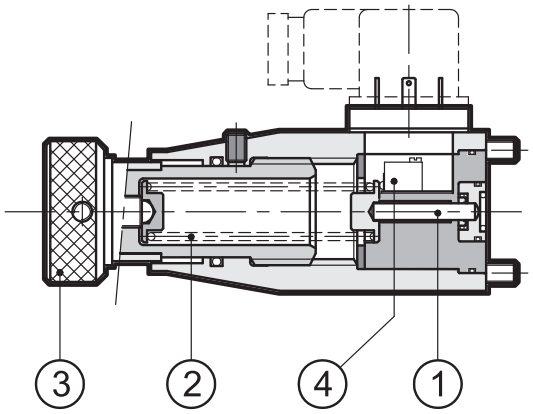
PS*
PISTON TYPE PRESSURE SWITCH
SERIES 21

p max **650** bar

max adjustable **p 35 - 140 - 350 - 630** bar

OPERATING PRINCIPLE



— PS* are piston type, hydro-electrical pressure switches.

The internal electrical contact is switched when the operating pressure reaches the set value.

— The line pressure acts on piston (1) which is directly loaded by a spring (2) on the opposite side. The spring load is adjustable by means of the knob (3). When the line pressure reaches the set valve, the piston (1) moves and switches the micro-contact (4).

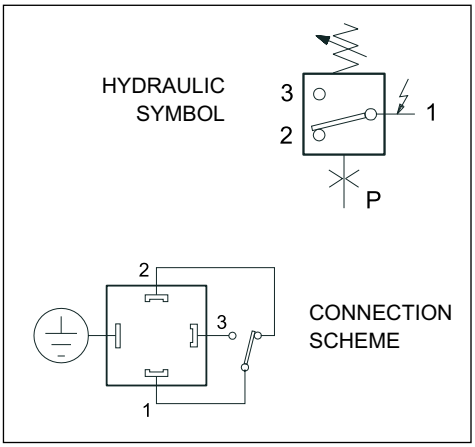
— The pressure switches are available in four pressure ranges, from 35 up to 630 bar, and they can be subplate mounting or 1/4" BSP threaded port type.

— Standard supply is with adjustment knob and with pressure scale.

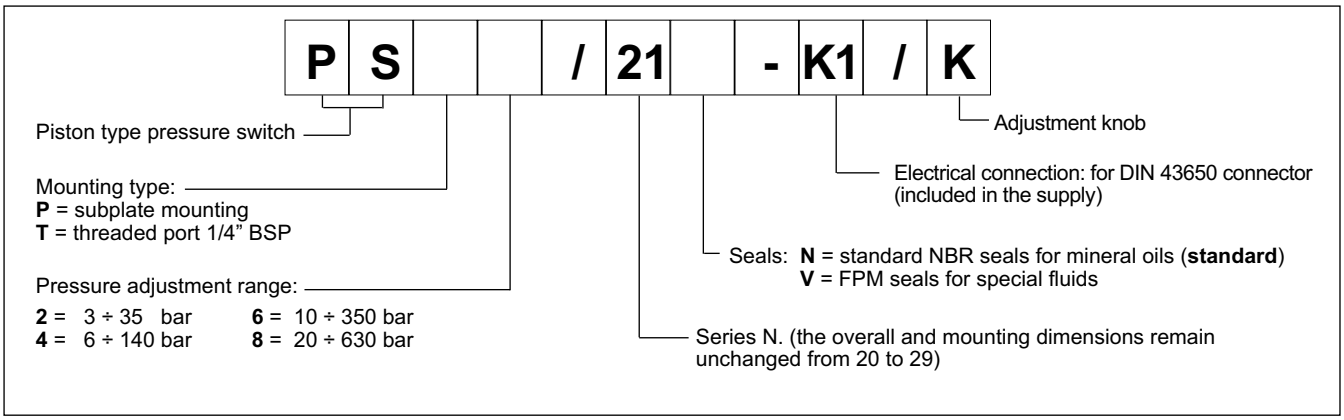
TECHNICAL CHARACTERISTICS

PRESSURE SWITCH		PS*2	PS*4	PS*6	PS*8
Pressure adjustment range	bar	3 ÷ 35	6 ÷ 140	10 ÷ 350	20 ÷ 630
Max operating pressure	bar	350	350	650	650
Hysteresis	see par. 5				
Repeatability	< ± 1 % of set pressure				
Electrical characteristics	see par. 3				
Ambient temperature range	°C	–20 / +50			
Fluid temperature range	°C	–20 / +80			
Fluid viscosity range	cSt	10 ÷ 400			
Recommended viscosity	cSt	25			
Fluid contamination degree	according to ISO 4406:1999 class 20/18/15				
Mass	kg	0,67			

SYMBOLS



1 - IDENTIFICATION CODE



2 - HYDRAULIC FLUIDS

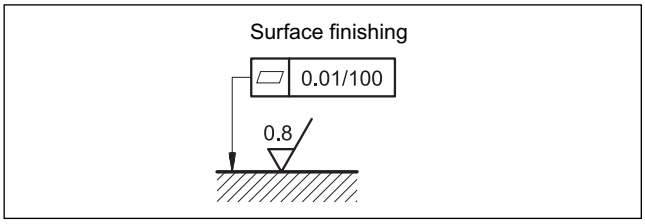
Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals (code N).
For fluids HFDR type (phosphate esters) use FPM seals (code V).
For the use of other fluid types such as HFA, HFB, HFC, please consult our technical department.
Using fluids at temperatures higher than 80 °C causes a faster degradation of the fluid and of the seals characteristics.
The fluid must be preserved in its physical and chemical characteristics.

3 - ELECTRICAL CHARACTERISTICS

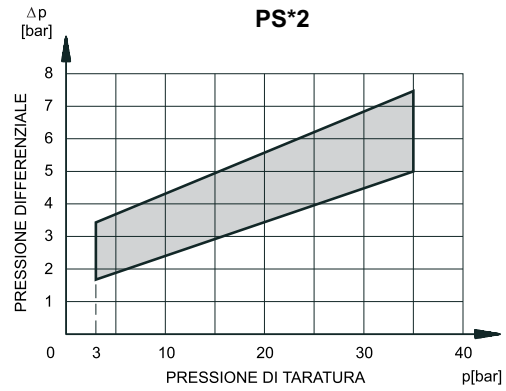
		AC		DC	
Power supply	V	125	250	30	250
Max load on contacts - resistive - inductive	A	 7 4	 5 2	 5 3	 0,2 0,02
Electrical insulation (according to CEI EN 60204)		> 1 M Ω at 500 Vdc			
Max switching rate	switches/min	120			
Protection class (according to CEI EN 60529)		IP 65			

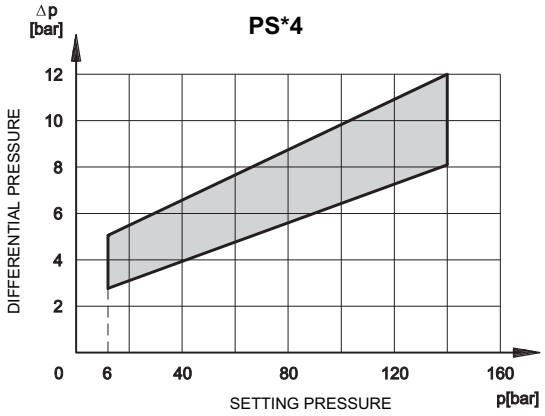
4 - INSTALLATION

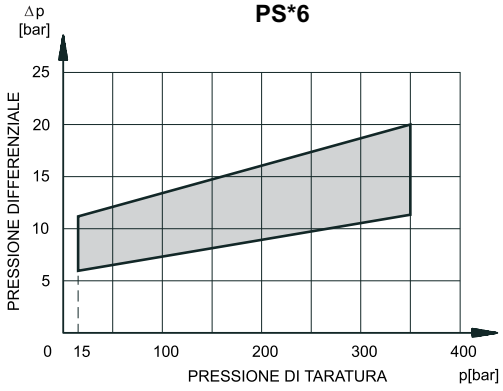
The pressure switches can be installed in any position without impairing its correct operation. Ensure that there is no air in the hydraulic circuit.
The subplate mounting pressure switch PSP type is fixed by means of screws on a flat surface with planarity and roughness values equal to or better than those indicated in the relative symbols. If the minimum values are not observed, the fluid can easily leak between the valve and the mounting surface.

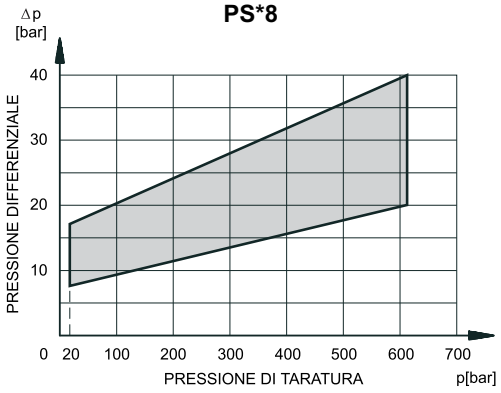


5 - HYSTERESIS CHARACTERISTICS (values measured with viscosity of 36 cSt at 50°C)







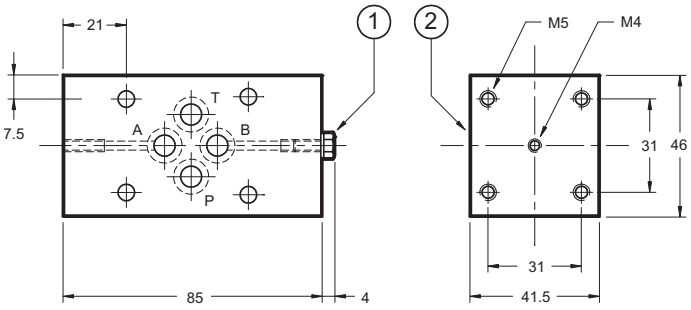


6 - SUBPLATES FOR STACK MOUNTING

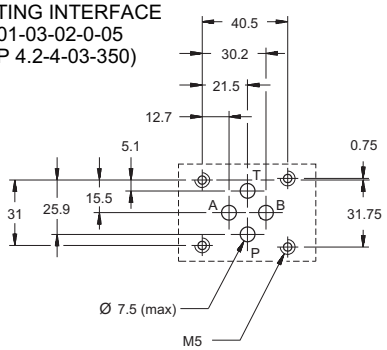
The PSP pressure switches can be stack mounted by means of ISO 4401-03 (CETOP 03 subplates), code 1950611 and 1950621.
The subplate code 1950611 permits the connection between the pressure switch and A and/or B ports, depending on where the bolt (1) is installed. The subplate code 1950621 permits the connection between the pressure switch and the P port.

SUBPLATE CODE 1950611 (A and B ports connection)

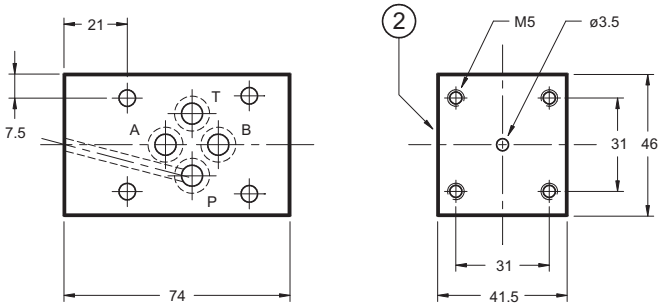
MAX PRESSURE 350 BAR



MOUNTING INTERFACE
ISO 4401-03-02-0-05
(CETOP 4.2-4-03-350)



SUBPLATE CODE 1950621 (P port connection)

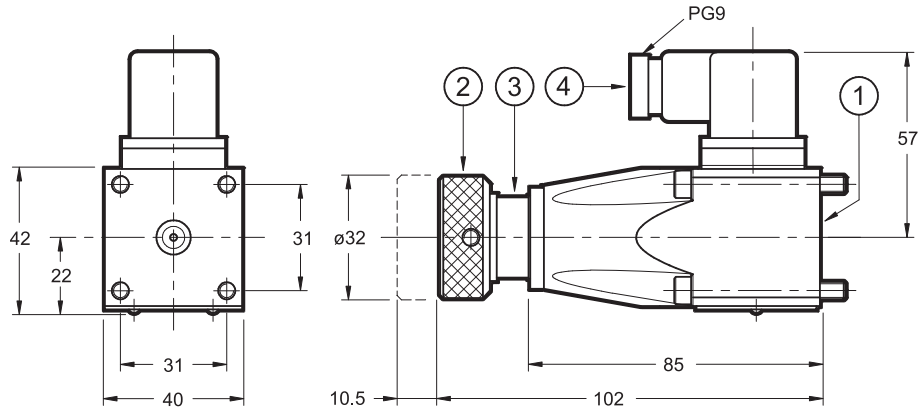


dimensions in mm

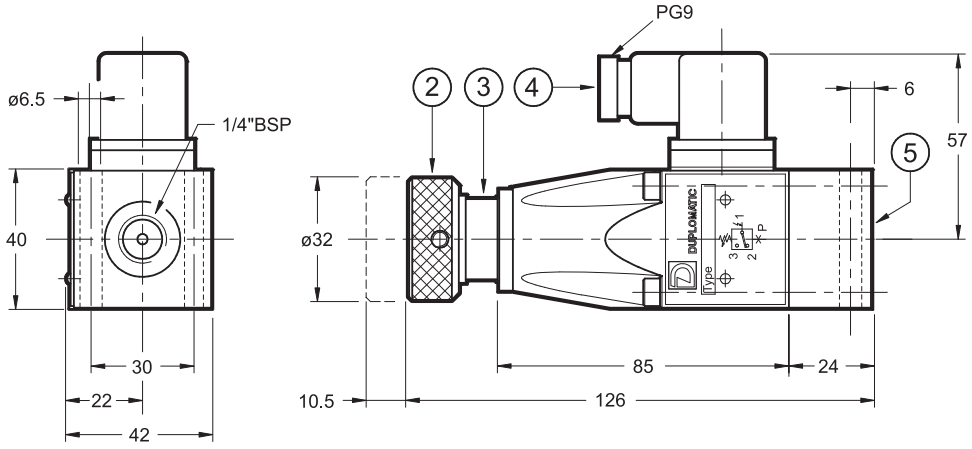
1	Hexagonal head M4x12 bolt with "bonded seal" type 400-002 (Dowty) Unscrew the bolt and its seal from the side where the switch is installed
2	Mounting surface with sealing rings 4 OR type 2037 (9.25x1.78) - 90 Shore

7 - OVERALL AND MOUNTING DIMENSIONS

PSP

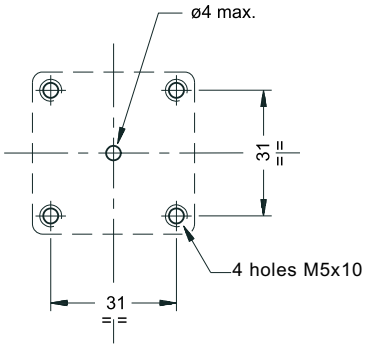


PST



MOUNTING INTERFACE (PSP version)

dimensions in mm



fastening bolts (PSP version)
N. 4 bolts M5x45 - ISO 4762 12.9 resistance class (included in the supply)
Tightening torque: 8 Nm

1	Mounting surface with sealing rings: N. 1 OR type 2025 (6.07x1.78) - 90 shore (PSP version)
2	Adjustment knob Clockwise rotation to increase pressure
3	Graduated scale with indication of setting pressure in [bar]
4	DIN 43650 electrical connector 3 poles + ground supplied with pressure switch
5	Interface plate for pipe connection: - 1/4” BSP threaded female connection - 2 clearance holes for possible fixing by means of bolts M5x50 **NOTE: the interface plate is already installed on the PST type pressure switch only.**

M63
PRESSURE GAUGE

SERIES 10

according to EN 837-1

TECHNICAL CHARACTERISTICS

Nominal diameter	mm	63
Nominal pressure	bar	0 ÷ 6 0 ÷ 10 0 ÷ 16 0 ÷ 25 0 ÷ 60 0 ÷ 100 0 ÷ 160 0 ÷ 250 0 ÷ 400
Static pressure	3/4 of the end scale value	
Dynamic pressure	2/3 of the end scale value	
Limit pressure	end scale value for short period	
Precision class according to EN 837-1/6	1.6	
Thermal drift	± 0,4% / 10K in the measure range	
Protection class according to EN 60529 - IEC 529	IP 65	
Ports according to EN 837-1/6	1/4” BSP	
Ports material	copper alloy	
Sensible element: 0 ÷ 6, 0 ÷ 10, 0 ÷ 16, 0 ÷ 25, 0 ÷ 60. 0 ÷ 100, 0 ÷ 160, 0 ÷ 250, 0 ÷ 400.	copper alloy, type-C, braze welding spring copper alloy, helical, braze welding spring	
Movements	copper alloy	
Dial	white plastic with lock pins in black plastic	
Case	stainless steel with natural finishing, and OR between case and shank	
Display	transparent plastic	
Filling liquid	glycerin 85% + distilled water 15%	
CE Marking	in compliance with 97/23/CE of 29.05.97 art. 3 par. 3	
Working temperature range	°C	-20 / +60
Mass	kg	0,24

DESCRIPTION

— The pressure gauges M63 are pressure indicators used on hydraulic systems.

