the label.

The bladder rubbers or seals must be suitable with the liquid of the circuit.

The thread of the port connection of the dampener must be identical to the thread of the adapter connection to the pipe circuit. **ATTENTION** if a play exists between threads, made a control to see which is out of norm and tolerance. **DO NOT** try to compensate the excess clearance between threads, with Teflon tape or similar.

The nominal size of a dampener shows very approximately the inside volume of the shell in litres, but not the amount of liquid that can store. It depends on the range of pressures at which the apparatus will work.

### MAINTENANCE

Our apparatus do not need practically any maintenance.

We only recommend, every six or ten months, to verify the pre-charge pressure. For this reason, you must use the charging kit assembly (see on the charging instructions sheet, how to use this accessory).

When the apparatus is submitted at limit working conditions such as max. temperature, very corrosive liquid, 24 hours working, etc; then you must make a control of pre-charging pressure every three months.

### DISMANTLING

Before proceeding to dismantle the apparatus, you must be sure all the remaining gas is exhausted to the atmosphere, using the charging kit.

When the apparatus is completely empty of gas, you have to proceed to remove the upper shell, unscrewed the nuts (4.2) of the bolts (4).

When the bolts are out, the upper shell can be easily removed, and can be checked the membrane (1) + insert (2) and the Silicone "O"-ring (1.2). If the membrane is broken, it should be changed for a new one. You should also change the Silicone "O"-ring (1.2)

Be careful because the "O" ring (1.2) is located in the upper shell side (see drawing).

Once the membrane (1) and "O"-ring (1.2) are on their place, you should screw the bolts (4) and nuts (4.2) with their gaskets (4.1)

The tightening torque needed depends on the size of the bolts:

For a bolt size of M10 the tightening torque should be 36 Nm
" " " " " M12 " " " " " 62 Nm
" " " " " M14 " " " " " 98 Nm
" " " " " M16 " " " " " 150 Nm
" " " " " M18 " " " " " 213 Nm
" " " " " M20 " " " " " 303 Nm

HOW TO USE: screw up the adapter on the PULS.DAMP. charging valve(3) be sure that the "o"ring is in place on the valve,then proceed as inflating a car tire

UTILISATION: visser l'adaptateur dans la valve(3) de gonflage du BALLON,s'assurer que le joint torique est a sa place dans la valve,après faire comme le gonflage d'un pneu de voiture

UTILIZACION:enroscar el adaptador en la válvula(3) de hinchado del AMORTIGUADOR verificar que la junta tórica este en su alojamiento en la válvula,seguidamente proceder como en el hinchado de un neumático de automovil

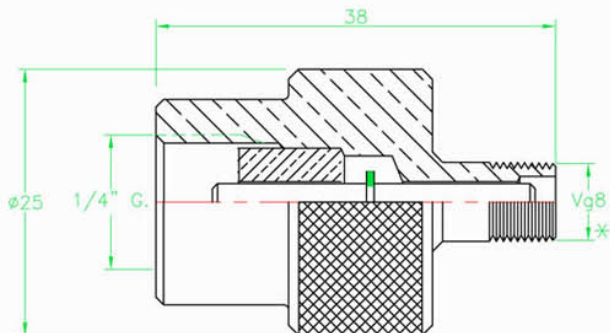
ANLEITUNG: Den adapter auf das aufblasventil (3) des Dämpfers einschrauben Sicherstellen ,dass sich der toriche Verschlussring an seinen vorgesehenen Platz auf dem ventil befindet, danach verfahren wie beim aufpumpen eines autoreifens.

