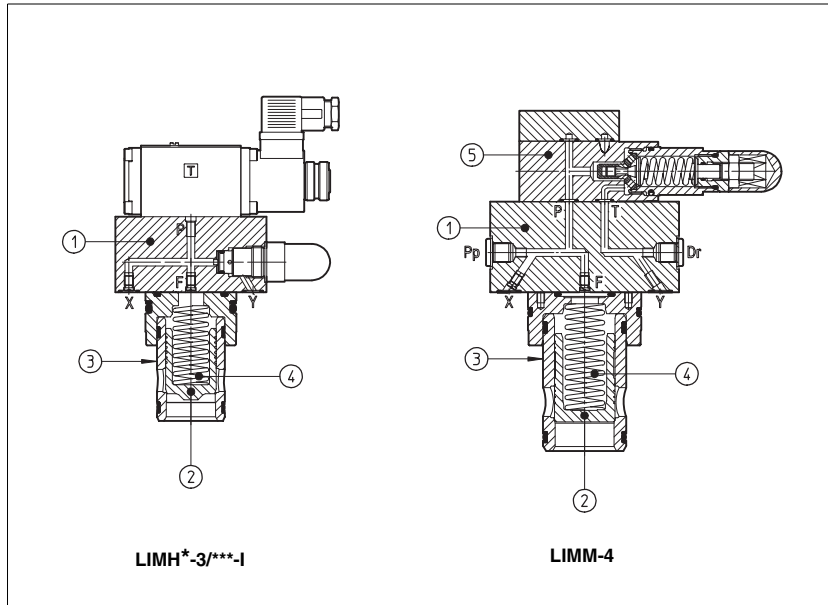


# Modular cartridge valves type LIM, LIR, LIC

Pressure control, ISO 7368 size 16 ÷ 80



LIM, LIR and LIC are pressure control valves composed by a 2-way cartridge housed in a standard recess and by a functional "cover" ①.

The cartridge is composed by a poppet ② hydraulically piloted by means of internal connections in the cover (X, F, Y) and sliding into a drilled sleeve ③; cracking pressure value depends on poppet spring ④.

Pressure relief valve ⑤ with manual setting is housed in the cover for sizes 16, 25 and 32 and is mounted on the cover for sizes 40...80.

Poppets may have different geometrical shapes and area ratios as described in section ④ to optimize the control.

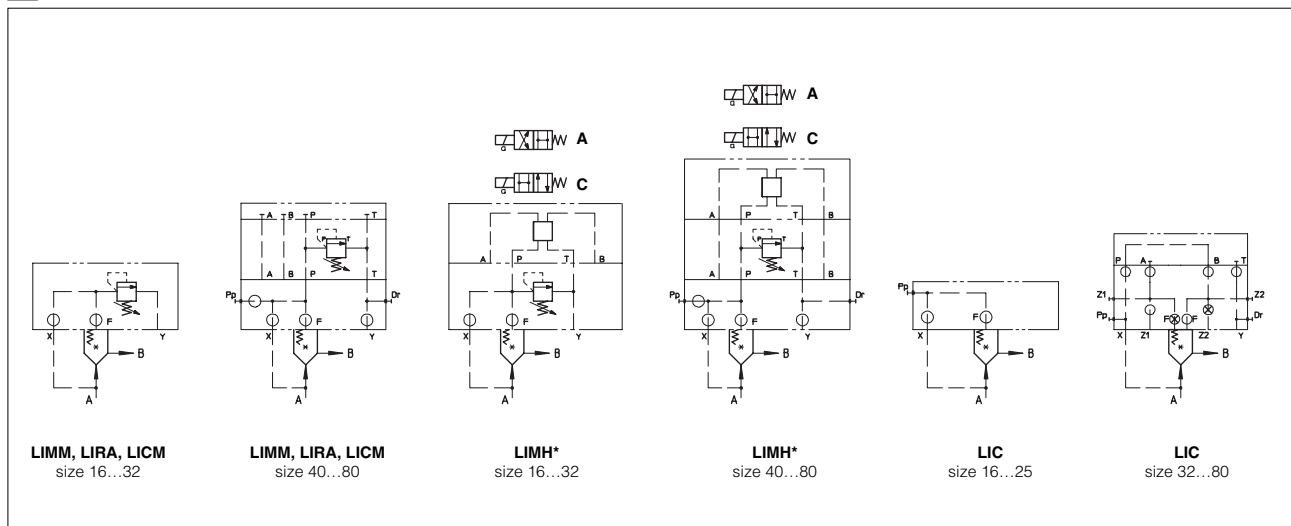
These valves are available in standard sizes 16 to 80 according to ISO 7368 (DIN 24342).