— They guarantee a correct pressure measurement also with pulsations and vibrations.

— They are available in 9 different pressure scales and with 2 connection types for mounting with radial port or rear port with flange connector.

— The case is made of stainless steel and the connection is made of copper alloy.

— The filling in liquid is made of 85% glycerin and 15% distilled water.

— As they are realised in compliance with 97/23/CE of the 29-05-97 art. 3 par. 3, only the ones with the end scale of 250 and 400 bar have the marking CE on the dial.

— The construction and the realisation have been done according to EN 837-1.

HYDRAULIC SYMBOL

M63
SERIES 10

1 - IDENTIFICATION CODE

M	63	-		/	10	

Pressure gauge

Dial nominal diameter
63 = 63 mm

Pressure gauge scale

006 = 0 ÷ 6 bar
010 = 0 ÷ 10 bar
016 = 0 ÷ 16 bar
025 = 0 ÷ 25 bar
060 = 0 ÷ 60 bar
100 = 0 ÷ 100 bar
160 = 0 ÷ 160 bar
250 = 0 ÷ 250 bar
400 = 0 ÷ 400 bar

Series N. (the overall and mounting dimensions remain unchanged from 10 to 19)

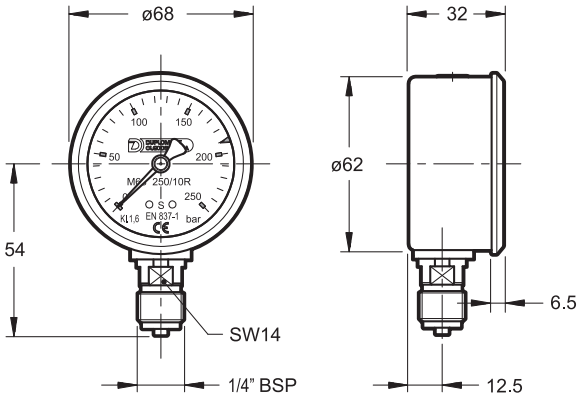
Connection type:
R = radial connector
PF = flange connector

NOTE: the models N. 006, 010, 016 and 025 are available with radial connector (**R**) only.

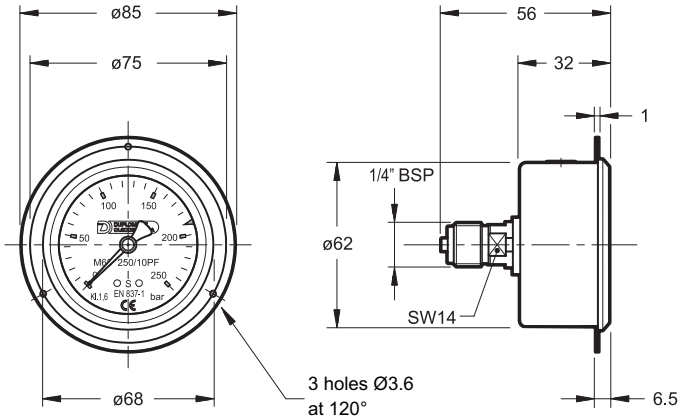
2 - OVERALL AND MOUNTING DIMENSIONS

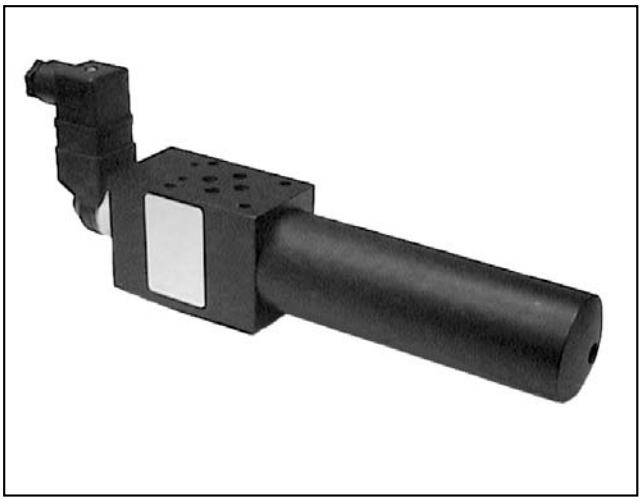
dimensions in mm

M63-*/10R



M63-*/10PF





FPHM

PRESSURE FILTER

SERIES 10

MODULAR VERSION

p max **320** bar
Q max (see table of performances)

OPERATING PRINCIPLE

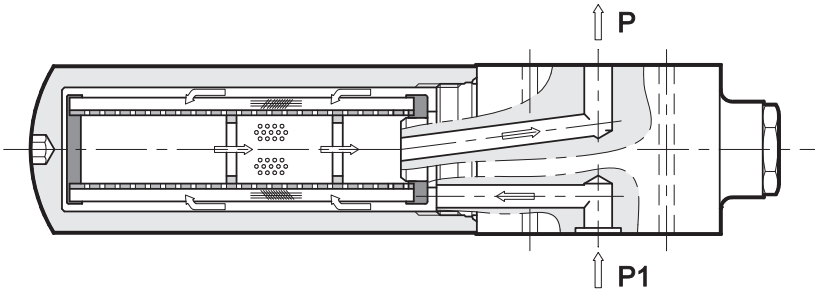
— The FPHM filters are designed for the modular mounting directly under proportional valves or servovalves with ISO 4401 (CETOP RP 121H) interfaces.

— They are available in two nominal dimensions with ISO 4401-03 (CETOP 03) e ISO 4401-05 (CETOP 05) mounting surface.

— FPHM filters are designed for working pressures up to 320 bar. The filter elements are made of high efficiency filtering materials and are available with three different filtration degrees and with a collapsing differential pressure = 210 bar:

F05 = 5 µm absolute
($ß_5$>100 - ISO 4406:1999 class 17/15/12)
F10 = 10 µm absolute
($ß_{10}$>100 - ISO 4406:1999 class 18/16/13)
F25 = 25 µm absolute
($ß_{25}$>100 - ISO 4406:1999 class 19/17/14)

— All the FPHM filters are supplied without by-pass valve and are designed to incorporate a visual-differential or a visual-electric clogging indicator to be ordered separately (see paragraph 5).



PERFORMANCES

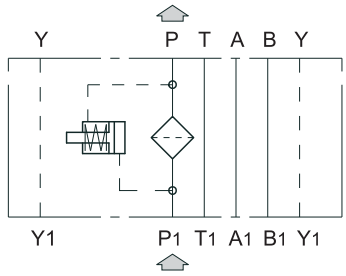
Filter	Dimensions	Mass [Kg]	Rated flow (indicative) [l/min]		
			F05	F10	F25
FPHM3	ISO 4401-03	2,5	12	13,5	16
FPHM5	ISO 4401-05	4,2	22	25	28

NOTE 1: The flow rates stated in the table correspond to a 3 bar pressure drop measured with mineral oil of viscosity 36 cSt at 50°C.
As for a different viscosity range, see NOTE 2 - par. 2.2.

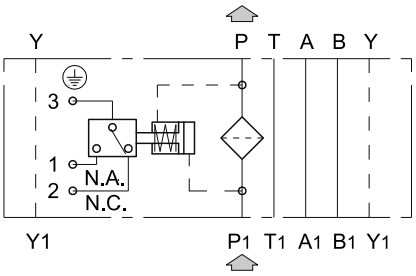
Maximum operating pressure	bar	320
Collapsing differential pressure of the filter element	bar	210
Ambient temperature range	°C	-25 / +50
Fluid temperature range	°C	-25 / +110
Fluid viscosity range	cSt	10 ÷ 400

HYDRAULIC SYMBOL

Modular filter with indicator VM type



Modular filter with indicator EM type



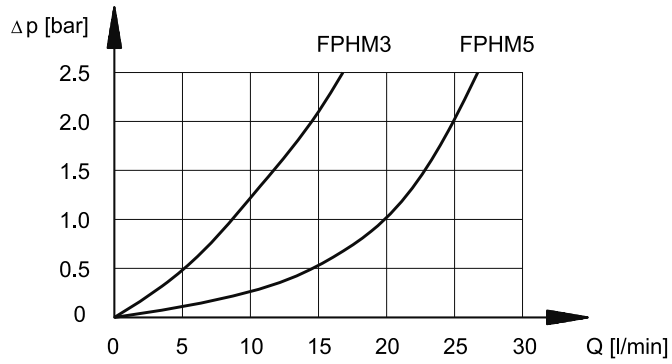
1 - IDENTIFICATION CODE

F	P	H	M		-			S	/	10		-	0

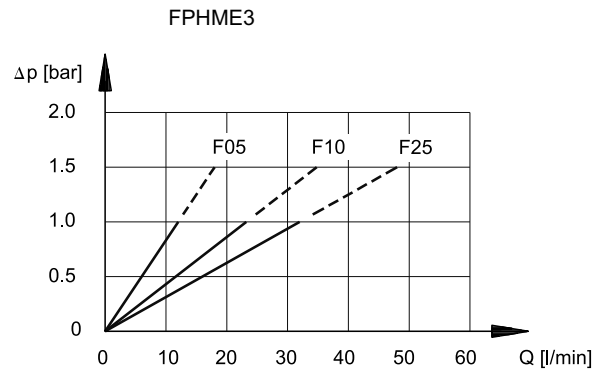
- F P H: High pressure delivery filter
- M: Modular version
- Nominal dimension: **3** = ISO 4401-03 **5** = ISO 4401-05
- Filtration degree:
  - **F05** = fibre 5 µm (β_5>100 - ISO 4406:1999 class 17/15/12)
  - **F10** = fibre 10 µm (β_{10}>100 - ISO 4406:1999 class 18/16/13)
  - **F25** = fibre 25 µm (β_{25}>100 - ISO 4406:1999 class 19/17/14)
- S: Standard filter element
- 10: Series No. (from 10 to 19 sizes and mounting dimensions remain unchanged)
- Seals: **N** = NBR standard seals for mineral oils (**standard**) **V** = FPM seals for special fluids
- 0: without by-pass valve

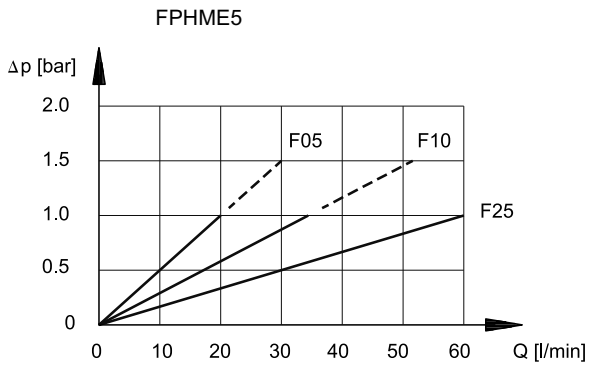
2 - CHARACTERISTIC CURVES (values measured with viscosity of 36 cSt at 50°C)

2.1 - Pressure drops through the filter body



2.2 - Pressure drops through FPHME filter element





NOTE 2: The filter size has to be selected so that with the nominal flow rate the pressure drop is lower than 0.8 bar.

The total pressure drop through the filter is given by adding the body pressure drop values to those of the filter element. As for fluids whose viscosity degree at a specific operating pressure is different from 36 cSt, the filter total pressure drop has to be changed according to the following ratio:

total Δpl value = body Δp value + (real Δp value of the filter element x real viscosity value (cSt) / 36)

real Δp value of the filter element = value obtainable through the diagrams in par. 2.2

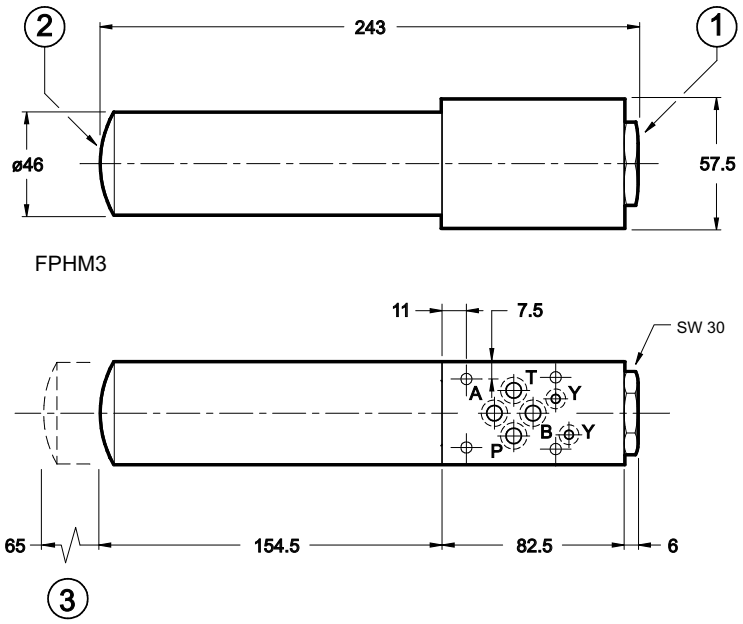
Such ratio is valid for a viscosity value up to 200 cSt. For a higher viscosity please consult our technical department.

3 - HYDRAULIC FLUIDS

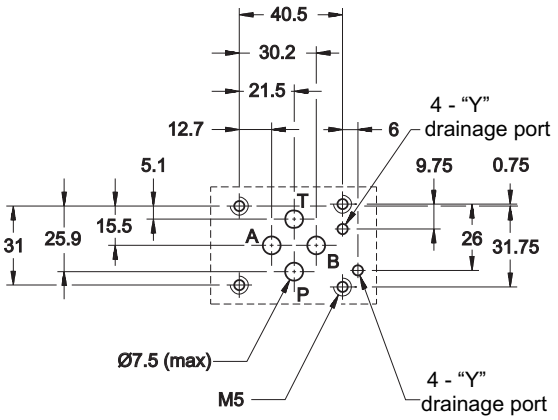
Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department. Using fluids at temperatures higher than 80 °C causes a faster degradation of the fluid and of the seals characteristics.
The fluid must be preserved in its physical and chemical characteristics.

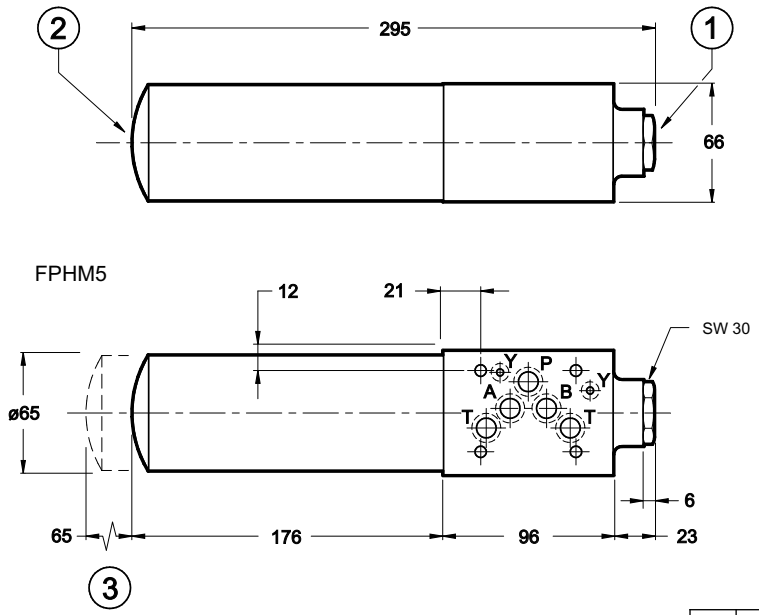
4 - OVERALL AND MOUNTING DIMENSIONS

dimensions in mm

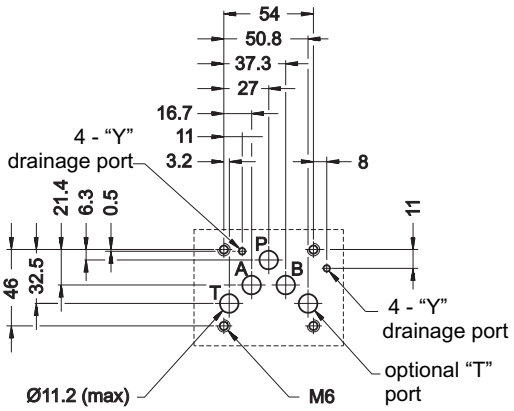


FPHM3 MOUNTING SURFACE





FPHM5 MOUNTING SURFACE



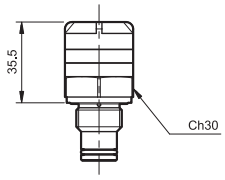
1	Clogging indicator port: M20x1,5
2	Wrench seat facility for housing removal: countersunk hex spanner 10

3	Mounting surface with sealing rings: **FPHM3**: 4 OR 108 (8.73x1.78) 2 OR 2025 (6.07x1.78) **FPHM5**: 5 OR 2050 (12.42x1.78) 2 OR 106 (6.75x1.78)
4	Filter element removal space

5 - CLOGGING INDICATORS

The filters are all designed to incorporate clogging indicators, which have to be ordered separately.