ADAPTER ZUR BELASTUNG UNSERER PULSSCHLAGDÄMPFER, MIT KOMPRIMIERTER LUFT, BEI DER MAN DAS AUFPUMPGERÄT VON REIFEN BENUTZT( bei Werten bis 10 bar)

ADAPTER FOR PRECHARGING WITH COMPRESSED AIR OUR PULSATION DAMPERS,USING A TIRE INFLATE KIT\*(for precharging values under 10 bar)

ADAPTEUR POUR PRECHARGER NOS BALLONS AMORTISSEURS AVEC DE L'AIR COMPRIE EN UTILISANT L'UTILE DE GONFLAGE DES PNEUS\* (pour valeurs de precharge en dessous de 10 bar)

ADAPTADOR PARA CARGAR NUESTROS AMORTIGUADORES DE PULSACIONES, CON AIRE COMPRIMIDO,UTILIZANDO EL ACCESORIO DE HINCHADO DE LOS NEUMATICOS\*(para valores de carga de hasta 10 bar)



MATERIAL

MESSING  
BRASS  
LAITON  
LATON

N.B.The pulsation damper bladder inflate operation ought to be done slowly and carefully and always with the adequate tool

L'opération de gonflage de la vessie du ballon amortisseur doit être fait toujours,lentement et attentivement et toujours avec l'utile adéquat

Das aufblasen der Blase der pulsschlagdämpfers wird langsam und vorsichtig vorgenommen und immer mit dem vorgesehenen werkzeug

La operación de hinchado de la vejiga de los amortiguadores de pulsaciones se efectuara lentamente y con cuidado y siempre con el útil adecuado

 **HIDRACAR SA**  
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TEL.34.3.8330252 FAX.34.3.8331950

Customer

Customer Ref.

Drawed

Checked

Title

Drg.No

ADACNEU.5

Rev.

05

M.CARCARE

Date Scale

01.08.02 2/1

# INSTRUCTIONS OF USE OF THE HIDRACAR CHARGING & CONTROL GAS KIT FOR PULSATION DAMPERS AND HYDROPNEUMATIC ACCUMULATORS

## DESCRIPTION

THE COMPLETE KIT CONSISTS IN:

- A block (max. W.P. 350 Bar) with manometer, depress core valve handle, venting purge and a check valve with a swivel nut to screw it to the accumulator charging valve (N° 3) (see drawing N° BV-350/A).
- 1.5 meter flexible hose (for a max. W.P. of 300 Bar).
- An adapter female thread to connect to the Nitrogen Cylinders Valve.
- A plastic case to protect and handle.

NOTE : The limit scale of the manometer should approximately be 30% higher than the pre-charging gas value.

## HOW TO USE

Charge with gas (**ONLY NITROGEN**); Oxygen is prohibited due to the danger of explosion by contact with oxidant liquids or Diesel effect).

I- You must remove the accumulator charging valve plug (N° 3).

II- Before screwing the nut (N°5) on the charging valve, you must check if the "O" Ring is placed on the charging valve socket. The core depressor pin must be hidden inside the block (the handle (1) must be completely turned anticlockwise and the venting gas valve handle (4) must be firmly screwed).

III- You must connect the hose on the side with the plane seat fitting to the check valve (3) located in the block (check again if the "O" Ring is on its place).

IV- You must connect the other side of the hose, with the adapter (c) female thread, to the nitrogen cylinder valve and open the cylinder gas valve slowly. You should do it with the accumulator in vertical position and, if possible, keep the accumulator fixed on the port.

V- When the needle of the manometer is approximately 15% over the desired charging gas value, you must close the cylinder valve, you vent the gas inside the block, you close again and you turn the handle (1) slowly clockwise. The pin will pilot the core of the charging valve and the pressure inside the accumulator must be indicated in the manometer. You have to adjust the correct charging gas value venting some gas if it is necessary.

Note : When the gas is compressed, its temperature rises. With high charging gas values, you have to wait a few minutes before checking it.

If the working temperature is higher than the ambient, you have to use the following formula to determine the charging pressure:

$$P_0 (\text{fill}) = P_0 (\text{need}) \times \frac{\text{charging temp} + 273}{\text{working temp.} + 273} \quad (P_0 = \text{Charging pressure})$$

When dismantling the flexible hose, you must be careful with the gas stored inside.

