Spirax-Monnier Products
General Safety, Installation and Maintenance Guidelines

WARNING
As with all Pressurised Systems, do NOT attempt ANY Installation or Maintenance function if there is ANY pressure in the product or connected system.

Spirax-Monnier
Spirax Monnier compressed air products are of well proven and simple design, with high natural levels of designed safety built in. However, used or installed incorrectly, their performance and that of the system they are protecting or controlling, may suffer. The information given indicates the product limiting conditions, maintenance and installation requirements and any specific component disposal needs.

Product Maintenance - See Over

Installation and Operation
1. Filters, Filter/Regulators, Lubricators, Flow Meters, Separators and Drain Traps should be fitted in horizontal pipelines, with the bowls vertically downwards.
2. Regulators and Ball Valves can be installed in any position.
3. On Pressure Regulators and combined Filter/regulators, a Pressure Gauge can be connected to one of the ⅛" ports.
   The gauge should be selected to cover the maximum pressure range of the main Control Spring. The gauge will indicate the downstream or controlled pressure.

4. Ensure that the Control Spring range for Regulators and Filter/Regulators fully meets the pressure requirements of the system.
5. There are Maximum Operating Pressures, and Maximum Operating and Environmental Temperatures for each product. These are shown in the table below.
6. Adequate space should be provided around any product to allow easy access for routine servicing requirements.
7. Products fitted with a Bowl (Polycarbonate or Metal) should be adequately drained - manually or automatically - to reduce the potentially harmful effects of water carryover.
8. **WARNING** Polycarbonate Bowls and Sight Domes, and Sight Levels fitted to Metal bowls, may be attacked by Phosphate Ester based fluids, Solvents, Chemical cleaners, Carbon Tetrachloride, etc. These and other similar substances should never be allow to come into contact with these product components. Certain compressor lubricating oils also contain additives harmful to these components. Where there is any doubt, we recommend, in the interests of safety, that Bowl Guards or Metal Bowls are fitted.
9. Local regulations may restrict the use of this product below the conditions quoted.
10. For more detailed information on any individual product, please ask for the appropriate Technical Information Sheet listed in the table.

MAXIMUM PRESSURES/TEMPERATURES

	Polycarbonate Bowl		Metal Bowl		Metal Bowl with Sight level		DISPOSAL CLASS	TI(TIS)
FILTERS	bar	°C	bar	°C	bar	°C		
MF2	10	50	-	-	-	-	1 & 3	P050-05 (7.580)
IF2/D/A	10	50	17	80	17	70	1 & 2	P500-01 (7.500)
IC3/4/DA	10	50	17	80	17	70	1 & 2	P501-01 (7.520)
IXI	10	50	17	70	17	70	1 & 2	P057-01 (7.522)
SF3/A	-	-	17	80	17	70	1 & 3	P050-03 (7.562)

REGULATORS							DISPOSAL CLASS	TI(TIS)
MR1/2/3	21 bar 70°C : CONTROL RANGES : 0.2/2. 0.3/4, 0.7/9 bar						1 & 3	P051-01 (7.582)
IRI	20 bar 70°C : CONTROL RANGES : 0.2/3.5, 0.5/1 bar						1 & 2	P058-01 (7.502)
SR2	21 bar 70°C : CONTROL RANGES : 1.3 - 17.0 bar						1 & 3	P570-01 (7.564)
SR3	21 bar 70°C : CONTROL RANGES : 0.2/4, 0.3/9 bar						1 & 3	P570-03 (7.566)

FILTER REGULATORS							DISPOSAL CLASS	TI(TIS)
IP2/A/D	10	50	17	80	17	70	1 & 2	P510-01 (7.504)
	RANGES : 0.2/3.5, 0.5/10 bar							
MP2	10	50	-	-	-	-	1 & 3	P054-01 (7.584)
	RANGES : 0.2/2.0, 0.3/4.0, 0.7/9.0 bar							
MPC2	10	50	-	-	-	-	-	P054-04 (7.588)
	RANGES : 0.2/2.0,.0.3/4.0, 0.7/9.0 bar						1 & 3	

LUBRICATORS							DISPOSAL CLASS	TI(TIS)
ML3	10	50	-	-	-	-	1 & 3	P052-07 (7.586)
IL1	10	50	17	80	17	70	1 & 2	P059-01 (7.506)
SL3	-	-	17	80	17	70	1 & 3	P052-04 (7.570)

OTHER PRODUCTS							DISPOSAL CLASS	TI(TIS)
IFM2	10	50	-	-	-	-	1 & 2	P580-01 (7.540)
S.M.S.	-	-	17	70°C	-	-	1 & 3	P050-17 (7.604)
BALL VALVES (all)	all to 15 bar & 45°C (see performance graph on TIS for full details)						1 & 4	P560-01 (7.601)
DRI-LINE	-	-	16	80°C	-	-	1 & 3	P050-07 (7.600)

DISPOSAL
1. Some plastic and/or rubber components
2. Main body Zinc - epoxy coated
3. Main body Aluminium - epoxy coated
4. Brass and Steel
5. Electronic Components

Note
Customers are reminded that under UK and EC Health, Safety and Environmental Law, when returning products to Spirax Sarco they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk. This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous.

Spirax Monnier IFM2 International Compressed Air Flow Meter

How does it work
The flow meter cartridge is fitted into an International filter housing. The unit has a variable orifice meter comprising a moving piston (1), a fixed tapered cone (2), and a spring (3). Air enters the bowl and flows up through the variable orifice (4). The variation in flow force across the orifice is balanced by the spring. The flow is indicated on the scale by the top edge of the white ring (5). The meter is calibrated at **6 bar and 20°C**. For other pressures and temperatures refer to the conversion table. TI-P580-02 (TIS 7.541).