5.1 - Visual indicator for modular filters
Identification code: VM/10

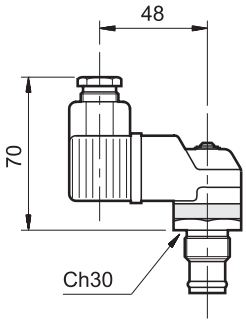


This indicator measures the differential pressure between the filter input and output.

The indicator is supplied with coloured bands, which informs you about the clogging condition of the filter element:

WHITE: efficient filter element $\Delta p < 8$ bar (± 10%)
RED: the filter element has to be replaced $\Delta p > 8$ bar (± 10%)

5.2 - Electric-visual indicator for modular filters
Identification code: EM/10



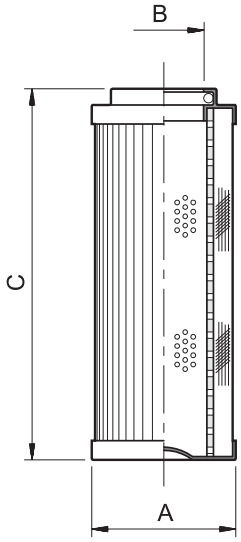
This indicator, apart from giving a visual indication, for example the VPM model, operates by switching an electric contact when the filter element has reached the clogging limit.

The contact can be wired in an open or closed condition (see the hydraulic symbol).

TECHNICAL SPECIFICATIONS

Differential operating pressure	bar	8
AC power supply		
Max. operating voltage	VAC	250 50/60 Hz
Max. load on the contacts (inductive or resistive)	A	5
DC power supply		
Max. operating voltage	VDC	125
Max. load on the contacts (with V at 30-50-75-125 VDC) resistive inductive	A	 2 - 0,5 - 0,25 - 0,2 2 - 0,5 - 0,25 - 0,03
Electric connector		DIN 43650
Class of protection according to CEI EN 60529 (atmospheric agents)		IP65

6 - FILTER ELEMENTS



filter element code	ØA	ØB	C	Average filtering surface [cm²]
FPHME3	33	16	100	270
FPHME5	45	25	115	475

FILTER ELEMENTS IDENTIFICATION CODE

F P H M E | | - | | | S / 10 |

Filter element for FPHM modular filter

Nominal dimension:
3 = ISO 4401-03
5 = ISO 4401-05

Filtration degree : **F05** = fibre 5 µm
F10 = fibre 10 µm
F25 = fibre 25 µm

Standard filter element

Series No. (from 10 to 19 sizes and mounting dimensions remain unchanged)

N = NBR seals for mineral oils **(standard)**
V = FPM seals for special fluids (upon request)

FPM

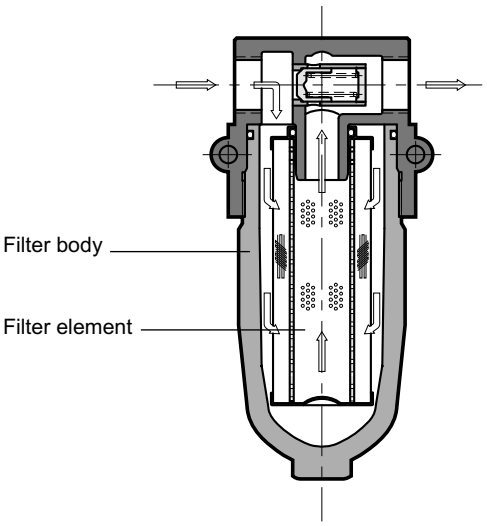
MEDIUM PRESSURE FILTER FOR LINE MOUNTING

SERIES 10

p max **210** bar

Q max (see table of performances)

OPERATING PRINCIPLE



— The FPM filters are designed to be line-mounted with BSP threaded ports for hydraulic connections. Threaded holes are machined on the head for possible filter bracket fixing .

— The replacement of the filter element can be easily carried out by using a normal hexagon spanner to unscrew the bowl of the filter, which has a suitably shaped end.

— FPM filters are designed to be installed on medium pressure lines up to 210 bar; the filter elements are made of high efficiency filtering materials and are available with three different filtration degrees:
F05 = 5 µm absolute (β_5 >100 - ISO 4401:1999 class 17/15/12)
F10 = 10 µm absolute (β_{10}>100 - ISO 4401:1999 class 18/16/13)
F25 = 25 µm absolute (β_{25} >100 - ISO 4401:1999 class 19/17/14)

— The filters are always supplied with a by-pass valve.

— The filter elements are available in the standard version (S) or in the long-lasting version (L) is able to hold high quantities of contamination material. For all filter elements the collapsing differential pressure is 20 bar.

— All the FPM filters are designed to incorporate a visual-differential or a visual-electric clogging indicator to be ordered separately (see paragraph 5).

PERFORMANCES

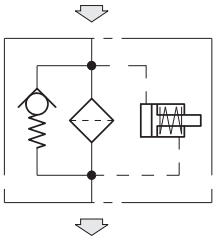
Filter code	BSP port dimensions	Mass [Kg]		Rated flow (indicative) [l/min]					
		type S	type L	F05S	F05L	F10S	F10L	F25S	F25L
FPM-TB012	1/2"	1,5	2,0	25	40	35	50	45	60
FPM-TB034	3/4"			35	50	50	65	65	80
FPM-TB100	1"			40	60	60	85	85	100

NOTE 1: the flow rates stated in the table correspond to a 0.8 bar pressure drop measured with mineral oil of viscosity 36 cSt at 50°C.
As for a different viscosity range, see NOTE 2 - par. 2.2.

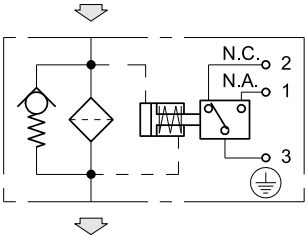
Maximum operating pressure	bar	210
Collapsing differential pressure of the filter element	bar	20
Differential pressure for the opening of the by-pass valve (±10 %)	bar	6
Ambient temperature range	°C	-25 / +50
Fluid temperature range	°C	-25 / +110
Fluid viscosity range	cSt	10 ÷ 400

HYDRAULIC SYMBOL

Filter with indicator VPM type



Filter with indicator EPM type



1 - IDENTIFICATION CODE

F	P	M	-	T	B				-				/	10		-	

Medium pressure delivery filter

BSP threaded ports

Nominal dimension:
012 = 1/2" **034** = 3/4" **100** = 1"

Filtration degree:
F05 = fibre 5 µm (β_5 > 100) - ISO 4401:1999 class 17/15/12
F10 = fibre 10 µm (β_{12} > 100) - ISO 4401:1999 class 18/16/13
F25 = fibre 25 µm (β_{25} > 100) - ISO 4401:1999 class 19/17/14

Type of filter element:
S = standard **L** = long-lasting element

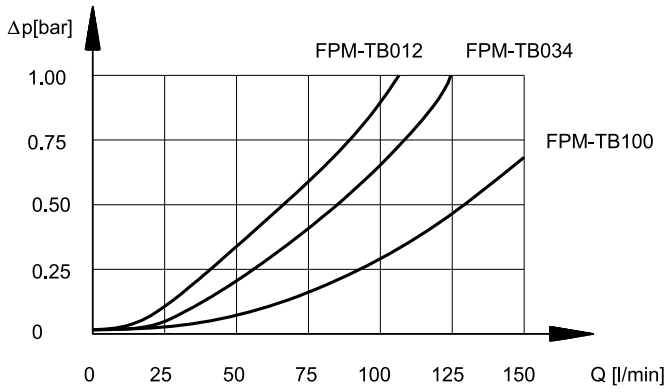
B = with by-pass valve Opening pressure 6 bar
0 = without by-pass valve (upon request only)

Seals:
N = NBR standard seals for mineral oils (**standard**)
V = FPM seals for special fluids

Series No. (from 10 to 19 sizes and mounting dimensions remain unchanged)

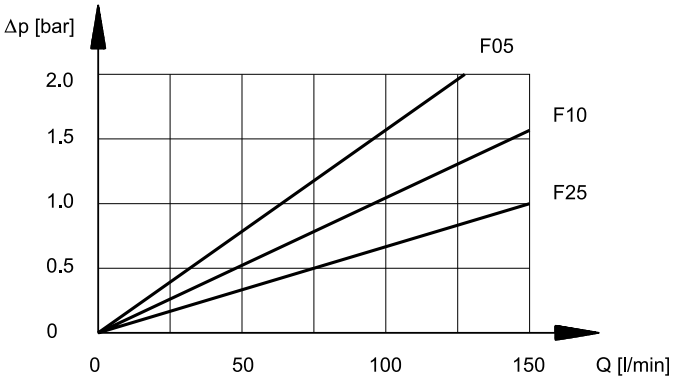
2 - CHARACTERISTIC CURVES (values measured with viscosity of 36 cSt at 50°C)

2.1 - Pressure drops through the filter body

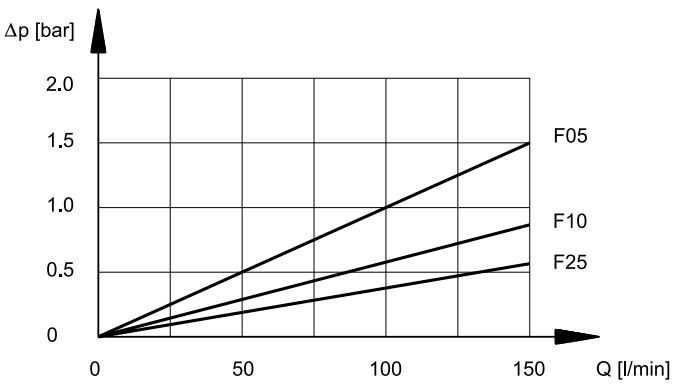


2.2 - Pressure drops through FPME filter element

FPME-*S
(standard filter element)



FPME-*L
(long-lasting filter element)



NOTE 2: The filter size has to be selected so that with the nominal flow rate the pressure drop is lower than 0.8 bar.

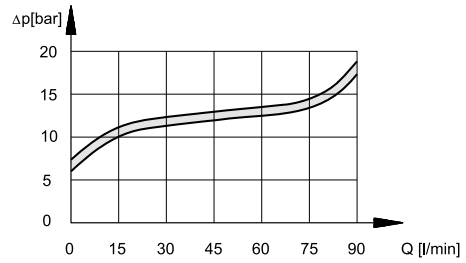
The total pressure drop through the filter is given by adding the body pressure drop values to those of the filter element. As for fluids whose viscosity degree at a specific operating pressure is different from 36 cSt, the filter total pressure drop has to be changed according to the following ratio:

total Δpl value = body Δp value + (real Δp value of the filter element x real viscosity value (cSt) / 36)

real Δp value of the filter element = value obtainable through the diagrams in paragraph 2.2

Such ratio is valid for a viscosity value up to 200 cSt. For a higher viscosity please consult our technical department.

2.3 - Pressure drops through by-pass valve



3 - HYDRAULIC FLUIDS

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department. Using fluids at temperatures higher than 80 °C causes a faster degradation of the fluid and of the seals characteristics.

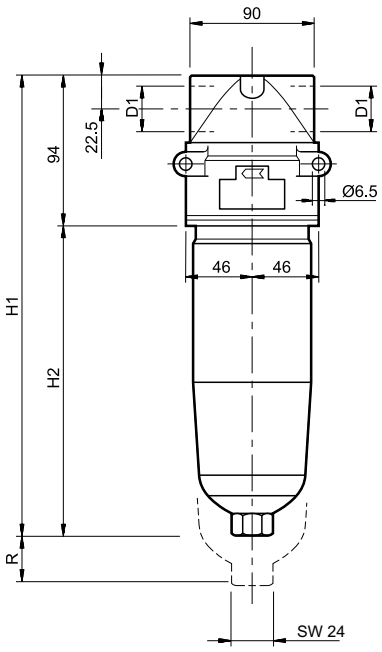
The fluid must be preserved in its physical and chemical characteristics.

4 - OVERALL AND MOUNTING DIMENSIONS

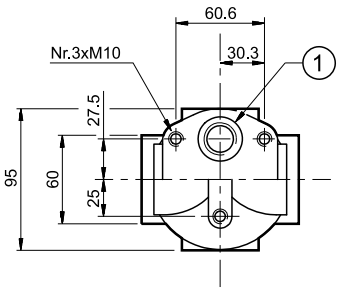
dimensions in mm

Filter code	D1	H1	H2	R*
FPM-TB012-*S	1/2”	205	111	100
FPM-TB034-*S	3/4”	205	111	100
FPM-TB100-*S	1”	205	111	100
FPM-TB012-*L	1/2”	298	197	100
FPM-TB034-*L	3/4”	298	197	100
FPM-TB100-*L	1”	298	197	100

R* = Filter element removal space



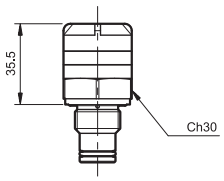
1	Clogging indicator port: M20 x 1,5



5 - CLOGGING INDICATORS

The filters are all designed to incorporate clogging indicators, which have to be ordered separately

5.1 - Visual indicator for medium pressure delivery filters Identification code: VPM/10



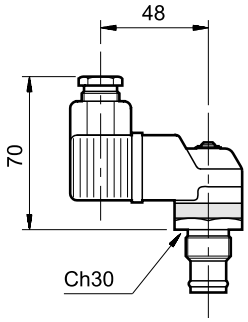
This indicator measures the differential pressure between the filter input and output.

The indicator is supplied with coloured bands, which informs you about the clogging condition of the filter element:

WHITE: efficient filter element Δp <5 bar (± 10%)

RED: the filter element has to be replaced p >5 bar (± 10%)

5.2 - Electric-visual indicator for delivery filters Identification code: EPM/10



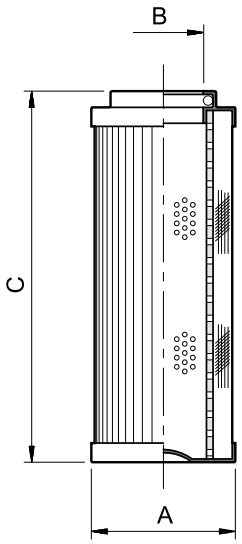
This indicator, apart from giving a visual indication, for example the VPM model, operates by switching an electric contact when the filter element has reached the clogging limit.

The contact can be wired in an open or closed condition (see the hydraulic symbol).

TECHNICAL SPECIFICATIONS

Differential operating pressure	bar	5
AC power supply		
Max. operating voltage	VAC	250 50/60 Hz
Max. load on the contacts (inductive or resistive)	A	5
DC power supply		
Max. operating voltage	VDC	125
Max. load on the contacts (with V at 30-50-75-125 VDC) resistive inductive	A	 2 - 0,5 - 0,25 - 0,2 2 - 0,5 - 0,25 - 0,03
Electric connector		DIN 43650
Class of protection according to CEI EN 60529 (atmospheric agents)		IP65

6 - FILTER ELEMENTS



filter element code	ØA	ØB	C	Average filtering surface [cm²]
FPME - *S	52	23,5	115	975
FPME - *L	52	23,5	210	1830

FILTER ELEMENT IDENTIFICATION CODE

F P M E - | | | | / 10 |

Filter element for FPM filters

Filtration degree:
F05 = fibre 5 µm
F10 = fibre 10 µm
F25 = fibre 25 µm

Filter element type:
S = standard
L = long-lasting

Series No. (from 10 to 19 sizes and mounting dimensions remain unchanged)

N = NBR seals for mineral oils **(standard)**
V = FPM seals for special fluids (upon request)

FPH

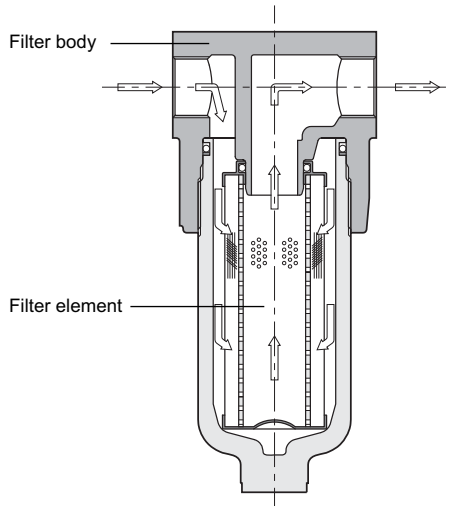
PRESSURE FILTER FOR LINE MOUNTING

SERIES 11

p max **420** bar

Q max (see table of performances)

OPERATING PRINCIPLE



— FPH filters are designed to be line-mounted with BSP threaded ports for hydraulic connections. Threaded holes are machined on the head for possible filter bracket fixing.