Flow up to 5400 l/min at  $\Delta p = 6$  bar.  
 Pressure up to 350 bar.

## 1 MODEL CODE FOR COVERS

LI	MHA	-1	/210	/V	- I	X	24DC	**	/*	F**
Cover according to ISO 7368									Synthetic fluids: /WG = water-glycol /PE = phosphate ester	Optional different provision or setting of the calibrated plugs in the pilot channels, see section ④
<p><b>MM</b> = pressure relief control with manual setting;  <b>MHA</b> = pressure relief control with solenoid valve for venting. Unloading when solenoid is deenergized;  <b>MHC</b> = pressure relief control with solenoid valve for venting. Unloading when solenoid is energized;  <b>RA</b> = pressure reducing control with manual setting. Open in resting position;  <b>C</b> = pressure compensator to be coupled with flow control valves;  <b>CM</b> = pressure compensator with mechanical max pressure regulation to be coupled with flow control valves.</p>										
<p>Size: <b>1</b> = 16; <b>2</b> = 25; <b>3</b> = 32; <b>4</b> = 40;  <b>5</b> = 50; <b>6</b> = 63; <b>8</b> = 80                      LIRA is available only in size 16, 25, 32, 40</p>										
<p>Pressure range:  <b>50</b> = 6 ÷ 50 bar; <b>210</b> = 10 ÷ 210 bar;  <b>100</b> = 8 ÷ 100 bar; <b>350</b> = 15 ÷ 350 bar</p>										
For model code of poppet, see section ③									Design number	
								Supply voltage (only for LIMH*); see section ⑧ <b>00</b> = valve without coils (only for OI solenoid)		
								Only for LIMH* <b>X</b> = without connector See section ⑧ for available connectors, to be ordered separately		
								Solenoid of pilot valve (only for LIMH*): <b>-I</b> = solenoid OI for AC and DC supply, see note in section ⑧ for other available solenoids		
								Options: see section ⑧		

## 2 HYDRAULIC SYMBOLS



## 2 HYDRAULIC CHARACTERISTICS

Cover, see section 1	LIMM, LIMHA, LIMHC							LIRA				LIC, LICM						
	31 (1), 34 (2), 35 (3)							37				31, 36						
Poppet, see section 3, 4	16	25	32	40	50	63	80	16	25	32	40	16	25	32	40	50	63	80
Size	16	25	32	40	50	63	80	16	25	32	40	16	25	32	40	50	63	80
Max flow at $\Delta p = 6 \text{ bar}$ [l/min]	200	400	670	1200	2200	3500	5400	160	270	540	840	200	400	670	1200	2200	3500	5400
Max pressure [bar]	350 bar at ports A, B, X; 160 bar at port Y																	

(1) Size 80 is available only for poppet 31; (2) Poppet 34 is available only in size 16; (3) Poppet 35 is available only in size 16...50;

## 3

<b>SC LI</b>	<b>-</b>	<b>16</b>	<b>31</b>	<b>2</b>	<b>**</b>	<b>/*</b>
Cartridge according to ISO 7368						Design number
Size, the same of relevant cover: <b>16</b> = 16; <b>32</b> = 32; <b>50</b> = 50; <b>80</b> = 80 <b>25</b> = 25; <b>40</b> = 40; <b>63</b> = 63;						
Type of poppet, see section 2 for maximum flow: <b>31</b> = (sizes 16...80) = for LIMM, LIMH*, LIC, LICM <b>34</b> = (size 16) = for LIMM, LIMH* <b>35</b> = (sizes 16...50) = for LIMM, LIMH* <b>36</b> = (sizes 16...80) = for LIC, LICM <b>37</b> = (sizes 16...40) = for LIRA						
Spring cracking pressure: <b>1</b> = 0,3 bar for poppet 35; <b>2</b> = 1,2 bar for poppet 31, 34, 35; <b>3</b> = 3 bar for poppet 31, 34, 35;						<b>4</b> = 4 bar for poppet 37; <b>6</b> = 6 bar for poppet 31, 34, 35, 36; <b>7</b> = 7 bar for poppet 37;
Synthetic fluids <b>WG</b> = water-glycol <b>PE</b> = phosphate ester						

## 4 TYPICAL FUNCTIONS OF POPPETS

Code of poppet	31	34	35	36	37
Functional sketch (Hydraulic symbol)					
Typical section					
Area ratio (1)	1:1	1:1	1:1,1	1:1	1:1

(1) It is the ratio of the area on which the main pressure of the circuit is applied to the area on which the pilot pressure is applied.