To check the pressure inside the accumulator, you must proceed as I, II, and 2on line of V.

## REFERENCE FOR A COMPLETE KIT

	BV	250	A	1	S	M
Block code	_____	_____	_____	_____	_____	_____
Manometer scale (Ex. From 0 to 250 bar)	_____	_____	_____	_____	_____	_____
Our standard swivel nut with 1/4"G thread ("B" for 5/8"UNF and "C" for Vg8)	_____	_____	_____	_____	_____	_____
Flexible hose (1.5 meter long)	_____	_____	_____	_____	_____	_____
Adapter for cylinder gas valve thread ("S" for W21.8 x 1/14" F, "T" for W24.3 x 1/14" F, "Y" for 5/8 ISO 228, "Z" for W21.8 x 1/14" M)	_____	_____	_____	_____	_____	_____
With plastic case	_____	_____	_____	_____	_____	_____

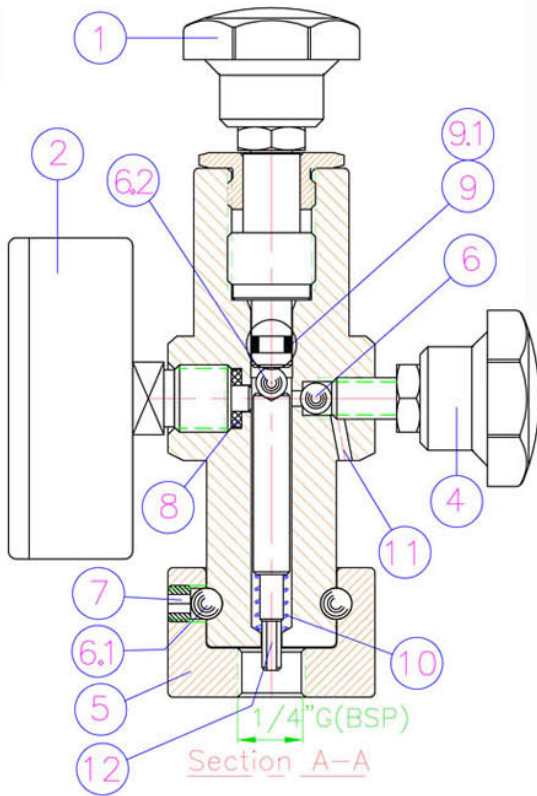
Complete kit weight : 2.5 Kg

HIDRACAR S.A. P.O. BOX 35 08295 St. VICENÇ CASTELLET (BARCELONA) SPAIN  
TEL.+34.93.8330252 FAX. +34.93.8331950 E-mail: hidracar@hidracar.com Web: www.hidracar.com



MAX.WORKING PRESSURE:600BAR

Body & nuts material: 1.0718 ( nickel coating)



MANOMETER SCALE  
End scale=250 bar

1-Handle for depress the core in the Pulsation Damper(Accumulator)inflating valve  
2-Manometer(scales according to the different charging pressures)

3-Check valve to connect with the gas filling hose  
4-Venting handle to release the gas

5-Swivel nut to attach to our standar Pulsation Damper inflating gas valve

6-Venting closure ball  
6.1-Retaining nut balls  
6.2-Transfer ball  
7-Allen Screw  
8-Pressure gage seal  
9-"O"Ring(ref.HC2008 NBR)

9.1-Back up Ring(ref.HC8008 NBR)  
10-Spring  
11-Exhaust hole  
12-Core depressor pin

**HIDRACAR SA**  
08295 S.VTE. CASTELLET  
(BARCELONA) SPAIN  
TEL.34.93.8330252 FAX.34.93.8331950

Customer  
Title CHARGING & CONTROL GAS BLOCK FOR OUR PULSATION DAMPERS AND ACCUMULATORS

Customer Ref.  
Drg.No BV250A1TM

Drawn	Checked	
E. Ponsa		
Rev. 01	Date 10.11.09	Scale 1:1



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ISO 9001