— The replacement of the filter element can be easily carried out by using a normal hexagon spanner to unscrew the bowl of the filter, which has a suitably shaped end.

— FPH filters are designed to be installed on pressure lines up to 420 bar; the filter elements are made of high efficiency filtering materials and are capable of holding high quantities of contamination particles. They are available with three different filtration degrees:

H05 = 5 µm: absolute (β_5> 100 - ISO 4406:1999 class 17/15/12) cartridge with a collapsing differential pressure = 210 bar to be used without a by-pass valve.
F10 = 10 µm: absolute (β_{10}> 100 - ISO 4406:1999 class 18/16/13)
F25 = 25 µm: absolute (β_{25}> 100 - ISO 4406:1999 class 19/17/14)

— Those filters with a F10 and F25 filtration degree are supplied with a by-pass valve and have a cartridge with a collapsing differential pressure = 20 bar.

— All the FPH filters are designed to incorporate a visual-differential or a visual-electric clogging indicator to be ordered separately (see par. 5).

PERFORMANCES

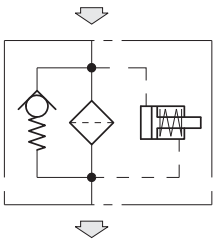
Filter code	BSP port dimensions	Mass [Kg]	Rated flow (indicative) [l/min]		
			H05	F10	F25
FPH-TB012	1/2”	4.4	10	27	33
FPH-TB034	3/4”	5.2	19	42	65
FPH-TB100	1”	8.2	40	95	105
FPH-TB114	1 ¼”	14	88	190	230
FPH-TB112	1 ½”	17.2	120	260	320

NOTE 1: The flow rates stated in the table correspond to a 0.8 bar pressure drop measured with mineral oil of viscosity 36 cSt at 50°C.
As for a different viscosity range, see NOTE 2 - par. 2.2.

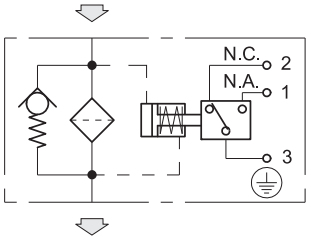
Maximum operating pressure	bar	420
Collapsing differential pressure of the filter element: H05 F-10-F25	bar	210 20
Differential pressure for the opening of the by-pass valve (±10 %)	bar	6
Ambient temperature range	°C	-25 / +50
Fluid temperature range	°C	-25 / +110
Fluid viscosity range	cSt	10 ÷ 400

HYDRAULIC SYMBOL

Filter with indicator VPM type



Filter with indicator EPM type



1 - IDENTIFICATION CODE

F	P	H	-	T	B				-			S	/	11		-	

High pressure delivery filter

BSP threaded ports

Nominal dimension:
012 = 1/2” **100** = 1” **112** = 1 1/2”
034 = 3/4” **114** = 1 1/4”

Filtration degree: **H05** = fibre 5 µm (β_5> 100) - ISO 4406:1999 class 17/15/12
F10 = fibre 10 µm (β_{10}> 100) - ISO 4406:1999 class 18/16/13
F25 = fibre 25 µm (β_{25}> 100) - ISO 4406:1999 class 19/17/14

Standard filter element

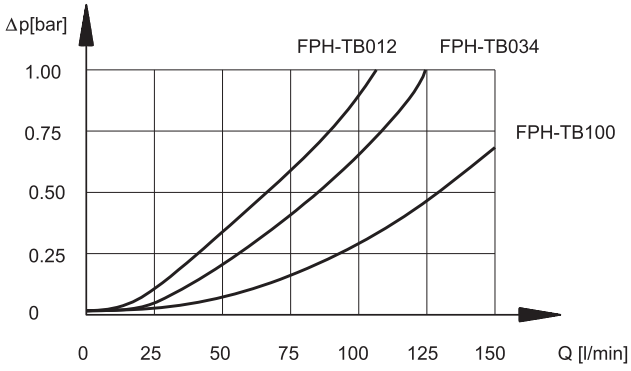
Series No. (from 10 to 19 sizes and mounting dimensions remain unchanged)

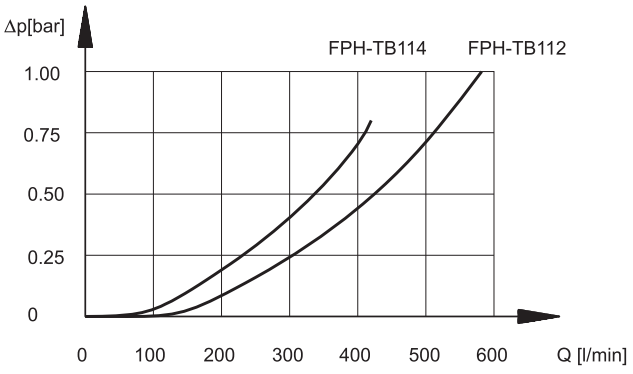
Seals:
N = NBR standard seals for mineral oils (**standard**)
V = FPM seals for special fluids

B = with by-pass valve
Opening pressure: 6 bar
0 = without by-pass valve (compulsory for a H05 filtration degree)

2 - CHARACTERISTIC CURVES (values measured with viscosity of 36 cSt at 50°C)

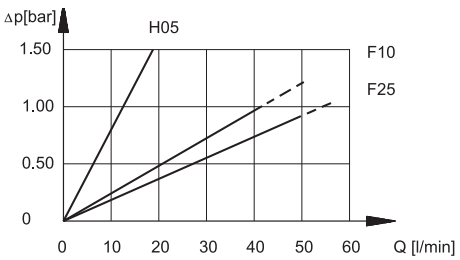
2.1 - Pressure drops through the filter body



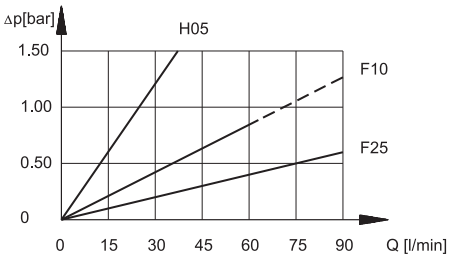


2.2 - Pressure drops through the FPHE filter element

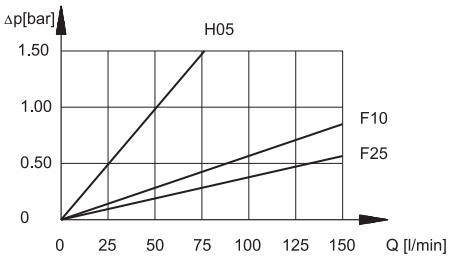
FPHE-TB012



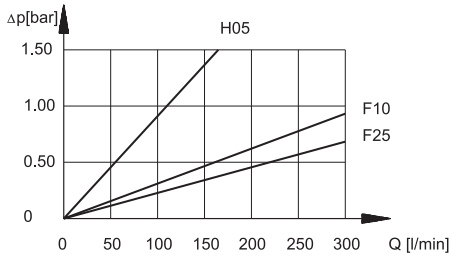
FPHE-TB034



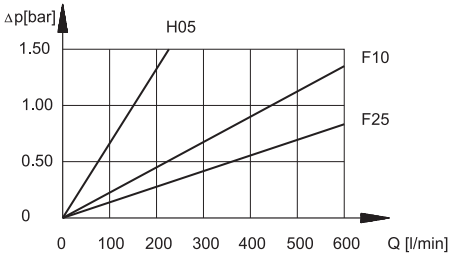
FPHE-TB100



FPHE-TB114



FPHE-TB112



NOTE 2: The filter size has to be selected so that with the nominal flow rate the pressure drop is lower than 0.8 bar.

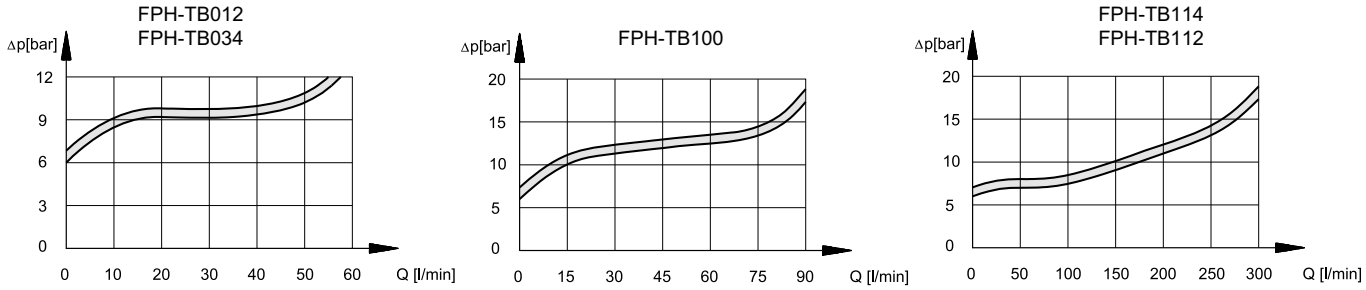
The total pressure drop through the filter is given by adding the body pressure drop values to those of the filter element. As for fluids whose viscosity degree at a specific operating pressure is different from 36 cSt, the filter total pressure drop has to be changed according to the following ratio:

total Δpl value = body Δp value + (real Δp value of the filter element x real viscosity value (cSt) / 36)

real Δp value of the filter element = value obtainable through the diagrams in par. 2.2

Such ratio is valid for a viscosity value up to 200 cSt. For a higher viscosity please consult our technical department.

2.3 - Pressure drops through the by-pass valve

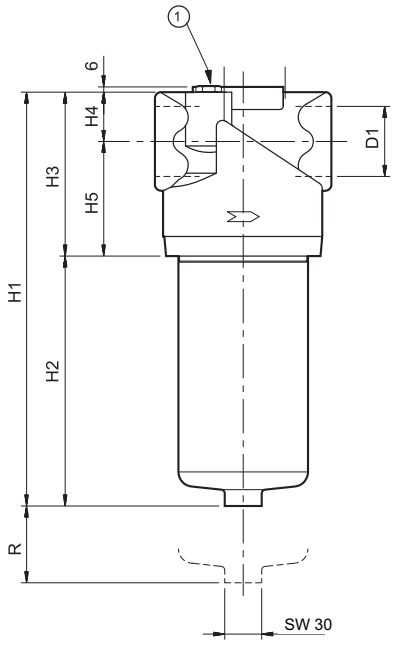


3 - HYDRAULIC FLUIDS

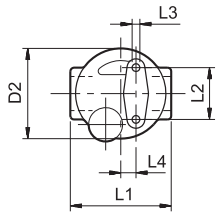
Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department. Using fluids at temperatures higher than 80 °C causes a faster degradation of the fluid and of the seals characteristics.

The fluid must be preserved in its physical and chemical characteristics.

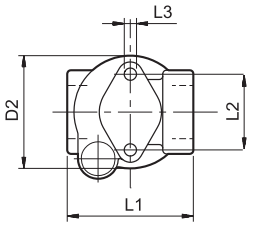
4 - OVERALL AND MOUNTING DIMENSIONS



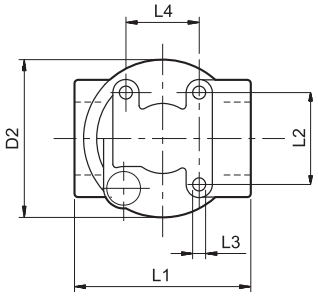
FPH - TB012
FPH - TB034



FPH - TB100



FPH - TB114
FPH - TB112



dimensions in mm

filter	D1	D2	H1	H2	H3	H4	H5	L1	L2	L3	L4	R*
FPH- TB012	1/2"	82	166	79	86	23	63	85	46	M8	12,5	100
FPH- TB034	3/4"	82	296	209	86	23	63	85	46	M8	12,5	100
FPH- TB100	1"	94	317	207	112	35	77	107	65	M8	-	100
FPH- TB114	1 ¼"	128	337	199	137	44	93	143	88	M10	43	100
FPH- TB112	1 ½"	128	457	319	137	44	93	143	88	M10	43	100

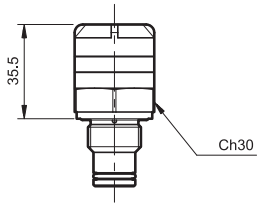
R* = removal space for filter element

1	Clogging indicator port: M20 x 1,5

5 - CLOGGING INDICATORS

The filters are all designed to incorporate clogging indicators, which have to be ordered separately.

5.1 - Visual indicator for delivery filters
Identification code: VPM/10



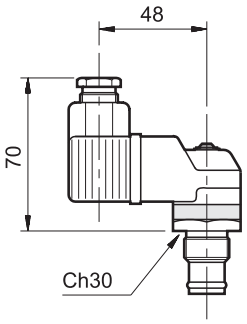
This indicator measures the differential pressure between the filter input and output.

The indicator is supplied with coloured bands, which informs you about the clogging condition of the filter element:

WHITE: efficient filter element Δp <5 bar (± 10%)

RED: the filter element has to be replaced Δp >5 bar (± 10%)

5.2 - Electric-visual indicator for delivery filters
Identification code: EPM/10



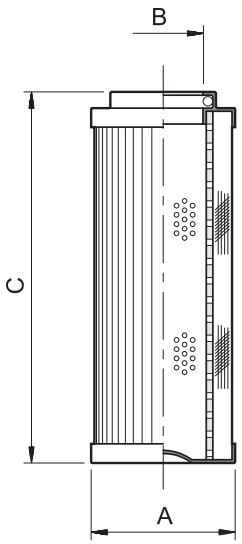
This indicator, apart from giving a visual indication, for example the VPM model, operates by switching an electric contact when the filter element has reached the clogging limit.

The contact can be wired in an open or closed condition (see the hydraulic symbol).

TECHNICAL SPECIFICATIONS

Differential operating pressure	bar	5
AC power supply		
Max. operating voltage	VAC	250 50/60 Hz
Max. load on the contacts (inductive or resistive)	A	1
DC power supply		
Max. operating voltage	VDC	125
Max. load on the contacts (with V at 30-50-75-125 VDC) resistive inductive	A	 2 - 0,5 - 0,25 - 0,2 2 - 0,5 - 0,25 - 0,03
Electric connector	DIN 43650	
Class of protection according to CEI EN 60529 (atmospheric agents)	IP65	

6 - FILTER ELEMENTS



filter element code	ØA	ØB	C	Average filtering surface [cm²]	
				H05	F12/F25
FPHE - 012	45	25	85	340	355
FPHE - 034	45	25	211	915	935
FPHE - 100	52	23,5	210	1785	1830
FPHE - 114	78	42,5	210	2695	3695
FPHE - 112	78	42,5	330	4325	5025

FILTER ELEMENT IDENTIFICATION CODE

F	P	H	E	-				-			S	/	10	

Filter element for FPH filters

Nominal dimension:
012 = 1/2” **114** = 1 1/4”
034 = 3/4” **112** = 1 1/2”
100 = 1”

Filtration degree: H05 = fibre 5 µm
F10 = fibre 10 µm
F25 = fibre 25 µm

Standard filter element

Series N. (from 10 to 19 sizes and mounting dimensions remain unchanged)

N = NBR seals for mineral oils (**standard**)
V = FPM seals for special fluids (upon request)

FRC

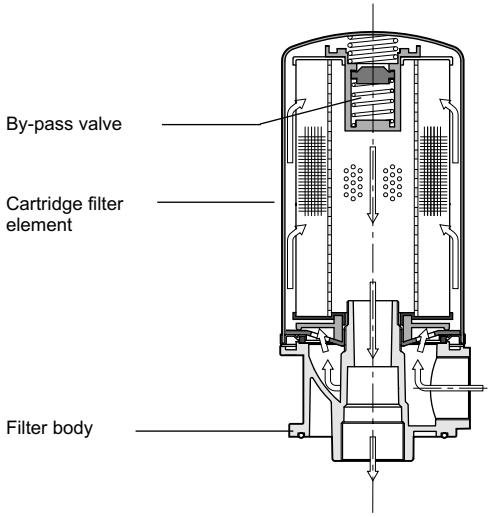
RETURN LINE FILTER FOR TANK TOP OR LINE MOUNTING

SERIES 10

p max **7** bar

Q max (see table of performances)

OPERATING PRINCIPLE



— FRC filters can be mounted both on the tank cover by using a 4-hole flange fixing system with a direct bottom discharge, or on the return line.