## 5 MAIN CHARACTERISTICS OF MODULAR PRESSURE CONTROL CARTRIDGE VALVES TYPE LIMM, LIMH\*, LIRA, LIC\*

Assembly position / location	Any position
Subplate surface finishing	Roughness index $\sqrt{Ra}$ , flatness ratio 0,01/100 (ISO 1101)
Ambient temperature	-20°C to +70°
Fluid	Hydraulic oil as per DIN 51524 . . . 535; for other fluids see section 1
Recommended viscosity	15 ÷ 100 mm <sup>2</sup> /s at 40°C (ISO VG 15 ÷ 100)
Fluid contamination class	ISO 19/16, achieved with in line filters at 25 µm and $\beta_{0.5} \geq 75$ (recommended)
Fluid temperature	-20°C +60°C (standard and /WG seals)    -20°C +80°C (/PE seals)

### 5.1 Coils characteristics

Insulation class	H (180°C) Due to the occurring surface temperatures of the solenoid coils, the European standards EN563 and EN982 must be taken into account
Connector protection degree	IP 65
Relative duty factor	100%
Supply voltage and frequency	See electric feature 6
Supply voltage tolerance	± 10%

## 6 OPTIONS

Only for LIMM (size 16...32):

**/P** = predisposed for ISO 4401 size 06 mounting surface

Handwheel for pressure control, only for LIMM, LIMH\*, LIRA, LICM (see section 12 for dimensions):

**/V** = regulating handwheel (available for all the sizes)

**/VF** = regulating knob (available only for sizes 40...80)

**/VS** = manual override with safety locking (available only for sizes 40...80)

Handwheel for OI solenoid pilot valve, only for LIMH\*:

**/WP** = prolonged manual override protected by rubber cap (see table K150).

For all the models:

**\*\*\*** = calibrated plugs different from standard one. All covers contain and are equipped with restrictors in the pilot channels according to the standard arrangement which is preset for each variant (see section 13). They can be exchanged with others for particular use. When ordering covers equipped with restrictors that are different from the standard ones it must be indicated at the end of the model code:

**LIMHA - 1 /210 -IX 24DC \*\* /WG F 06**

Channel where the orifice has to be provided:  
**X** = channel X  
**F** = channel F

Size of the throttling hole in ten of millimeters:  
**05** = 0,5 mm    **10** = 1 mm  
**06** = 0,6 mm    **12** = 1,2 mm  
**08** = 0,8 mm    **15** = 1,5 mm

Note:

OI solenoid pilot valve can be provided with the following handwheel (see table K150):

**SP-WPD/H** = manual override with detent, to be ordered separately.

Covers type LIMH\* can also be equipped with the following pilot solenoid valves.

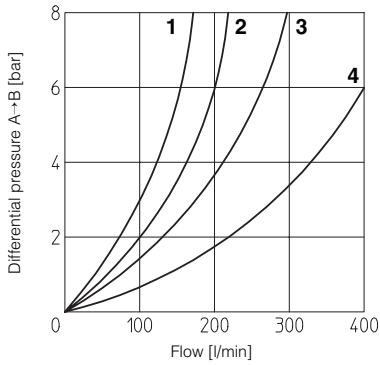
**-OO** = solenoid OO for DC supply (see table E010 and K500 for technical characteristics of coil and relevant connectors)

**-AO** = explosion-proof solenoid according to ATEX Norm (see table E120 for technical characteristics)

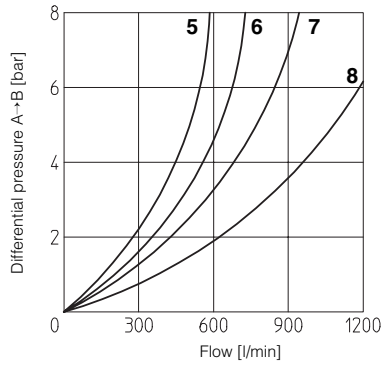
**-AO/UL** = explosion-proof solenoid according to UL Norm (see table E125 for technical characteristics)

