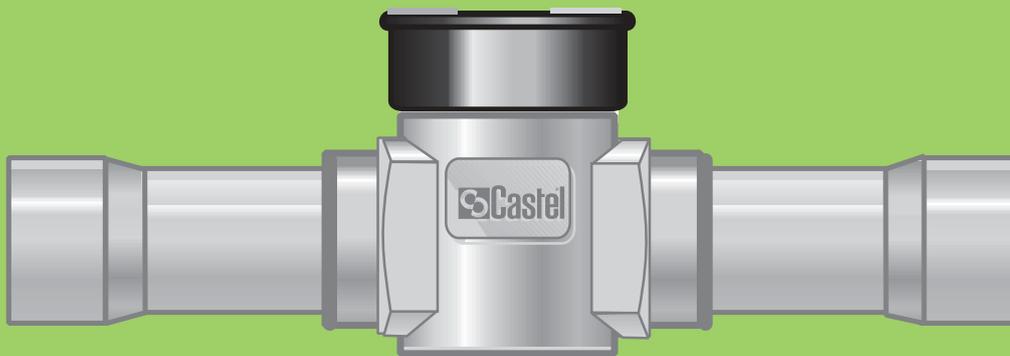


LIQUID INDICATORS & MOISTURE-LIQUID INDICATORS



 **Castel**[®]



LIQUID INDICATORS & MOISTURE-LIQUID INDICATORS

APPLICATIONS

The indicators, shown in this chapter, are classified “Pressure accessories” in the sense of the Pressure Equipment Directive 97/23/EC, Article 1, Section 2.1.4 and are subject of Article 3, Section 1.3 of the same Directive.

The indicators series 3780 are excluded from the scope of Directive 97/23/EC, as specified in the Guidelines 1/8 and 1/9, because they are piping components.

They are designed for installation on commercial refrigerating systems and on civil and industrial conditioning plants, which use refrigerant fluids proper to the Group II (as defined in Article 9, Section 2.2 of Directive 97/23/EC and referred to in Directive 67/548/EEC).

Liquid indicators and moisture liquid indicators ensure a fast and safe inspection of the conditions of the refrigerant fluid in the circuit concerning regular flow and moisture. Liquid indicators also ensure inspection of the regular return of oil to the compressor crankcase.

OPERATION

The moisture/liquid indicators consist of a sensitive element as a ring, which changes color passing from green to yellow according to the percentage of moisture in the system.



The data of moisture content, shown in table 1 with the “green” color, can be considered admissible for the proper working of the system. When the sensitive element from green fade to yellow, “green Chartreuse”, working conditions of the system could become difficult. When the sensitive element becomes “yellow”, it’s time to substitute the dehydrator filter. If the charge and working condition are normal, the refrigerant fluid appears perfectly liquid underneath the “lens” of the indicator. The presence of bubbles indicates that the refrigerant fluid is partial evaporating along the liquid line.

TABLE 1: Moisture contained in the fluid [p.p.m.]

Colour	Refrigerant fluid					
	R22	R134a	R404A	R407C	R410A	R507
Green	<60	<75	<30	<30	<30	<30
Green “Chartreuse”	60	75	30	30	30	30
Yellow	>60	>75	>30	>30	>30	>30

CONSTRUCTION

Castel liquid indicators and liquid/moisture indicators are manufactured with the glass “lens” which has been fused onto the metallic ring. This construction permits the total elimination of sealing gasket between the glass disc and the metallic structure with the consequent elimination of possible refrigerant leaks.

The main parts of the indicators are made with the following materials:

- hot forged brass EN 12420 – CW 617N for body;
- copper tube EN 12735-1 – Cu-DHP for solder connections;
- steel, with proper surface protection, for the ring;
- chloroprene rubber (CR) for outlet seal gaskets;
- elastomer polyester for cap that covers the ring.

TABLE 2: General Characteristics

Catalogue Number		Connections									TS [°C]		PS [bar]	Risk Category according to PED
Liquid Indicators	Moisture Liquid Indicators	Type	SAE Flare	ODS		ODM		for pipe			min.	max.		
				Ø [in.]	Ø [mm]	Ø [in.]	Ø [mm]	Ø [in.]	Ø [mm]	Ø Foro [mm]				
3610/22	3710/22	male male	1/4"	-	-	-	-							
3610/33	3710/33		3/8"	-	-	-	-							
3610/44	3710/44		1/2"	-	-	-	-							
3610/55	3710/55		5/8"	-	-	-	-							
3610/66	3710/66		3/4"	-	-	-	-							
3620/M12	3720/M12	soldering	-	-	12	-	-							
3620/5	3720/5		-	5/8"	16	-	-							
3620/M18	3720/M18		-	-	18	-	-							
3620/M22	3720/M22		-	-	22	-	-							
3640/2	3740/2		-	1/4"	-	-	-							
3640/3	3740/3		-	3/8"	-	-	-							
3640/M10	3740/M10		-	-	10	-	-							
3640/M12	3740/M12		-	-	12	-	-							
3640/4	3740/4		-	1/2"	-	-	-	-	-	-				
3640/5	3740/5		-	5/8"	16	-	-							
3640/M18	3740/M18		-	-	18	-	-							
3640/6	3740/6		-	3/4"	-	-	-							
3640/7	3740/7		-	7/8"	22	-	-							
3640/9	3740/9		-	1.1/8"	-	-	-					-30	+110	
3650/22	3750/22		male female	1/4"	-	-	-	-						
3650/33	3750/33	3/8"		-	-	-	-							
3650/44	3750/44	1/2"		-	-	-	-							
3650/55	3750/55	5/8"		-	-	-	-							
3650/66	3750/66	3/4"		-	-	-	-							
-	3770/M28	soldering	-	-	-	-	28							
-	3770/11		-	-	-	1.3/8"	35							
-	3770/13		-	-	-	1.5/8"	-							
-	3770/M42		-	-	-	-	42	5/8"	16					
-	3771/11		-	1.3/8"	35	-	-	-	18					
-	3771/M42		-	-	42	-	-	7/8"	22					
-	3771/17		-	2.1/8"	-	-	-	1.1/8"	28					
-	3780/5		saddle type	-	-	-	-	-	1.3/8"	35				
-	3780/M18			-	-	-	-	-	-	-				
-	3780/7			-	-	-	-	-	-	-				
-	3780/9	-		-	-	-	-	-	-					
-	3780/11	-		-	-	-	-	-	-					
-	3781/M28	level glass								28				