— The filter element with a screw on cartridge allows easy and practical replacement; a suitable membrane inside the cartridge prevents the residual oil from coming out.

— The filter element is made of high efficiency filtering materials and is able to accumulate high quantities of contamination material. It is available with three different filtration degrees:

F25 = 25 µm: absolute ($\beta_{25} > 100$) - ISO 4406:1999 class 19/17/14

P10 = 10 µm: nominal ($\beta_{10} > 2$) - ISO 4406:1999 class 21/19/16

P25 = 25 µm: nominal ($\beta_{25} > 2$) - ISO 4406:1999 class 24/22/19

— FRC filters are always supplied with a by-pass valve.

— All the FRC filters are designed to incorporate an electric or visual clogging indicator, to be ordered separately (see paragraph 5).

PERFORMANCES

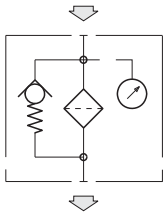
Filter code	BSP port dimensions	Mass [kg]	Rated flow (indicative) [l/min]				
			F25L	P10S	P10L	P25S	P25L
FRC-TB034	3/4"	1.6	65	65	70	70	75
FRC-TB112	1 ½"	2.2	180	150	200	200	200

NOTE 1: the flow rates stated in the table correspond to a 0.5 bar pressure drop measured with mineral oil of viscosity 36 cSt at 50°C.
As for a different viscosity range, see NOTE 2 - par. 2.2.

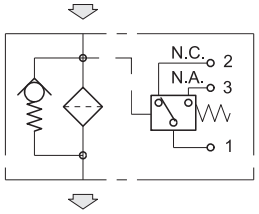
Maximum pressure	bar	7
Collapsing differential pressure of the filter element	bar	3.0
Differential pressure for the opening of the by-pass valve (±10 %)	bar	1,7
Ambient temperature range	°C	-25 / +50
Fluid temperature range	°C	-25 / +110
Fluid viscosity range	cSt	10 ÷ 400

HYDRAULIC SYMBOL

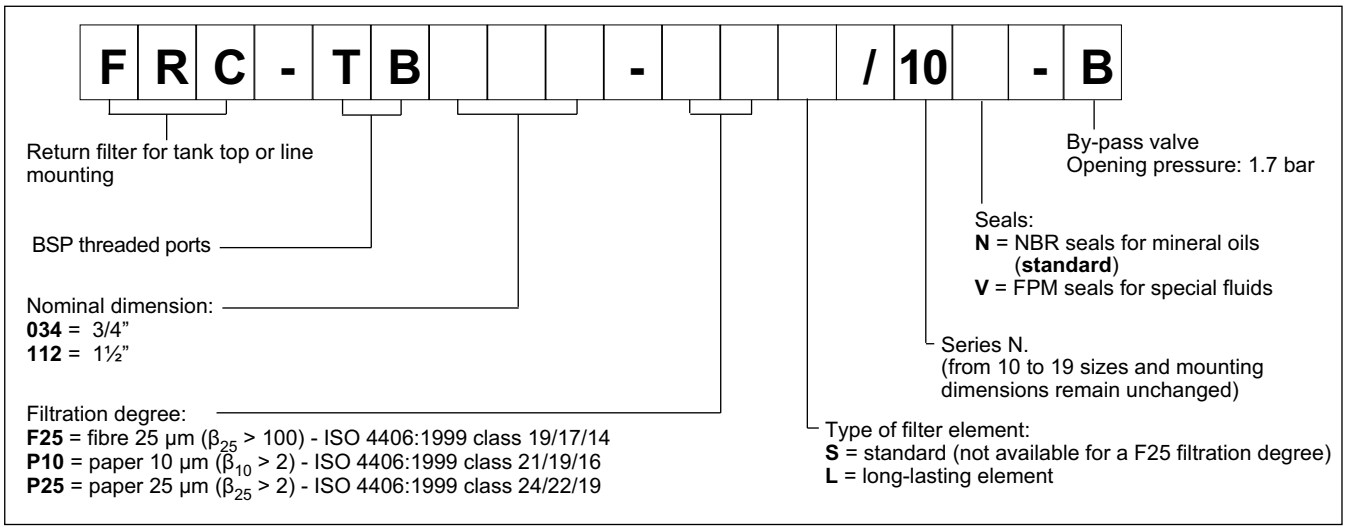
Filter with indicator VR type



Filter with indicator ER type

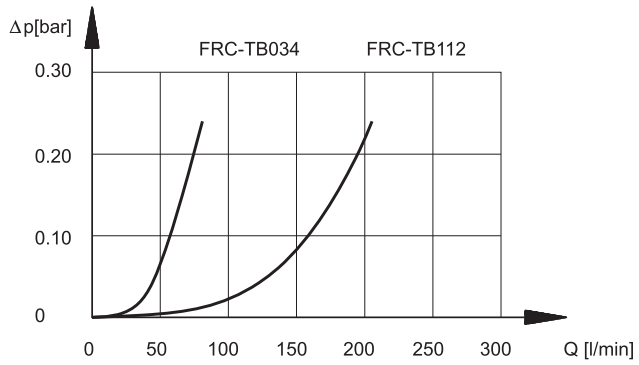


1 - IDENTIFICATION CODE

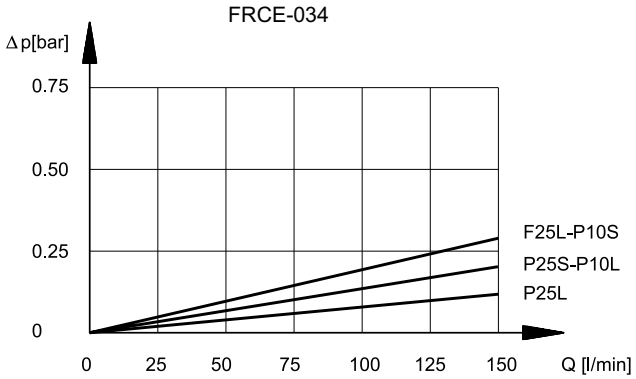


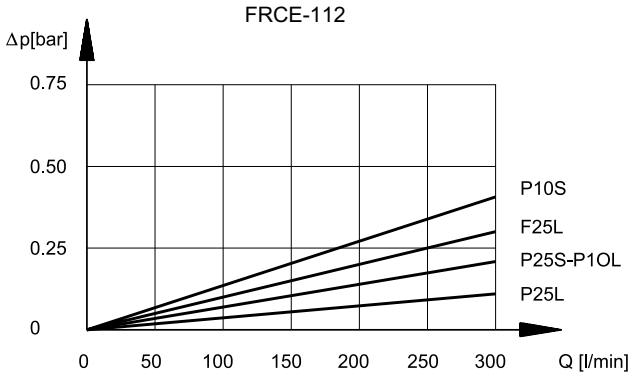
2 - CHARACTERISTIC CURVES (values measured with viscosity of 36 cSt at 50°C)

2.1 - Pressure drops through the filter body



2.2 - Pressure drops through the FRCE filter element



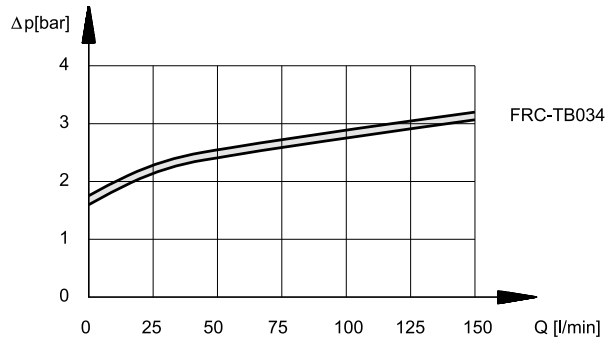


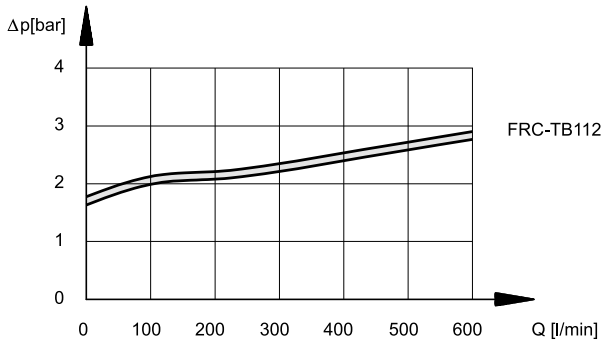
NOTE 2: The filter size has to be selected so that with the nominal flow rate the pressure drop is lower than 0.5 bar.
The total pressure drop through the filter is given by adding the body pressure drop values to those of the filter element.
As for fluids whose viscosity degree at a specific operating pressure is different from 36 cSt, the filter total pressure drop has to be changed according to the following ratio:
total ∆pl value = body ∆p value + (real ∆p value of the filter element x real viscosity value (cSt) / 36)

real ∆p value of the filter element = value obtainable through the diagrams in paragraph 2.2

Such ratio is valid for a viscosity value up to 200 cSt.
For a higher viscosity please consult our technical department.

2.3 - Pressure drops through the by-pass valve



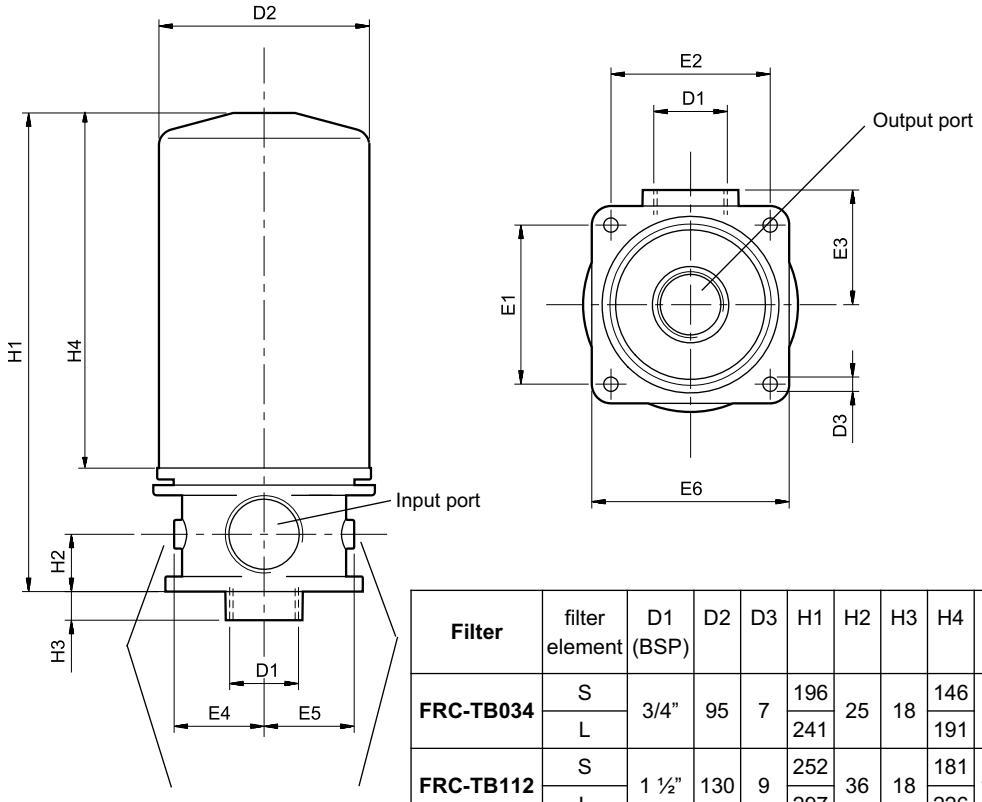


3 - HYDRAULIC FLUIDS

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department. Using fluids at temperatures higher than 80 °C causes a faster degradation of the fluid and of the seals characteristics.
The fluid must be preserved in its physical and chemical characteristics.

4 - OVERALL AND MOUNTING DIMENSIONS

dimensions in mm



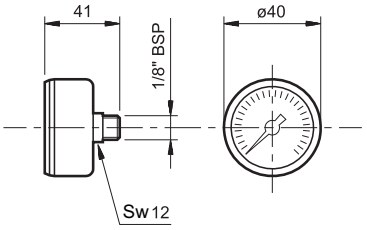
Filter	filter element	D1 (BSP)	D2	D3	H1	H2	H3	H4	E1	E2	E3	E4	E5	E6	R*
FRC-TB034	S	3/4"	95	7	196	25	18	146	70	70	50	38	38	108	211
	L				241			191							256
FRC-TB112	S	1 ½"	130	9	252	36	18	181	100	100	72	56	56	140	282
	L				297			226							327

R* = Filter element removal space above the tank surface

5 - CLOGGING INDICATORS

The filters are designed to incorporate clogging indicators, which have to be ordered separately.

5.1 - Visual indicator for return filters
Identification code: VR/10



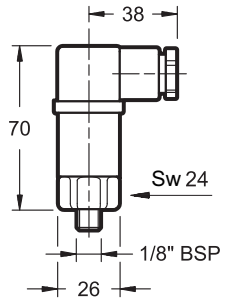
This indicator is a pressure gauge sensitive to the filter input pressure.

The indicator is supplied with a 0 ÷ 6 bar graduated scale and with a two-colour reading scale, which informs you about the clogging condition of the filter element:

GREEN: efficient filter element (0 ÷ 1.7 bar)

RED: the filter element has to be replaced (> 1.7 bar)

5.2 - Electric indicator for return filters
Identification code: ER/11



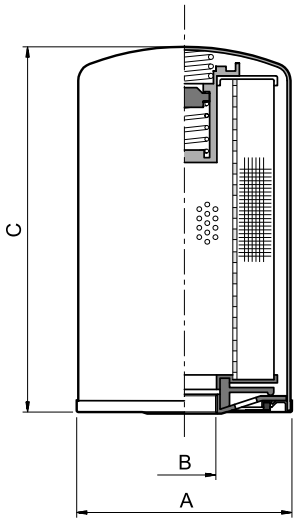
This indicator is a pressure switch sensitive to the filter input pressure, which switches an electric contact when the filter element has reached the clogging limit.

The contact can be wired in an open or closed condition (see the hydraulic symbol).

TECHNICAL SPECIFICATIONS

Operating pressure	bar	1,5
AC power supply		
Max. operating voltage	VAC	250 50/60 Hz
Max. load on the contacts (inductive or resistive) with V at 125 VAC with V at 250 VAC	A	 3 0,5
DC power supply		
Max. operating voltage	VDC	30
Max. load on the contacts resistive inductive	A	 3 1
Electric connector	DIN 43650	
Class of protection according to CEI EN 60529 (atmospheric agents)	IP65	
Atex classification	3 GD EEx e T6	

6 - FILTER ELEMENTS



Filter element code	ØA	ØB	C	Average filtering surface [cm²]
FRCE - 034 -P*S	96,5	3/4" BSP	146	3305
FRCE - 034 -P*L	96,5	3/4" BSP	191	4745
FRCE - 034 -F25L	96,5	3/4" BSP	191	3630
FRCE - 112 -P*S	129	1 ¼" BSP	181	5560
FRCE - 112 -P*L	129	1 ¼" BSP	226	7360
FRCE - 112 -F25L	129	1 ¼" BSP	226	5890

FILTER ELEMENT IDENTIFICATION CODE

F	R	C	E	-				-				/	10	

Cartridge filter element for FRC filters

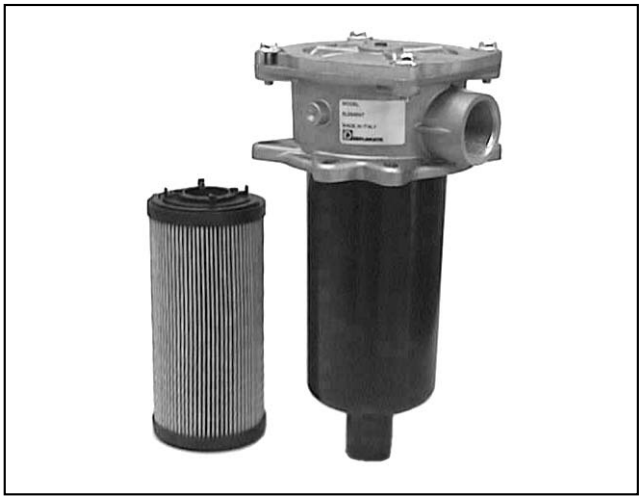
Nominal dimension
034 = 3/4" **112** = 1 ½"

Filtration degree : F25 = fibre 25 µm
P10 = paper 10 µm
P25 = paper 25 µm

Type of filter element:
S = standard (not available with a F25 filtration degree)
L = long-lasting element

Series N. (from 10 to 19 sizes and mounting dimensions remain unchanged)

N = NBR seals for mineral oils (**standard**)
V = FPM seals for special fluids upon request



FRT

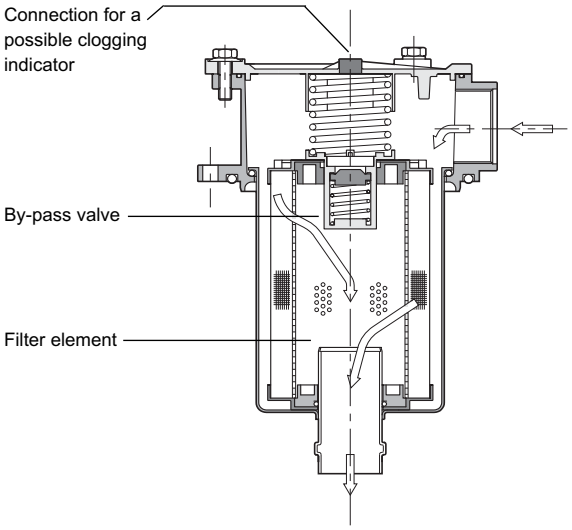
RETURN FILTER FOR FLANGE MOUNTING ON THE TANK

SERIES 10

p max **3** bar

Q max (see performance table)

OPERATING PRINCIPLE



— FRT filters are designed to be flange-mounted on the tank cover; the BSP threaded port for the input connection is positioned on the filter head and is therefore very accessible.