**-WO** = intrinsically safe solenoid according to ATEX (see table E130 for technical characteristics)

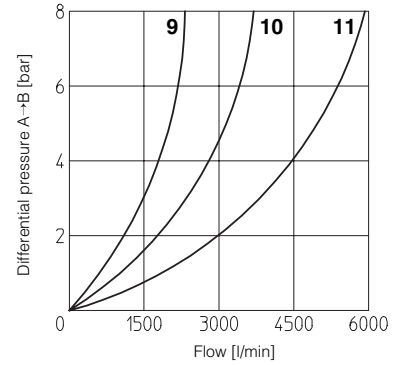
**7 DIAGRAMS OF POPPETS**



1 = SC LI-1637    3 = SC LI-2537  
                   -1631                   -2531  
 2 = SC LI-1634    4 = SC LI-2535  
                   -1635                   -2536  
                   -1636



5 = SC LI-3237    7 = SC LI-4037  
                   -3231                   -4031  
 6 = SC LI-3235    8 = SC LI-4035  
                   -3236                   -4036



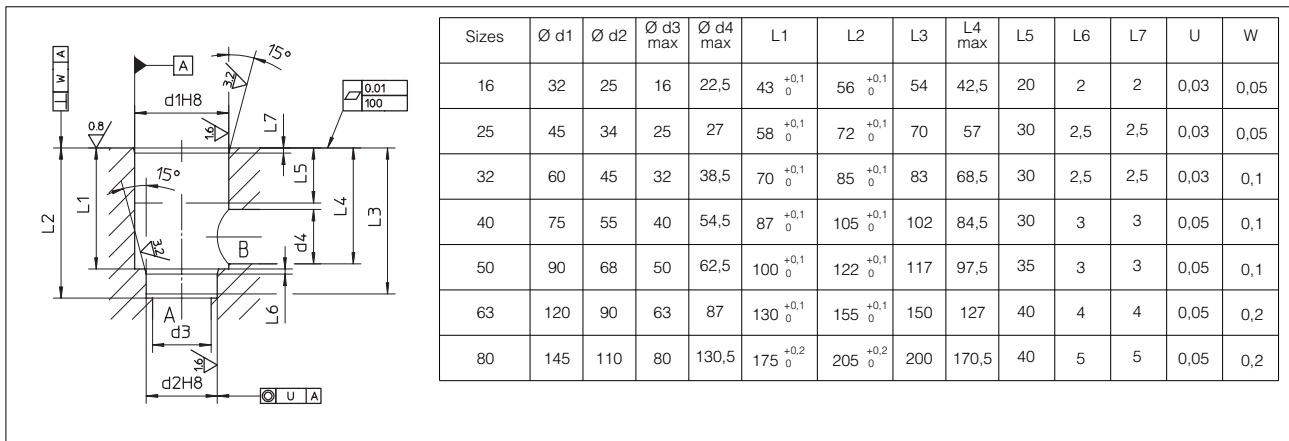
                                  -5031  
 9 = SC LI-5035    11 = SC LI-8031  
                                   -5036                   -8036  
 10 = SC LI-6331  
                                   -6336

**8 ELECTRIC FEATURES**

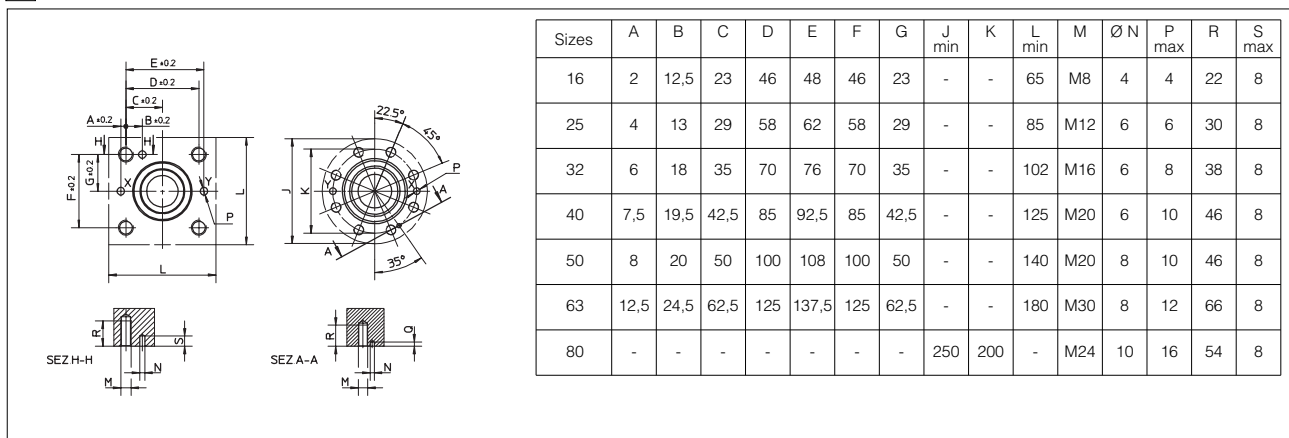
Type of solenoid	External supply nominal voltage ± 10% (1)		Type of connector (3)	Power consumption (4)	Code of spare coil	Colour of coil label
OI	DIRECT CURRENT	6 DC 12 DC 24 DC 48 DC	SP-666 or SP-667	33 W	SP-COU-6DC /80 SP-COU-12DC /80 SP-COU-24DC /80 SP-COU-48DC /80	brown green red silver
		ALTERNATE CURRENT	110/50 AC (2) 120/60 AC 230/50 AC (2) 230/60 AC	SP-666 or SP-667	60 VA (5)	SP-COI-110/50/60AC /80 SP-COI-120/60AC /80 SP-COI-230/50/60AC /80 SP-COI-230/60AC /80