Art. 3.3

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Art. 3.3

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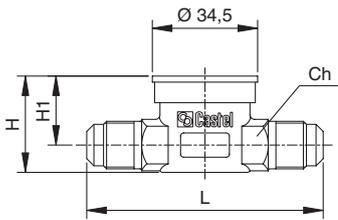
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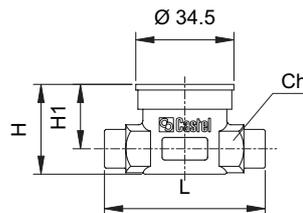
INSTALLATION

At the start-up the color of the sensitive element may be yellow, due to exposure to air humidity and to moisture in the circuit. When the moisture of the refrigerant is brought back to acceptable levels with the dehydrator, the indicator color is once again green. This is evidence that equilibrium has been re-established. In case of persisting yellow, measures have to be taken to eliminate moisture. Only when the sensitive element comes back to green, there is evidence that adopted measures were effective. About 12 hours of system operation are required to achieve equilibrium. However, the moisture

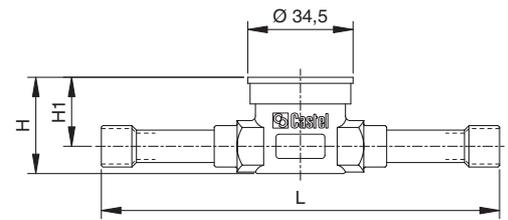
indication is given normally when the plant is in function and the fluid is flowing. The brazing of indicators with solder connections should be carried out with care, using a low melting point filler material. Before starting to braze, it's necessary to disassemble the ring of indicators series 3620, 3720, 3780 and 3781, while this operation is not necessary with solder connection indicators. In any case, avoid direct contact between the torch flame and the indicator body or ring, which could be damaged and compromise the proper functioning of the indicator.



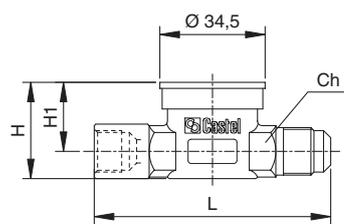
3610
3710



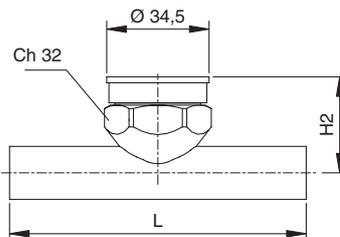
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3720



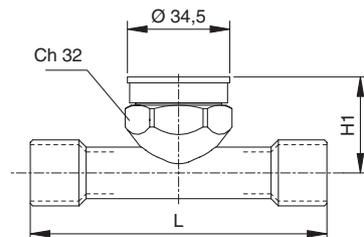
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3740



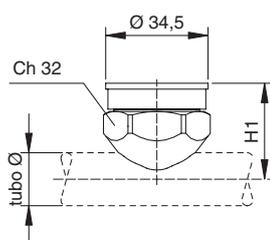
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3750



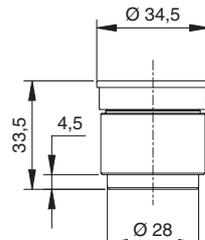
3770



3771



3780



3781

TABLE 3: Dimensions and Weights									
Catalogue Number		Dimensions [mm]				Weight [g]			
Liquid Indicators	Moisture Liquid Indicators	H	H _i	L	Ch				
3610/22	3710/22	28,5	22	71,5	12	130			
3610/33	3710/33	31,5	22,5	77,5	17	165			
3610/44	3710/44	36	24,5	81,5	22	210			
3610/55	3710/55	38,5	26	89,5	24	255			
3610/66	3710/66	46	31,5	93	28	315			
3620/M12	3720/M12	28,5	22	49		100			
3620/5	3720/5	38,5	26			110			
3620/M18	3720/M18	40	27,5			110			
3620/M22	3720/M22	46	31,5			160			
3640/2	3740/2	28,5	22	133		135			
3640/3	3740/3	38,5	26	117	-	195			
3640/M10	3740/M10					200			
3640/M12	3740/M12			210					
3640/4	3740/4			40		27,5	131		215
3640/5	3740/5	295							
3640/M18	3740/M18	580							
3640/6	3740/6	53,5	36		186				
3640/7	3740/7			205					
3640/9	3740/9			235					
3650/22	3750/22			31,5		22,5	68	12	
3650/33	3750/33	36	24,5	74	17	205			
3650/44	3750/44	38,5	26	77	22	235			
3650/55	3750/55	46	31,5	84	24	300			
3650/66	3750/66	53,5	36	92	28	525			
-	3770/M28	-	38	150	-	250			
	3770/11		41,5	160		300			
	3770/13		45	170		480			
	3770/M42		41,5	160		-	300		
	3771/11						45	170	480
	3771/M42								550
	3771/17						30	-	90
	3780/5		31						
	3780/M18		33						
	3780/7		36						
	3780/9		39,5						