— The inspection cover fixed with three or four screws allows easy maintenance; the filter element is supplied with a screw, which makes its removal together with the container easier. In this way, by replacing the filter element, it is possible to clean the contamination present in the bowl of the filter.

— The filter element is made of high efficiency filtering materials and is able to hold high quantities of contamination material. It is available with three different filtration degrees:

F10 = 10 µm absolute (β_{10} > 100) - ISO 4406:1999 class 18/16/13
F25 = 25 µm absolute (β_{25} > 100) - ISO 4406:1999 class 19/17/14
P10 = 10 µm nominal (β_{10} > 2) - ISO 4406:1999 class 21/19/16

— FRT filters are always supplied with a by-pass valve.

— All the FRT filters are designed to incorporate an electric or visual clogging indicator, to be ordered separately (see par. 5).

PERFORMANCES

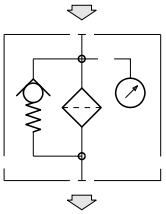
Filter code	BSP port dimensions	Mass [kg]	Rated flow (indicative) [l/min]		
			F10	F25	P10
FRT-TB012	1/2”	0,45	18	25	30
FRT-TB034	3/4”	0,95	50	70	85
FRT-TB100	1”	1,1	65	110	130
FRT-TB114	1 ¼”	2,1	150	190	210
FRT-TB112	1 ½”	3,1	160	250	290
FRT-TB200	2”	4,1	280	400	430

Maximum pressure	bar	3
Collapsing differential pressure of the filter element	bar	3
Differential pressure for the opening of the by-pass valve (±10 %)	bar	1,7
Ambient temperature range	°C	-25 / +50
Fluid temperature range	°C	-25 / +110
Fluid viscosity range	cSt	10 ÷ 400

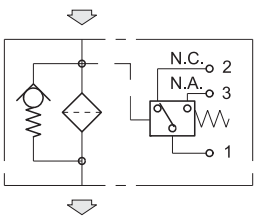
NOTE: the flow rates stated in the table correspond to a 0.5 bar pressure drop measured with mineral oil of viscosity 36 cSt at 50°C.
As for a different viscosity range, see **NOTE 2** - par. 2.2.

HYDRAULIC SYMBOL

Filter with indicator VR type



Filter with indicator ER type



1 - IDENTIFICATION CODE

F	R	T	-	T	B				-			S	/	10		-	B

Return filter tank-top mounted

BSP threaded ports

Nominal dimension:
012 = 1/2" **114** = 1 ¼"
034 = 3/4" **112** = 1 ½"
100 = 1" **200** = 2"

Filtration degree:
F10 = 10 µm fibre (β_{10} > 100) - ISO 4406:1999 class 18/16/13
F25 = 25 µm fibre (β_{25} > 100) - ISO 4406:1999 class 19/17/14
P10 = 10 µm paper (β_{10} > 2) - ISO 4406:1999 class 21/19/16

Standard filtering element

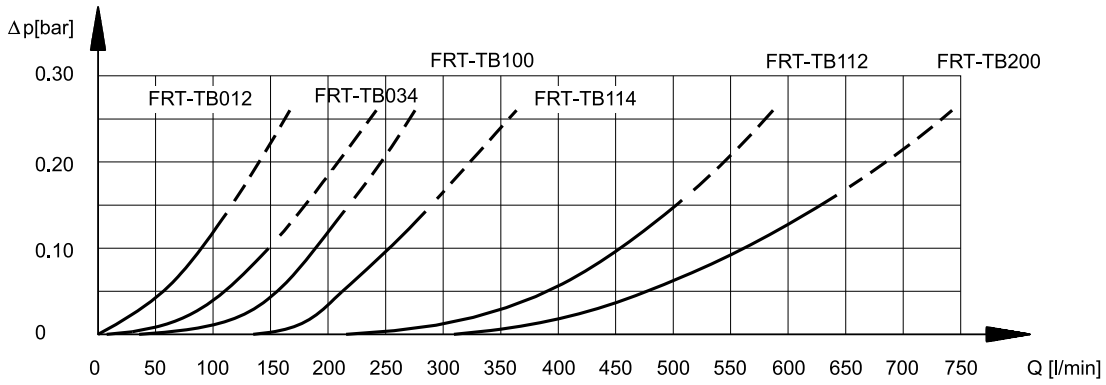
Series N. (from 10 to 19 sizes and mounting dimensions remain unchanged)

Seals:
N = NBR seals for mineral oils (**standard**)
V = FPM seals for special fluids

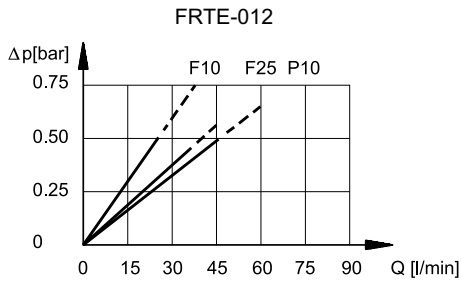
By-pass valve
Opening pressure: 1.7 bar

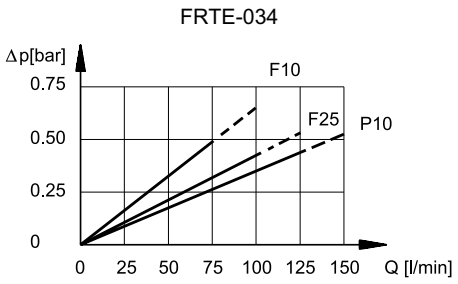
2 - CHARACTERISTIC CURVES (values measured with viscosity of 36 cSt at 50°C)

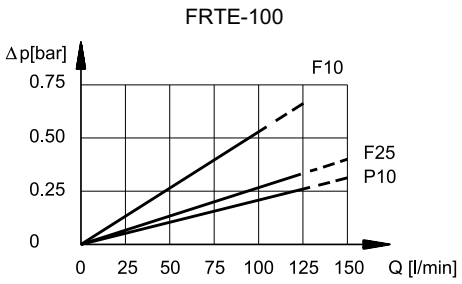
2.1 - Pressure drops through the filter body

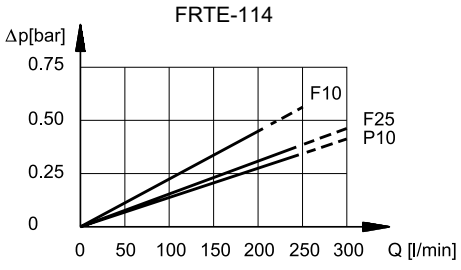


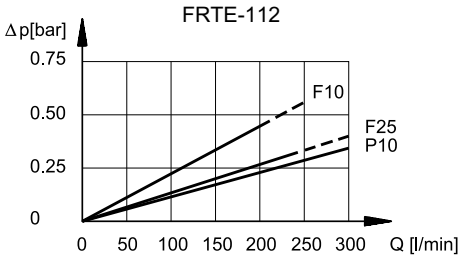
2.2 - Pressure drops through the FRTE filtering element

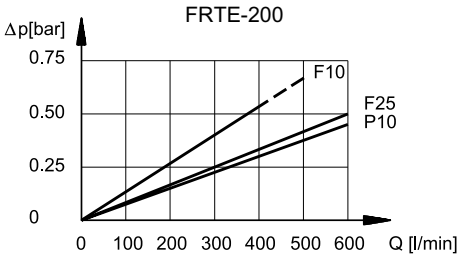












NOTE 2: the filter size has to be calculated so that with the nominal flow rate the pressure drop is lower than 0.5 bar.

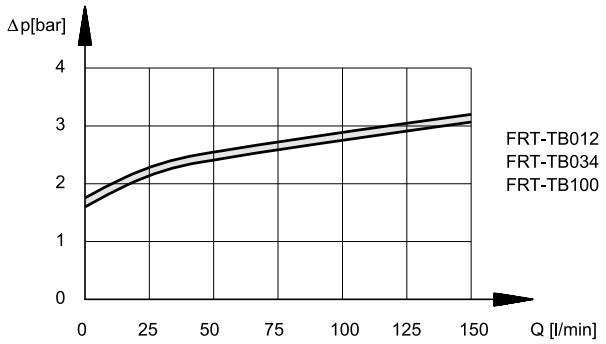
The total pressure drop through the filter is given by adding the body pressure drop values to those of the filter element. As for fluids whose viscosity degree at a specific operating pressure is different from 36 cSt, the filter total pressure drop has to be changed according to the following ratio:

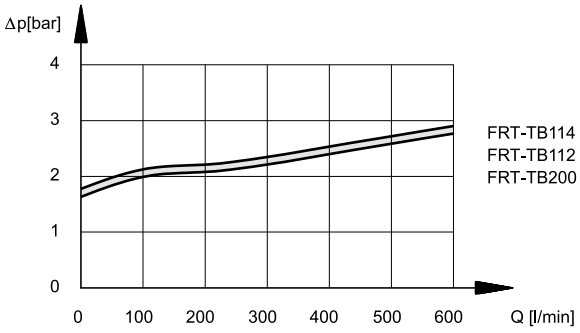
total Δp value = body Δp value + (real Δp value of the filter element x real viscosity value (cSt) / 36)

real Δp value of the filter element = value obtainable through the diagrams in par. 2.2

Such ratio is valid for a viscosity value up to 200 cSt. For a higher viscosity please consult our technical department.

2.3 - Pressure drops through the by-pass valve





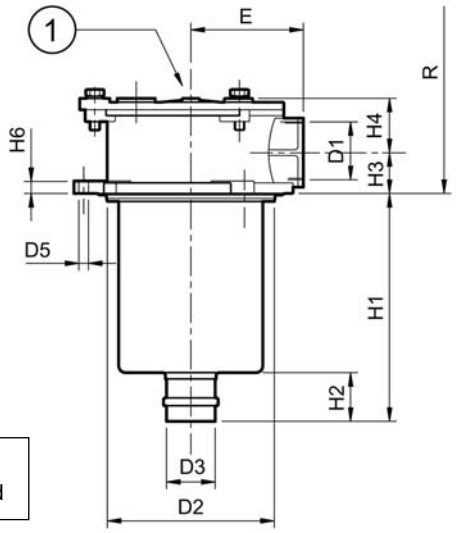
3 - HYDRAULIC FLUIDS

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals (code N). For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department. Using fluids at temperatures higher than 80 °C causes a faster degradation of the fluid and of the seals characteristics.

The fluid must be preserved in its physical and chemical characteristics.

4 - OVERALL AND MOUNTING DIMENSIONS

dimensions in mm

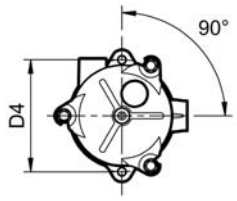


1	Clogging indicator port: 1/8” BSP usually plugged

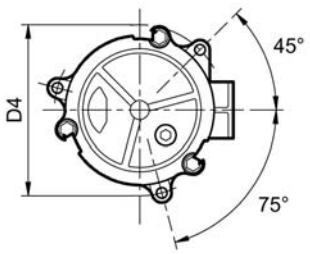
filter	D1	D2	D3	D4	D5	E	H1	H2	H3	H4	H6	R*
FRT - TB012	1/2”	67	24	90	6.5	50	80	20	22	33	9	120
FRT - TB034	3/4”	89	28	115	9	67	150	25	28	47	10	190
FRT - TB100	1”	89	40	115	9	67	234	30	28	47	10	270
FRT - TB114	1 ¼”	126	40	175	10.5	95	248	50	35	56	13	289
FRT - TB112	1 ½”	174	20	220	10.5	115	178	50	55	69	13	250
FRT - TB200	2”	174	63.5	220	10.5	115	285	50	55	69	13	355

R * = Filter element removal space starting from the tank surface

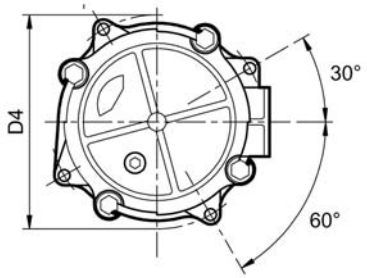
FRT - TB012
FRT - TB034
FRT - TB100



FRT - TB114



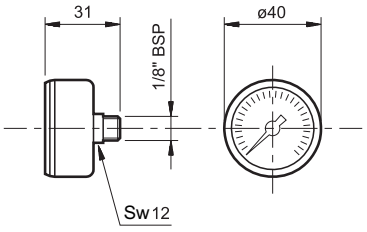
FRT - TB112
FRT - TB200



5 - CLOGGING INDICATORS

The filters are designed to incorporate clogging indicators, which have to be ordered separately.

5.1 - Visual indicator for return filters
Identification code: VR/10



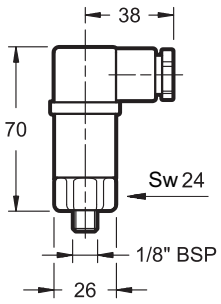
This indicator is a pressure gauge sensitive to the filter input pressure.

The indicator is supplied with a 0 ÷ 6 bar graduated scale and with a two-colour reading scale, which informs you about the clogging condition of the filter element:

GREEN: efficient filter element (0 ÷ 1.7 bar)

RED: the filter element has to be replaced (> 1.7 bar)

5.2 - Electric indicator for return filters
Identification code: ER/11



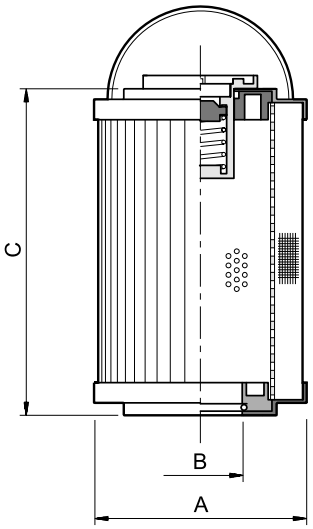
This indicator is a pressure switch sensitive to the filter input pressure, which switches an electrical contact when the filter element has reached the clogging limit.

The contact can be wired in an open or closed condition (see the hydraulic symbol).