- (1) For other supply voltages available on request, see technical table E010.
- (2) Coil can be supplied also with 60 Hz of voltage frequency: in this case the performances are reduced by 10 ÷ 15% and the power consumption is 55 VA.
- (3) Connectors according to DIN46350: see table E010 and K500 for characteristics.
- (4) Average values based on tests performed at nominal hydraulic condition and ambient/coil temperature of 20°C.
- (5) When solenoid is energized, the inrush current is approx 3 times the holding current. Inrush current values correspond to a power consumption of about 150 VA.

**9 RECESS DIMENSIONS [mm]**

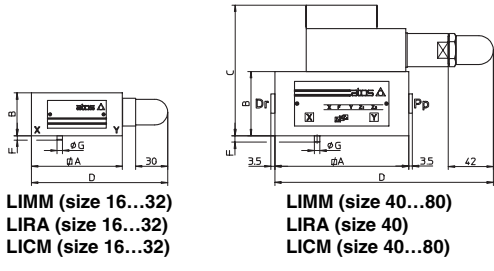


**10 COVER INTERFACE DIMENSIONS [mm]**

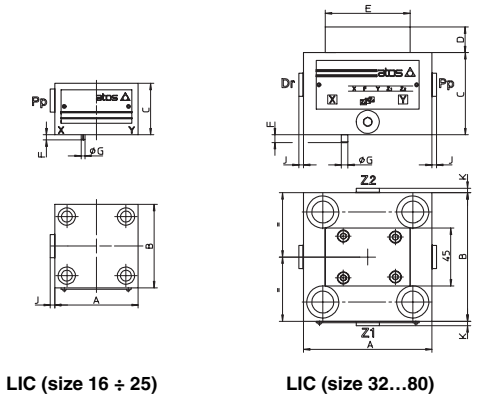


**11 COVER DIMENSIONS [mm]**

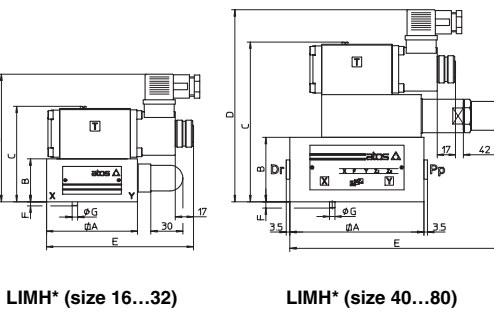
Covers	A	B	C	D	F	G	Port Pp-Dr	Seals	Fastening bolts (2)	Tightening torque [Nm]	Weight [Kg]
LIMM-1 LIRA-1 LICM-1	65	40	-	107,5	4	3	-	2 OR 108	Nr. 4 M8x45	41,6	1,7
LIMM-2 LIRA-2 LICM-2	85	40	-	127,5	6	5	-	2 OR 108	Nr. 4 M12x45	143	2,2
LIMM-3 LIRA-3 LICM-3	100	50	-	142,5	6	5	-	2 OR 2043	Nr. 4 M16x55	346	3,5
LIMM-4 LIRA-4 LICM-4	125	60	122	195	6	5	G 1/4	2 OR 2050	Nr. 4 M20x70	674	8,9
LIMM-5 LICM-5	140	70	132	202,5	4	6	G 1/4	2 OR 2050	Nr. 4 M20x80	674	12,4
LIMM-6 LICM-6	180	80	142	222,5	4	6	G 3/8	2 OR 2056	Nr. 4 M30x90	2310	21,6
LIMM-8 LICM-8	Ø250	80	172	257,5	6	8	G 3/8	2 OR 123	Nr. 8 M24x90	1170	30,5