Warning
Polycarbonate bowls are attacked by phosphate ester fluids, paint thinners and carbon tetrachloride. These and similar substances should never be allowed to come into contact with the bowl. Certain compressor lubricating oils also contain additives harmful to polycarbonate and, where there is any doubt, we recommend, in the interest of safety that a bowl guard should be fitted.
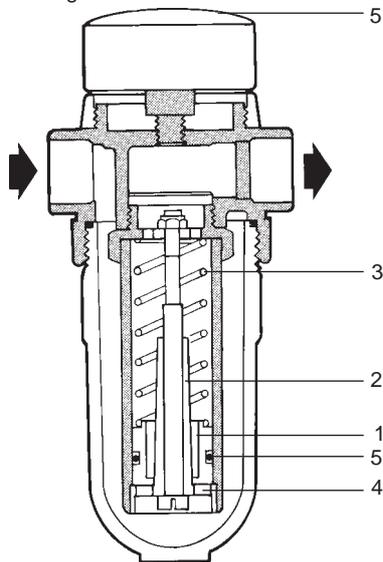
Specification
Operating flow range:	3 - 25 dm³/s at 6 bar
Minimum operating pressure:	1 bar
Maximum operating pressure:	10 bar
Maximum temperature:	50°C
Accuracy:	±5%
Repeatability:	±1%

Conversion
For pressures other than 6 bar and temperature other than 20°C, **multiply** the meter reading by the appropiate conversion factor from the table below, to obtain true air flow. **Note:** To determine the pressure correction factor, the pressure reading of the gauge must be taken under flow conditions.

Multiplying correction factor

Operating (flow) Pressure	Correction Factor
2 bar	.66
4 bar	.85
6 bar	1.00
8 bar	1.13
10 bar	1.25

Spare parts

|	
Bowl Assembly - Polycarbonate only	A,B
Cartridge Assembly	C,D
Pressure gauge	E
Set of 'O' Rings (3 off)	B,D

How to order
Example: 1 - Flow Meter Cartridge Assembly for ⅛" Spirax-Monnier IFM2.

To Service Flow Meter Unit
Shut off air supply and release pressure, either through self venting ball valve upstream of the unit or by slowly unscrewing the bowl. Remove bowl guard (if fitted) and unscrew bowl. Unscrew flow meter cartridge by holding across section XX.
Wipe all parts clean using soap and water ony. Dry thoroughly. Replace in reverse order using new components where necessary. The cartridge can be rotated 360° relative to XX, for easier viewing.

Bowl guard
See note under "Warning"
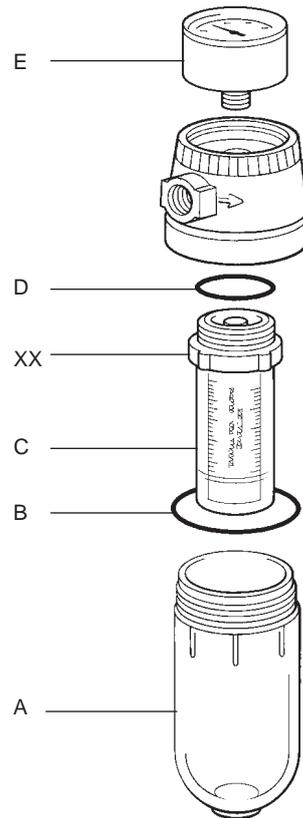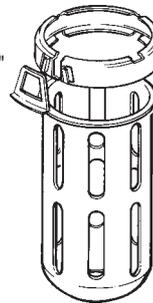
Conversion factors

Alternatively, correction factors may be calculated from:

Actual air flow = $\dfrac{\text{Indicated air flow}}{\sqrt{F_1 \times F_2 \times (F_3)}}$

Pressure Correction

$$F1 = \sqrt{\frac{7.013}{1.013 + \text{operating pressure in bar}}}$$

Temperature Correction

$$F2 = \sqrt{\frac{273 + \text{operating temp in °C}}{293}}$$

The flow meter can be used on gases, other than compressed air, within the pressure and temperature limits, specified for the product. The gas must be compatible with the materials of construction.

Specific Gravity Correction (S.G. of Air = 1)

$$F3 = \sqrt{\text{Specific gravity of gas}}$$

Temperature °C	Correction Factor
0	1.04
10	1.02
20	1.00
30	.98
40	.97
50	.95

Example 1: To find the true flow of compressed air if meter reads 15 dm³/s at 4.1 bar and 35°C.

$$F1 = \sqrt{\frac{7.013}{1.013 + 4.1 = 1.17}}$$

$$F2 = \sqrt{\frac{273 + 35}{293}} = 1.025$$

True air flow = $\dfrac{15}{1.17 \times 1.025}$ = 12.5 dm³/s

Example 2: To find true flow of CO_2 (SG 1.53) if meter reads 20 dm³/s at 5 bar and 15°C

$$F1 = \sqrt{\frac{7.013}{1.013 + 5}}$$

$$F2 = \sqrt{\frac{273 + 15}{293}}$$

$$F3 = \sqrt{1.53}$$

$\dfrac{\text{True flow}}{CO_2 \text{ flow}} = \dfrac{20}{1.08 \times 0.99 \times 1.24}$ = 15.09 dm³/s