TECHNICAL SPECIFICATIONS

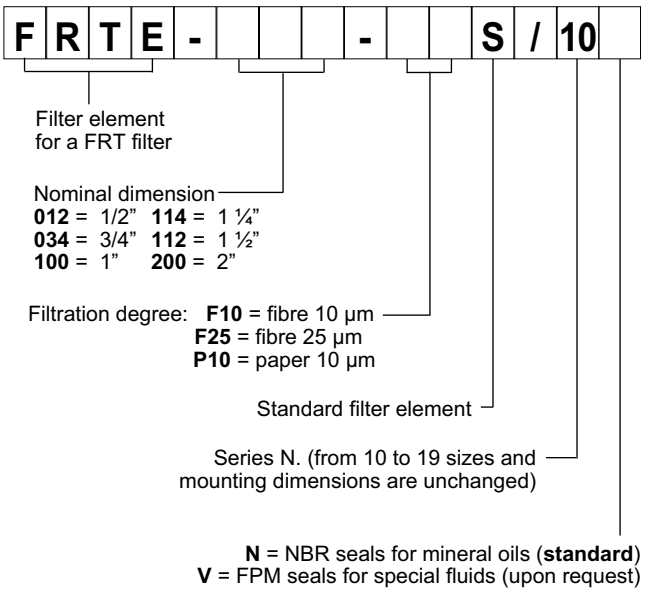
Operating pressure	bar	1,5
AC power supply		
Max. operating voltage	VAC	250 50/60 Hz
Max. load on the contacts (inductive or resistive) with V at 125 VAC with V at 250 VAC	A	 3 0,5
DC power supply		
Max. operating voltage	VDC	30
Max. load on the contacts resistive inductive	A	 3 1
Electric connector	DIN 43650	
Class of protection according to CEI EN 60529 (atmospheric agents)	IP65	
Atex classification	3 GD EEx e T6	

6 - FILTER ELEMENTS



Filter element code	ØA	ØB	C	Average filtering surface [cm²]	
				P10	F12/F25
FRTE - 012	52	24	70	310	380
FRTE - 034	70	28	130	1000	1600
FRTE - 100	70	40	210	1660	2670
FRTE - 114	99	40	211	3800	4280
FRTE - 112	130	51	140	4140	4360
FRTE - 200	130	63	251	7930	8350

FILTER ELEMENT IDENTIFICATION CODE



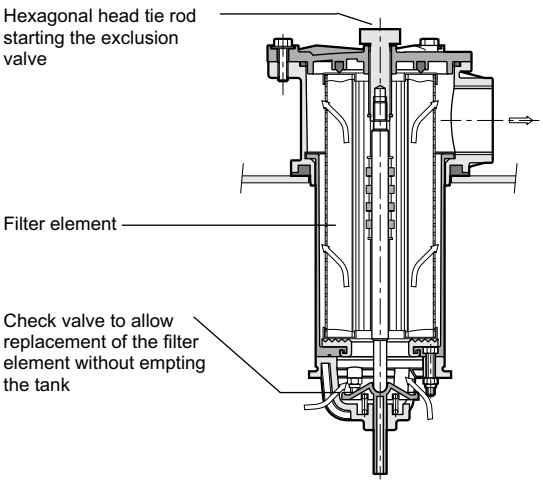
FST

SUCTION FILTER WITH SEALED FLANGE MOUNTING

SERIES 10

Q max (see performances table)

OPERATING PRINCIPLE



— FST filters are designed for sealed flange mounting.They are assembled directly on to the hydraulic power unit.

— They are aimed at protecting the pump from any possible gross contamination present inside the tank.

— The filter element is made of a metallic strainer with a 90 µm filtration degree, which grants a good pump protection without compromising the correct fluid flow. It can be easily replaced without empting the tank. See paragraph 6 for its identification code.

— The filters are designed with a SAE flange port with the exception of the smallest size, which uses a BSP threaded port.

— All the FST filters are designed to incorporate an electric or visual clogging indicator, to be ordered separately (see paragraph 5).

PERFORMANCES

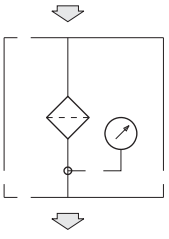
Filter code	port dimensions		Mass [kg]	Rated flow (indicative) [l/min]	Rated filtration degree [µm]
	BSP	SAE flange			
FST-TB114	1 ¼”	-	1,6	70	90
FST-FS212	-	2 ½”	3,0	100	
FST-FS300	-	3”	13,0	200	
FST-FS400	-	4”	16,0	300	

NOTE 1: the flow rates stated in the table correspond to a 0.02 bar pressure drop measured with mineral oil of viscosity 36 cSt at 50°C.
As for a different viscosity range, see NOTE 2 - paragraph 2.2.

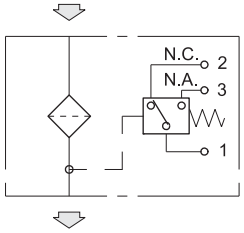
Collapsing differential pressure of the filter element	bar	1,0
Ambient temperature range	°C	-25 / +50
Fluid temperature range	°C	-25 / +110
Fluid viscosity range	cSt	10 ÷ 400

HYDRAULIC SYMBOL

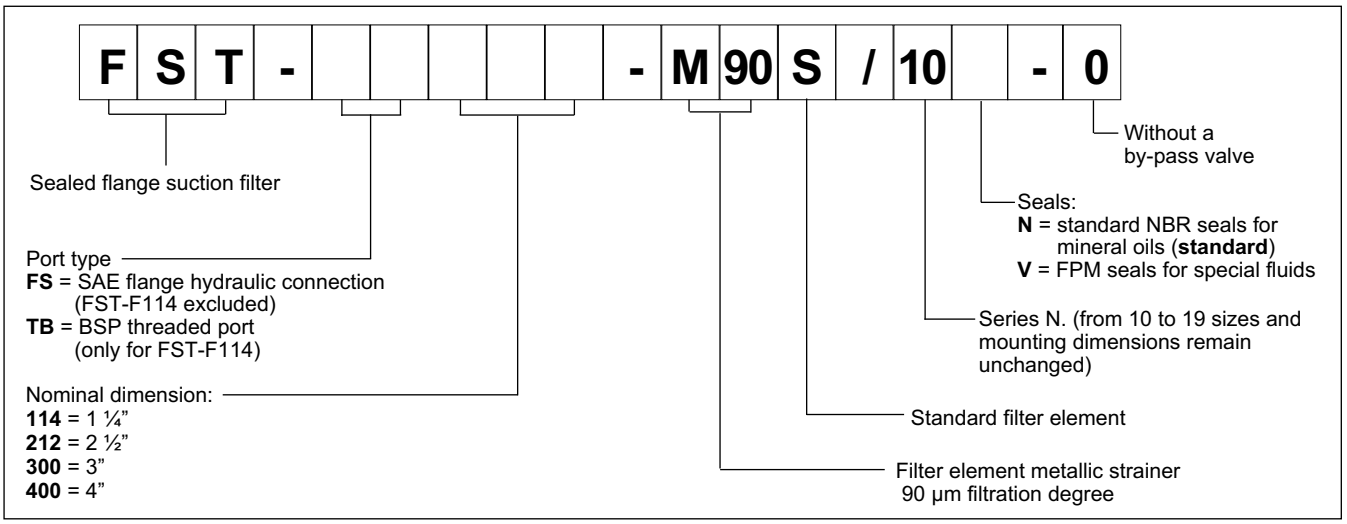
Filter with indicator VS type



Filter with indicator ES type

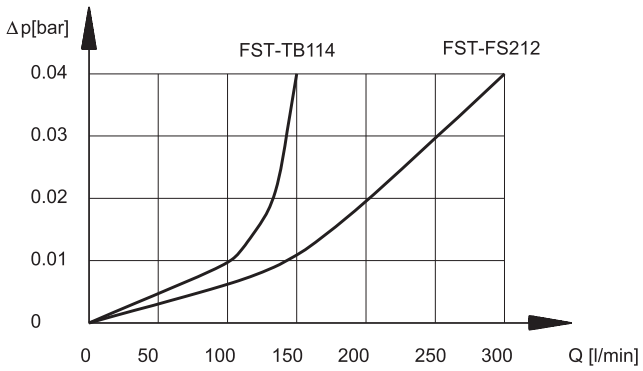


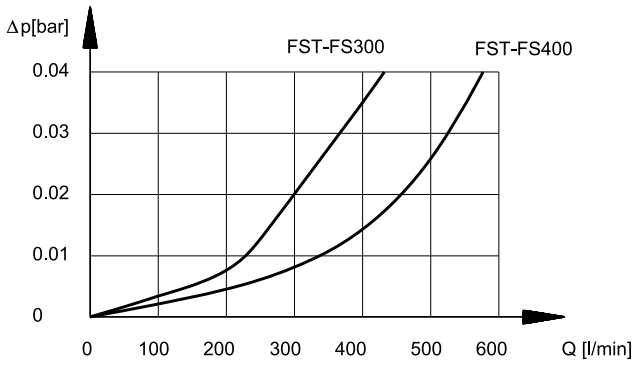
1 - IDENTIFICATION CODE



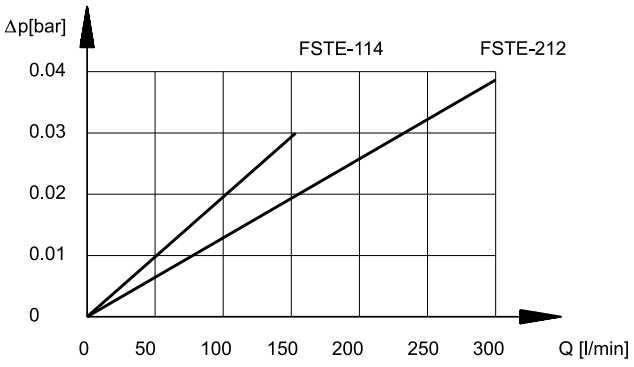
2 - CHARACTERISTIC CURVES (values measured with viscosity of 36 cSt at 50°C)

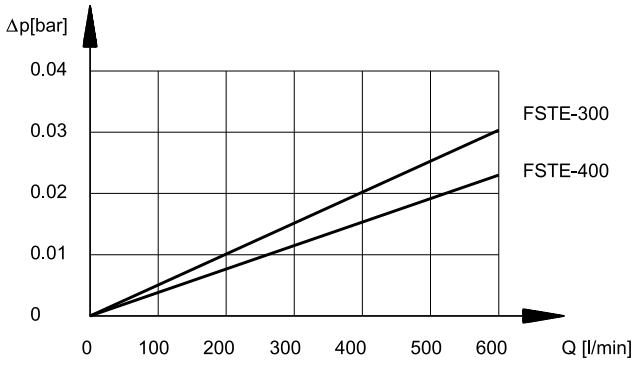
2.1 - Pressure drops through the filter body





2.2 - Pressure drops through the FSTE filter element





NOTE 2: the filter size has to be selected so that with the nominal flow rate the pressure drop is lower than 0,02 bar.

The total pressure drop through the filter is given by adding the body pressure drop values to those of the filter element.

As for fluids whose viscosity degree at a specific operating pressure is different from 36 cSt, the filter total pressure drop has to be changed according to the following ratio:

total Δpl value = body Δp value + (real Δp value of the filter element x real viscosity value (cSt) / 36)

real Δp value of the filter element = value obtainable through the diagrams in paragraph 2.2

Such ratio is valid for a viscosity value up to 200 cSt.

For a higher viscosity please consult our technical department.

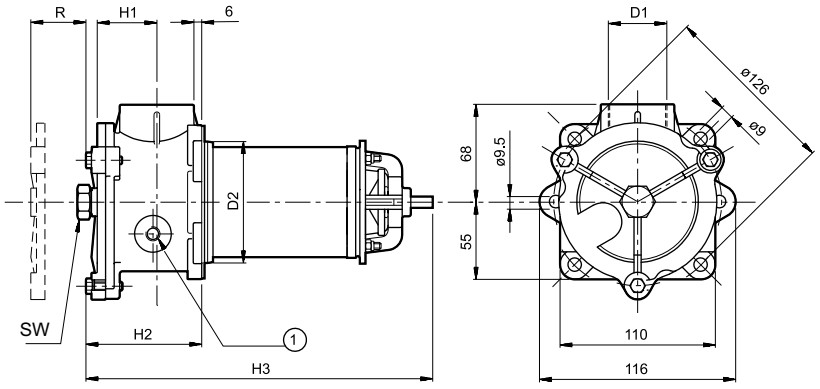
3 - HYDRAULIC FLUIDS

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department. Using fluids at temperatures higher than 80 °C causes a faster degradation of the fluid and of the seals characteristics.

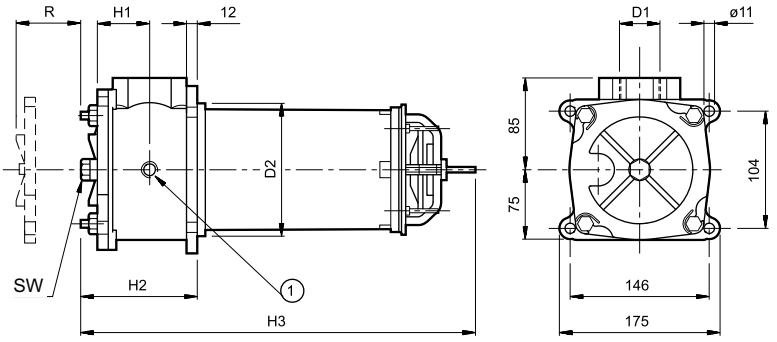
The fluid must be preserved in its physical and chemical characteristics.

4 - OVERALL AND MOUNTING DIMENSIONS

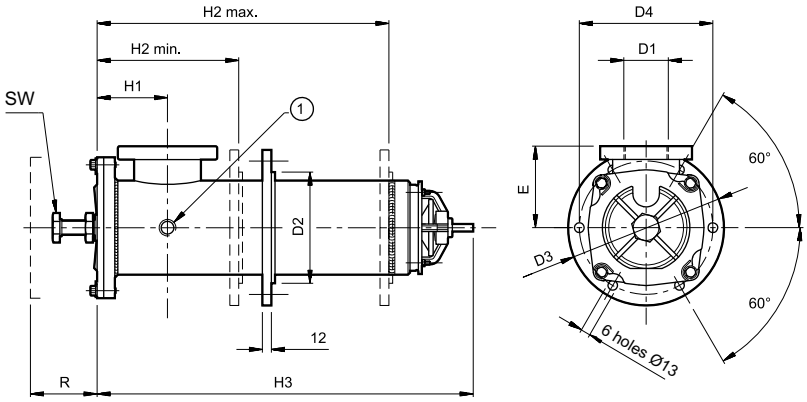
dimensions in mm



FST-TB114



FST-FS212



FST-FS300

FST-FS400

1	Clogging indicator port: 1/8” BSP usually plugged

Filter code	D1	D2 NOTE 3	D3	D4	E	H1	H2 NOTE 4	H3	R*	Ch
FST-TB114	1 ¼” BSP	86	-	-	-	42	80	275	250	22
FST-FS212	2 ½” SAE	130	-	-	-	66	120	322	300	22
FST-FS300	3” SAE	150	210	180	110	95	174÷355	480	500	32
FST-FS400	4” SAE	180	242	210	120	122	250÷405	470	500	32

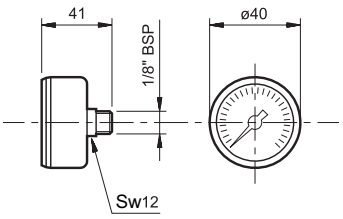
NOTE 3: tank hole = D2 + 1 (mm)
NOTE 4: for filters FSU-FS300 and FSU-FS400 the flange is not welded
R* = filter element removal space

5 - CLOGGING INDICATORS

The filters are designed to incorporate clogging indicators, which have to be ordered separately.

5.1 - Visual indicator for suction filters

Identification code: VS/10



This indicator is a vacuum gauge sensitive to the suction depression.

The indicator is supplied with a 0 ÷ -1 relative bar graduated scale and with a three-colour reading scale, which informs you about the clogging condition of the filter element:

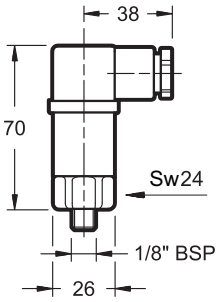
GREEN: efficient filter element (0 / -0.15 bar)

YELLOW: the filter element is wearing out (-0.15 / -0.25 bar)

RED: the filter element has to be replaced (> -0.25 bar)

5.2 - Electric indicator for suction filters

Identification code: ES/10



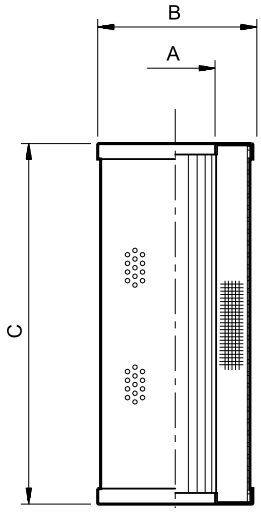
This indicator is a vacuum gauge sensitive to the suction depression, which operates by switching an electric contact when the filter element has reached the clogging limit.

The contact can be wired in an open or closed condition (see the hydraulic symbol).