Covers	A	B	C	D	E	F	G	K	J	Port Pp-Dr	Port Z1-Z2	Seals	Fastening bolts (2)	Tightening torque [Nm]	Weight [Kg]
LIC-1	65	65	40	-	-	4	3	-	3,5	G 1/4	-	2 OR 108	Nr. 4 M8x45	41,6	1,4
LIC-2	85	85	40	-	-	6	5	-	3,5	G 1/4	-	2 OR 108	Nr. 4 M12x45	143	1,8
LIC-3	100	100	50	20	66	6	5	-	3,5	G 1/4	-	4 OR 2043	Nr. 4 M16x55	346	2,3
LIC-4	125	125	60	20	66	6	5	-	3,5	G 1/4	-	4 OR 2050	Nr. 4 M20x70	674	6,2
LIC-5	140	140	70	20	66	4	6	3,5	3,5	G 1/4	G 1/4	4 OR 2050	Nr. 4 M20x80	674	9,3
LIC-6	180	180	80	20	66	4	6	3,5	3,5	G 3/8	G 3/8	4 OR 2056	Nr. 4 M30x90	2310	17,1
LIC-8	Ø 250	-	80	30	73	6	8	-	3,5	G 3/8	-	4 OR 123	Nr. 8 M24x90	1170	27



Covers	A	B	C	D	E	F	G	Port Pp-Dr	Seals	Fastening bolts (2)	Tightening torque [Nm]	Weight [Kg]
LIMHA-1 LIMHC-1	65 (1)	40	86	119	124,5	4	3	-	2 OR 108	Nr. 4 M8x45	41,6	3
LIMHA-2 LIMHC-2	85	40	86	119	134,5	6	5	-	2 OR 108	Nr. 4 M12x45	143	3,3
LIMHA-3 LIMHC-3	100	50	129	149	142,5	6	5	-	2 OR 2043	Nr. 4 M16x55	346	5
LIMHA-4 LIMHC-4	125	60	149	179	195	6	5	G 1/4	2 OR 2050	Nr. 4 M20x70	674	9,2
LIMHA-5 LIMHC-5	140	70	159	189	202,5	4	6	G 1/4	2 OR 2050	Nr. 4 M20x80	674	13,2
LIMHA-6 LIMHC-6	180	80	169	199	222,5	4	6	G 3/8	2 OR 2056	Nr. 4 M30x90	2310	22,5
LIMHA-8 LIMHC-8	Ø 250	80	199	229	257,5	6	8	G 3/8	2 OR 123	Nr. 8 M24x90	1170	31,3



(1) Cover is not squared: 65x80  
 (2) Hexagon socket head screw according to DIN 912-12.9

Overall dimensions refer to the pilot valves with connectors type SP-666

**12 HANDWHEELS FOR PRESSURE PILOT VALVES: DIMENSIONS [mm]**

Options	IV	IVF	IVS

**13 SCREWED ORIFICES IN STANDARD COVER EXECUTION: DIMENSIONS (1)**

Cover	Port																								
	LIM*-1	LIRA-1	LICM-1	LIC-1	LIM*-2	LIRA-2	LICM-2	LIC-2	LIM*-3	LIRA-3	LICM-3	LIC-3	LIM*-4	LIRA-4	LICM-4	LIC-4	LIM*-5	LICM-5	LIC-5	LIM*-6	LICM-6	LIC-6	LIM*-8	LICM-8	LIC-8
X	M4 10A	M4 08A	M4 08A	-	M4 10A	M4 08A	M4 08A	-	M6 10A	M6 08A	M6 12A	M6 10A	M6 10A	M6 12A	M6 10A	M6 10A	M6 10A	M6 10A	M6 10A	M6 10A	M6 10A	M6 10A	M8 10A	M8 10A	M8 10A
F	M4 12F	M4 12A	M4 05F	M4 05F	M4 12F	M4 12A	M4 05F	M4 05F	M6 12F	M6 12A	M6 12F	M6 05F	M6 12F	M6 08A	M6 12F	M6 12F	M6 12F	M6 12F	M6 12F	M6 12F	M6 12F	M6 12F	M8 12F	M8 12F	M8 12F

(1) The showed codes define the orifice thread, diameter of the throttling hole in ten of millimeters and the form of throttle sectional area:  
 A = variable sectional area; F = constant sectional area