TECHNICAL SPECIFICATIONS

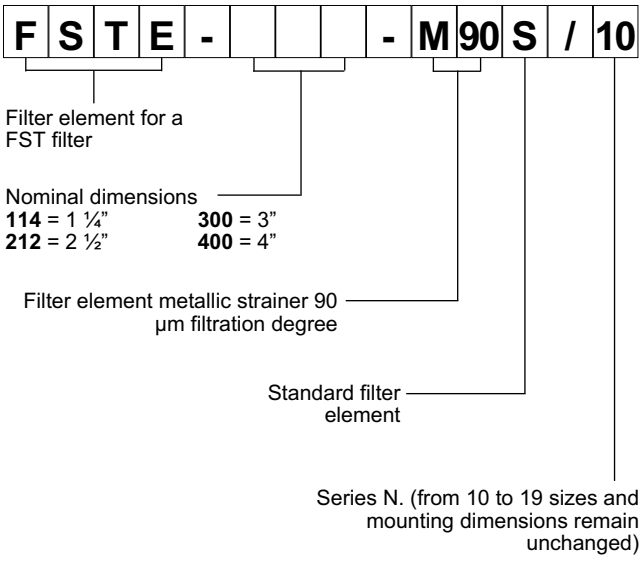
Operating pressure	bar	- 0,2
AC power supply		
Max. operating voltage	VAC	250 50/60 Hz
Max. load on the contacts (inductive or resistive) with V at 125 VAC with V at 250 VAC	A	 3 0,5
DC power supply		
Max. operating voltage	VDC	30
Max. load on the contacts resistive inductive	A	 3 1
Electric connector	DIN 43650	
Class of protection according to CEI EN 60529 (atmospheric agents)	IP65	
Atex classification	3 GD EEx e T6	

6 - FILTER ELEMENTS



Filter element code	ØA	ØB	C	Average filter surface [cm²]
FSTE - 114	29,5	70	163	1600
FSTE - 212	65	99	198	1845
FSTE - 300	65	99	375	3545
FSTE - 400	93	136	375	5065

FILTER ELEMENT IDENTIFICATION CODE



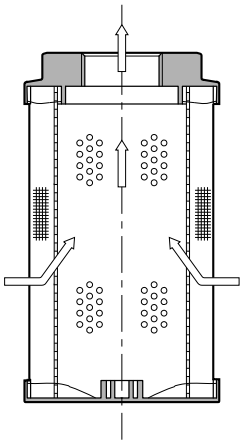
FSI

SUCTION FILTER FOR SUBMERGED MOUNTING

SERIES 10

Q max (see performance ratings table)

OPERATING PRINCIPLE



— FSI filters are filter elements which function being completely submerged in the tank. They are installed directly at the end of the pump suction line.

— They are aimed at protecting the pump from any possible gross contamination present inside the tank.

— The filter element is a metallic strainer with a 90 µm filtration degree, which grants a good pump protection without compromising the correct fluid supply.

— The filters are designed with a threaded BSP connection, available in the sizes from 3/8" to 3". They are supplied with a hexagonal shank, which allows the filter element to be connected by spanner to the pump suction line.

TECHNICAL SPECIFICATIONS

Filter code	BSP port dimensions	Rated flow [l/min] (**NOTE 1**)	Rated filtration degree [µm]
FSI-TB038	3/8"	9	90
FSI-TB012	1/2"	14	
FSI-TB034	3/4"	25	
FSI-TB100	1"	45	
FSI-TB114	1 ¼"	75	
FSI-TB112	1 ½"	100	
FSI-TB200	2 "	160	
FSI-TB212	2 ½"	250	
FSI-TB300	3"	350	

NOTE 1: The flow rates stated in the table correspond to a 0.02 bar pressure drop measured with mineral oil of viscosity 36 cSt at 50°C

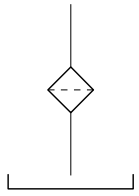
As for fluids whose viscosity degree at a specific operating pressure is different from 36 cSt, the real pressure drop has to be changed according to the following ratio:

$$\text{real } \Delta p \text{ value} = 0.02 \cdot \frac{\text{real Q}}{\text{table Q}} \cdot \frac{\text{real viscosity degree (cSt)}}{36}$$

The filter size has to be selected so that with the nominal flow rate the pressure drop is lower than 0.02 bar.

Collapsing differential pressure of the filter element	bar	1.0
Ambient temperature range	°C	–25 / +50
Fluid temperature range	°C	–25 / +110
Fluid viscosity range	cSt	10 ÷ 400

HYDRAULIC SYMBOL



1 - IDENTIFICATION CODE

F	S	I	-	T	B				-	M	90	S	/	10	-	0

Submerged suction filter

BSP threaded port

Nominal dimension:
038 = 3/8” **114** = 1¼”
012 = 1/2” **112** = 1½”
034 = 3/4” **200** = 2”
100 = 1” **212** = 2 ½”
300 = 3”

Without a by-pass valve

Series No. (from 10 to 19 sizes and mounting dimensions remain unchanged)

Standard filter element

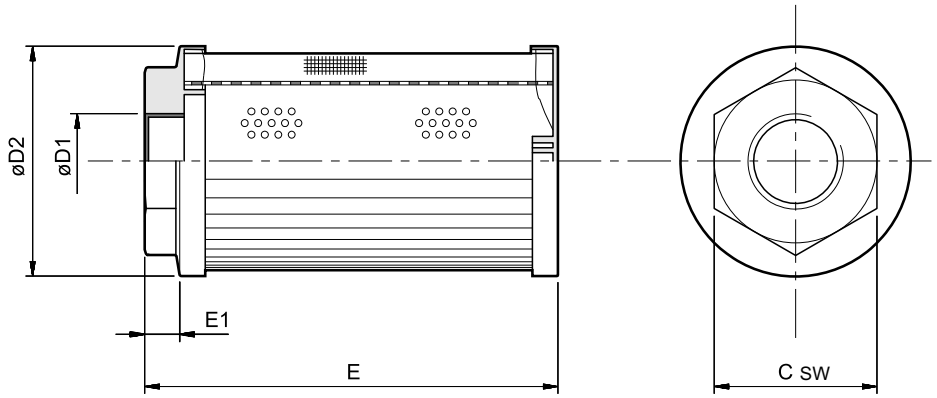
Filter element metallic strainer. 90 µm filtration degree

2 - HYDRAULIC FLUIDS

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. Using fluids at temperatures higher than 80 °C causes a faster degradation of the fluid and of the seals characteristics. The fluid must be preserved in its physical and chemical characteristics.

3 - OVERALL AND MOUNTING DIMENSIONS

dimensions in mm



D1	D2	E	E1	SW
3/8”	52	73	12	30
1/2”	70	92	13	42
3/4”	70	137	13	42
1”	70	137	13	42
1 ¼”	99	135	15	70
1½”	99	218	15	70
2”	130	201	15	70
2 ½”	130	253	15	101
3”	130	253	15	101

DUPLOMATIC OLEODINAMICA

DUPLOMATIC OLEODINAMICA S.p.A.
20015 PARABIAGO (MI) • Via M. Re Depaolini 24
Tel. +39 0331.895.111
Fax +39 0331.895.339
www.duplomatic.com • e-mail: sales.exp@duplomatic.com

PTH
PRESSURE TRANSMITTERS

p nom **40 - 100 - 250 - 400** bar

DESCRIPTION

This series of pressure transmitters has been designed in order to be used for the main industrial applications and on moving machines.

The main feature of this transmitter is to ensure its functioning also in harsh environements, especially for what concerns the fluid temperature range which can go from a minimum of - 40 °C up to a maximum of + 120 °C

The basis of this transmitter is the strain-gauge, which is powered by an electric circuit developed according to the SMT technology which ensures a high reliability and maximum resistance to vibrations and mechanical stress.

Every component into contact with the fluid is made of stainless steel and the pressure sensor is completely fluid-proof.

It's available with current output signal 4 ÷ 20 mA or with voltage output signal 0÷10 V. Versions also available upon request are 0÷5 V and 0.5÷4.5 V, ratiometric. They all are reverse polarity protected.

The protection class of the electrical connection for the version with DIN connector is IP65, while the version with the M12 connector has a protection class IP67.

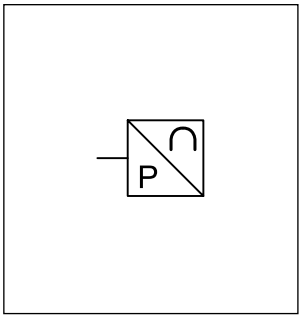
These transmitters are available in 4 different pressure ranges, from 40 to 400 bar.

TECHNICAL SPECIFICATIONS

Nominal pressure P_N	bar	**40**	**100**	**250**	**400**
Overpressure - max working pressure	x P_N	x 3	x 3	x 3	x 2.5
Burst pressure	x P_N	x 7	x 5	x 4	x 5

Accuracy typical at 25 °C		% P_N	± 0,5
Output signal :	current voltage	mA V	4 ÷ 20 0÷10, 0÷5, 0.5÷4.5
Sensor temperature range:		°C	-40 / +120
Ambient and fluid temperature range: sealing in	FPM (standard) NBR EPDM	°C	-20 / +120 -25 / +100 -40 / +125
Rise time (10%…90% of P_N)		ms	1
Hydraulic connection			1/4" BSP with seal
Housing and pressure connection			AISI 304
Mass		g	50

HYDRAULIC SYMBOL



1 - IDENTIFICATION CODE

P	T	H	-		/			-		

Pressure transmitter

High dynamic performance

Nominal pressure
040 = 40 bar **250** = 250 bar
100 = 100 bar **400** = 400 bar
(other pressure values are available upon request)

Series N.
30 = transmitters with electrical connection type K10
31 = transmitters with electrical connection type K12
(the overall and mounting dimensions remain unchanged from 30 to 39)

Seals:
V = FPM seals for special fluids (**standard**)
N = NBR seals for mineral oil
EP = EPDM seals

WARNING! The EPDM is not suitable for use with mineral oil. Verify the compatibility of EPDM with the used fluid!

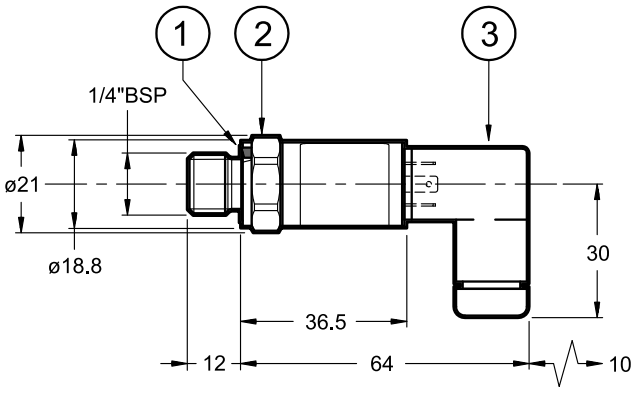
Analogue output signal (**standard**)
E0 = 0 ÷ 10 V
E1 = 4 ÷ 20 mA
upon request only:
E2 = 0 ÷ 5 V
E5 = 0.5 ÷ 4.5 V ratiometric

Electrical connection
K10 = Reduced electrical connector type DIN 43650
K12 = Electrical connector M12 - 4 pin

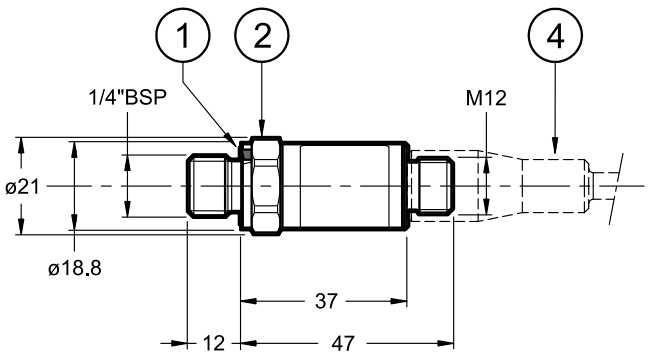
2 - OVERALL AND MOUNTING DIMENSIONS

dimensions in mm

PTH-*/30*- * K10



PTH-*/31*- * K12



1	Integral seal type DIN 3869
2	Key: spanner 19 Tightening torque: 25 Nm
3	Electrical connector EN 17301-803 (ex DIN 43650) Micro C - PG7 **Included in delivery**
4	Electrical connector 5 pin EC5S/M12L/10 (**to be ordered separately**) code 3491001001 IP67 - PG7

3 - TECHNICAL CHARACTERISTICS

Electrical data

		E0	E1	E2	E5
Output signal		0 ÷ 10 V	4 ÷ 20 mA	0 ÷ 5 V	0.5 ÷ 4.5 V ratiometric
Supply voltage	V CC	24 (15 ÷ 32)	24 (9 ÷ 32)	24 (9 ÷ 32)	5 (4.75 ÷ 5.25)
Max current consumption	mA	≤ 15	-	≤ 20	≤ 10
Load resistance	kΩ	≥ 5.0	see par. 4.2	≥ 5.0	≥ 5.0

Accuracy

Accuracy (typical at 25 °C)	% P_N	± 0.5
TEB Total error band (-25…+85 °C)	% P_N	± 1.75
NLH Non linearity and hysteresis (at 25 °C)	% P_N	± 0.2
TC Temperature coefficient	% P_N	± 0.03
Stability after 1 million cycles	% P_N	± 0.2

Environmental conditions

Electromagnetic compatibility (EMC): according to 2014/30/EU		Immunity 61000-6-2 Emissions 61000-6-4
Vibrations		50 G / 11 ms
Class protection according to EN 60529 with connector proprerly installed.	K10 K12	IP65 IP67

4 - TRANSMITTERS SUPPLY

4.1 - Versions in voltage (E0, E2, E5 ratiometric)

These transmitters are equipped with voltage stabilizer which supplies the electric circuit with constant voltage, independently from power supply voltage.

We recommend a stabilized power supply voltage, within proper ranges as in table at par. 3 .

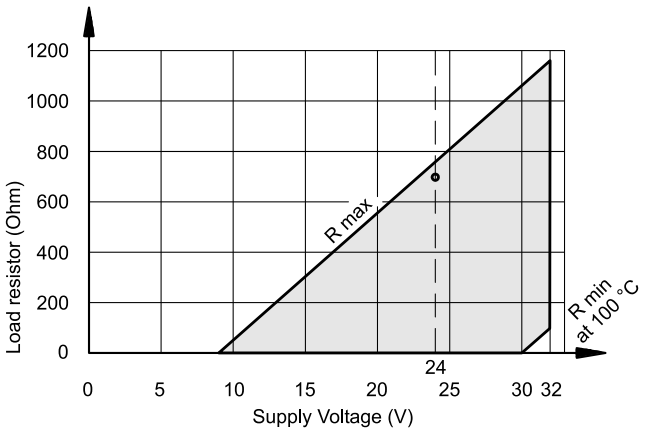
4.2 - Version in current 4 ÷ 20 mA (E1)

The transmitter works properly within an operating area (see diagram) that depends on both the voltage supply value and the external load resistance used to convert the signal.

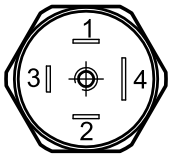
Is recommended to choose values close to the limit Rmax, in order to have a wide signal easier to read.

We suggest supply voltage of 24 VDC and a load resistance of 700 Ohm

min./max resistor vs. supply voltage E1 version
with Pmax = 100%

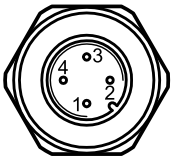


5 - ELECTRIC CONNECTIONS



K10

Connection DIN 43650 reduced
3 pin + GND

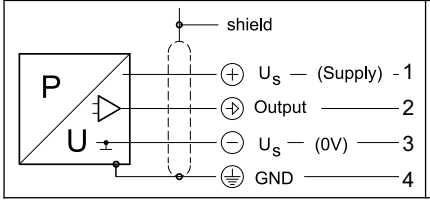


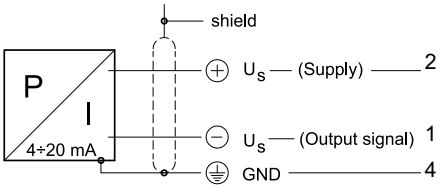
K12

Connection M12x1
4 pin

WARNING! Check that the connection cables are suitable for the temperature range intended for use of the device.

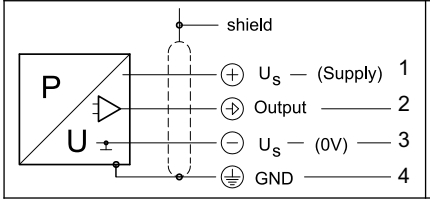
6 - WIRING DIAGRAMS - K10 CONNECTION

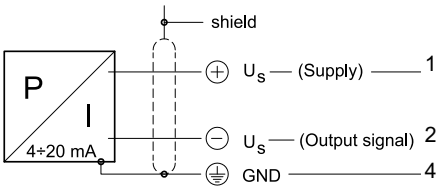
voltage output - 3 wires + GND	Version		
	E0	**E2**	**E5**
	24 V 0÷10 V 0 V GND	24 V 0÷5 V 0 V GND	5 V 0.5÷4.5 V 0 V GND

current output - 2 wires + GND	Vers.
	E1
	24 V 4 ÷ 20 mA GND

WARNING! The pin assignment for the transducer PTH - */30*- E0K10 (DIN 43650 connection) differs from that of the previous series!

7 - WIRING DIAGRAMS - K12 CONNECTION

voltage output - 3 wires + GND	Version		
	E0	**E2**	**E5**
	24 V 0÷10 V 0 V GND	24 V 0÷5 V 0 V GND	5 V 0.5÷4.5 V 0 V GND

current output - 2 wires + GND	Vers.
	E1
	24 V 4 ÷ 20 mA GND

WARNING! The pin assignment for the transducer PTH - */31*- E*K12 (M12 - 4 pin connection) differs from that of the previous series!